Environmental Impact Assessment Report

Volume 1

Waterfront South Central SHD

North Wall Quay, Dublin 1

TOM PHILLIPS + ASSOCIATES
PLANNING FOR THE FUTURE

Prepared For:
Waterside Block 9 Developments Limited

Prepared By:
Tom Phillips + Associates

In Association With:
Environmental Resource Manament
CS Consulting
Axiseng
Irish Archaeological Consultancy
Henry J. Lyons

January 2021

Waterfront South Central – SHD Proposal – EIAR Vol. 1

Table of Contents:

1.0 INTRODUCTION

1.1 Outline Details

This *Environmental Impact Assessment Report* (EIAR) relates to a Strategic Housing Development (SHD) Planning Application by Waterside Block 9 Developments Limited[1] (referred to as the Applicant throughout) in relation to a proposed primarily residential development on lands at City Block 9, North Wall Quay, Dublin 1.

Figure 1.1: Aerial photo showing the indicative boundary of the Subject Site outlined in red. (Source: Bing Maps, cropped and annotated by TPA, January 2021.)

The application site has an area of approximately 1.1 hectares (2.72 acres), and is bounded by North Wall Quay to the south, North Wall Avenue to the east, Mayor Street Upper to the north and the residential City Block 9 lands fronting Castleforbes Road to the west, within the SDZ Planning Scheme for the North Lotts and Grand Canal Dock.

The site was previously used as warehousing / industrial use. These warehouses have since been demolished, as permitted by Reg. Ref. DSDZ2242/16 (see Section 2.2 of this EIAR), and the site is currently vacant.

In summary, the proposed development will comprise the construction of a primarily residential development of 125,388 sq m GFA (including 22,499 sq m at basement levels relating to ancillary car parking, bicycle parking, plant, waste storage and ancillary facilities).

The project will comprise:

1. Construction of 1,005 No. residential units (with balconies and winter gardens on all elevations) arranged in 3 No. blocks ranging in height from 8 No. storeys to 45 No. storeys

[1] Units 15/16 The Courtyard, Carmanhall Road, Sandyford, Dublin 18, D18 YD27.

over a triple-level basement (including mezzanine plant level), the former comprising: Block A (8-14 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 116 No. 1-bed; and 92 No. 2-bed; with landscaped terraces at Level 1 (south east elevation), Level 8 (south west elevation), Level 11 (south west elevation) and Level 14 (roof level)); Block B (8-41 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 172 No. 1-bed; and 247 No. 2-bed; with landscaped terraces at Level 5 (south west elevation), Level 8 (north west elevation and south west elevation), Level 11 (north elevation), Level 12 (west elevation), Level 13 (east elevation), Level 14 (east elevation), and at Level 41 (roof level)); and Block C (11-45 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 207 No. 1-bed; 168 No. 2-bed; and 3 No. 3-bed units; with landscaped terraces at Level 11 (north elevation), Level 24 (south, west and east elevation), Level 32 (south, west and east elevation), and Level 45 (roof level), incorporating a public viewing deck at Levels 44 and 45).

2. Provision of ancillary residential amenities and support facilities including: a residential study area (321 sq m), a gym/spa reception (52 sq m), a residents' games room (91 sq m), a residents' common room (110 sq m), a residents-only social space (193 sq m), a management office (96 sq m), a security office (50 sq m), concierge spaces (GFA of 369 sq m) all located at ground floor level; a residents' games room (122 sq m) located at Level 1 of Block B; a residents' common room (86 sq m) located at Level 14 of Block B; a residents' wellness club and common room (408 sq m) located at Level 24 of Block C;

3. Construction of a triple level basement, comprising two levels of basement and a mezzanine plant level (total basement area 22,499 sq m), accommodating: waste storage areas (659 sq m), plant rooms (4,228 sq m), maintenance / management offices (GFA of 92 sq m), residents' courier / parcel rooms (GFA of 210 sq m), residents' laundry rooms (GFA of 138 sq m), ancillary residential storage (GFA of 291 sq m), residents' WCs (65 sq m), a residents' gym / spa (1,529 sq m) and ancillary gym storage room (100 sq m), residents' screening rooms (240 sq m), a residents' indoor plant cultivation room (356 sq m), 176 No. car parking spaces, 10 No. motorcycle parking spaces and 1,693 No. bicycle parking spaces, with vehicular access provided by ramp from North Wall Avenue.

4. Provision of 4,307 sq m of "other uses" as defined by the *Planning and Development (Housing) and Residential Tenancies Act 2016,* comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmers' Market/foodhall (299 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Levels 41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C.

5. Provision of 84 No. surface-level bicycle parking spaces, a pocket park, an external market area, a winter garden/seating area, and new pedestrian lanes from North Wall Quay, North Wall Avenue and Mayor Street Upper to the centre of the site.

6. All enabling and site development works, landscaping (including living walls), lighting, services and connections, waste management, interim site hoarding, and all other ancillary works above and below ground including the use of existing secant piling permitted under Reg. Ref. DSDZ3779/17 and DSDZ3780/17 (as amended by DSDZ3042/19).

The proposed development constitutes "the Project" for the purposes of EIA, and is set out in more detail in Chapter 3.0 below.

A Non-Technical Summary of the EIAR is also being submitted with this application.

1.2 EIA Process

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

EIA forms part of the planning consent process and is carried out by the Competent Authority. An EIAR is prepared by / on behalf of a Developer in respect of a project seeking planning consent. The EIAR thus becomes an integral informing element in the Competent Authority's EIA.

The 2014 Directive has introduced strict new requirements in respect of the competency of experts responsible for the preparation of the EIAR (see Appendix 1.A1 of this Chapter). below for details on the experts involved in the preparation of this document).

The EIA process may be summarised as follows:

1. Screening – Is EIA required?

2. Scoping – If EIA is required, what aspects of the Environment should be considered?

3. Preparation of EIAR.

4. EIAR informs EIA (as part of the consent process).

Figure 1.2 below illustrates where the EIAR fits within the EIA Process.

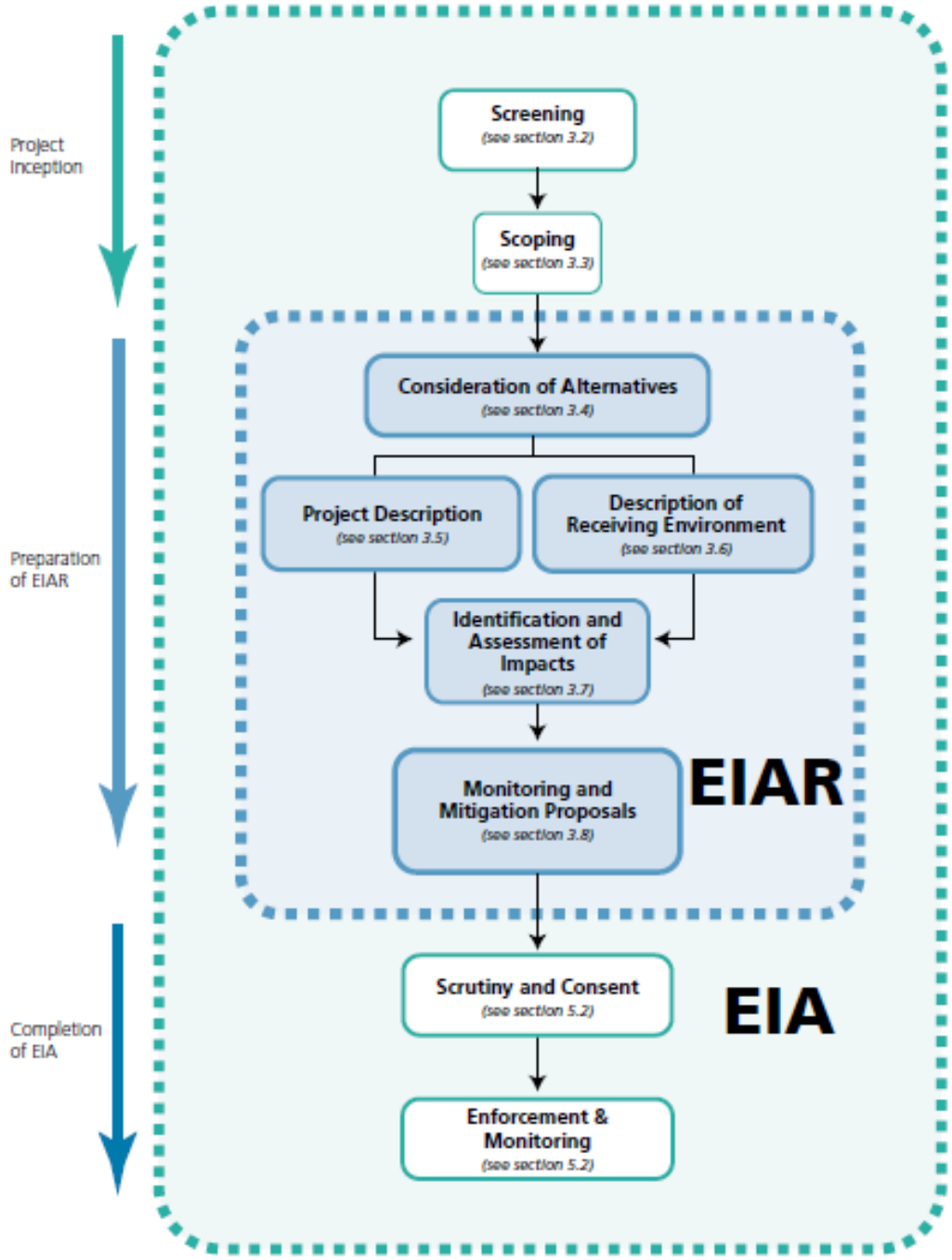


Figure 1.2: Flow chart illustrating the EIA Process. (Source: *Guidelines on the information to be contained in Environmental Impact Assessment Reports*, 2017, EPA; Figure 2.2.)

1.3 Need for EIAR – Class 10(b)(i)

The transposition of the EIA Directive into Irish Planning Codes was completed on 1 September 2018. Section 172(1) of the *Planning and Development Act 2000* (as amended) sets out the requirement for EIA. The subject project has been screened for EIA in accordance with this code (namely the *European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018*).

The EIA Directives list those projects for which an EIA is mandatory (Annex I) and those projects for which an EIA may be required (Annex II).

Annex I projects are listed in Part 1 of Schedule 5 of the *Planning and Development Regulations 2001-2020* ("the Regulations").

The Project is not listed within Part 1 of Schedule 5 of the Regulations and therefore mandatory EIA is not required under Annex 1.

With respect to Part 2 of Schedule 5 (Annex II) Projects, the relevant thresholds relating to the subject proposal are outlined below:

1. Class 10(b)(i)

"Construction of more than 500 dwelling units."

This Project comprises a residential development including the provision of 1,005 No. residential dwelling units. Therefore, the Project exceeds the stated threshold and an EIA is required in the context of this Class of the Regulations.

2. Class 10(b)(ii):

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

The Project includes a total of 176 No. car parking spaces, which serve the proposed development. However, as the spaces provided are ancillary to the primary residential use of the development, it is considered that they do not fall within this Class of Regulations.

3. Class 10(b)(iv):

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

The Project relates to a site which extends to 1.1 ha in a business district. As such, it is considered that the proposed development does not fall within this Class of Regulations.

1.4 Purpose of the Environmental Impact Assessment Report

As noted, the 2014 Directive has redefined EIA as a process, whereby an "Environmental Impact Assessment Report" is a key informing element (this replaces the previous "Environmental Impact Statement" – EIS).

An EIAR's purpose is to predict and assess likely significant effects (direct and indirect) on the environment arising from the proposed development. It is used during the consent process to inform EIA.

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

- Description of Project;
- Description of Baseline Scenario;
- Description of Likely Significant Effects;
- Description of Avoidance / Mitigation Measures;
- Description of Reasonable Alternatives (and rationale for chosen option); and
- A Non-Technical Summary.

Annex IV of the Directive sets out a more detailed outline of the information required in an EIAR. The subject EIAR has been prepared in full accordance with these stated requirements of Annex IV.

Tom Phillips + Associates Town Planning Consultants[2] co-ordinated the preparation of the *Environmental Impact Assessment Report* in association with other members of the Project Team as identified in Table 1.2 below. Details in respect of the competence of the various experts is set out in Appendix 1.1.

1.5 Scoping of the Environmental Impact Assessment

An informal EIA Scoping Report was undertaken by following the *Environmental Impact Assessment of Projects: Guidance on Scoping* with respect to the proposed development (European Commission, 2017).

The purpose of the EIA Scoping exercise was to inform consultees of the proposed development, having regard to the extent of information to be contained within the EIAR for the project.

The scope of the EIAR has been prepared in consultation with the respective specialists within the EIA team. The Report set out a detailed justification relating to the environmental aspects to be considered in detail in the EIAR for the proposed development on the basis of the potential for significant effects. The Report also related to the construction and operational phases of the proposed development.

Table 1.1 below outlines the environmental aspects covered in this EIAR and the justification for why they have been included in respect to the EIA Scoping carried out by TPA in December 2019.

[2] Tom Phillips + Associates, Town Planning Consultants, 80 Harcourt Street, Dublin 2, D02 F449.

Environmental Aspect	Detailed Assessment	Justification
Archaeological, Architectural and Cultural Heritage	Yes	The site is not identified as being in an area with any relevant Archaeological Conservation Area – however, its southern extent falls within a Conservation Area as defined by DCC. Given the extent of works proposed and the location of the site, an assessment is considered appropriate. The archaeological, architectural and cultural assessment will provide an assessment of the archaeological, architectural and cultural heritage potential within, and in the vicinity of the extent of the proposed development.
Population and Human Health	Yes	The proposed development may impact on population and human health, employment, local community and amenity uses, during the construction and operational phases.
Biodiversity	Yes	The subject site is brownfield in nature with no existing buildings or structures *in situ*. As the proposed development includes multi-storey buildings, the ecological impact assessment will also consider the overflying of the site by birds and bats. In addition to the ecological impact assessment, a Natura Impact Statement (NIS) will be carried out and submitted with the final Application as part of the four-stage Appropriate Assessment (AA) process as it cannot be excluded, on the basis of the Stage 1 screening process, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.
Land and Soils (Geology and Hydrogeology)	Yes	Impacts on geology and hydrogeology will be assessed in terms of the construction, operational and decommissioning phase of the proposed development. This will include geo-technical and environmental site investigation. Potential cumulative impacts with other projects will also be assessed.
Landscape and Visual Impact Assessment	Yes	Given the height and scale of the buildings proposed, the LVIA will consider effects on the landscape character of the existing setting (i.e. as a result of the construction and existence of the proposed development) and visual impacts (i.e. the extent to which the proposed development can be seen).
Air Quality and Climatic Factors	Yes	Construction and operational phases will have the potential to give rise to air quality impacts, principally relating to traffic associated with the proposed development. A baseline air quality assessment will be undertaken, with reference to EPA monitoring data which is representative of the current location which lies in Zone

		A (Dublin) of the 4 No. Air Quality Monitoring Zones (A-D) in Ireland.
Noise and Vibration	Yes	Construction and operational phases will have the potential to give rise to impacts relating to noise and vibration. A baseline noise survey will be undertaken to determine the prevailing noise level representative of the site and nearest noise sensitive locations. Noise monitoring will be installed on site at secure locations. In addition, an attended day survey will be conducted on a cyclical basis at locations representative of the nearest noise sensitive locations and development facades.
Material Assets – Waste	Yes	The proposed development may generate waste arisings that will require management during construction and operation.
Material Assets – Traffic and Transportation	Yes	The transportation chapter of the EIAR will present an assessment of the potential traffic and transport impacts of the proposed development at City Block 9, North Wall Quay, Dublin 1. The assessment will be influenced by the requirements set out within *Traffic and Transport Assessment Guidelines* TII, 2017.
Material Assets – Site Services	Yes	The Material Assets' section of the EIAR will examine the likely significant effects of the construction and operation of the proposed development on intrinsic and valuable assets of material value.
Water	Yes	The proposed development has the potential to impact on water (including flood risk, hydrology and drainage) as there will be ground disturbance associated with the proposed development.
Major Accidents and Disasters	No	The subject site is located in close proximity to Dublin Port which contains a number of Seveso III sites. A review of the consultation distances for each Upper Tier and Lower Tier Seveso III site indicates that the subject site is not located within same. As a result, there is no requirement for a Major Accidents and Disasters Chapter in this EIAR.
Interactions	Yes	There is the potential for multiple direct or indirect effects (from various environmental aspects) to result in an accumulation or magnified effects from the proposed development.
Cumulative Impacts	Yes	The proposed development will be in proximity to other developments permitted and proposed developments and thus has the potential to exacerbate or create larger, more significant effects. The EIAR will assess the impact *inter alia* of the proposed commercial development of the remainder of City Block 9 (which does not form part of this Application, but which is being lodged concurrently with Dublin City Council.) (See Figure 1.2.)

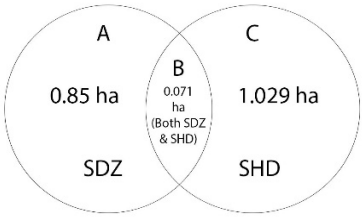
		 SDZ Site = 0.921 ha (0.85 ha + 0.071 ha) / A+B SHD Site = 1.1 ha (1.029 + 0.071 ha) / C+B **Figure 1.3:** Venn diagram illustrating concurrent commercial scheme to the west of the SHD scheme with a shared area of some 0.071 ha. (Source: TPA, January 2021.)
Daylight and Sunlight	Yes	The proposed development has the potential to impact on Daylight and Sunlight considerations at neighbouring properties, due to the scale of the multi-storey buildings proposed.
Wind	Yes	A Wind Assessment for the proposed development will be undertaken. The aim of the analysis will be to record and analyse the effect of the geometry, height and massing of the proposed development and existing surroundings on local wind speed and direction and its impact on pedestrian comfort and safety.

Table 1.1: Scoping of EIAR chapters as per EIAR Scoping Report prepared by TPA (dated 10th December 2019) and enclosed with Pre-Application Consultation Request submitted to An Bord Pleanála on 11th December 2019.

All matters raised have been addressed within this EIAR and appropriate mitigation measures identified where necessary.

1.6 EIAR Methodology and Format

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

- *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, August 2017);
- *Advice Notes for Preparing Environmental Impact Statements,* Draft, (EPA September 2015);
- *Environmental Impact Assessment of Projects: Guidance on Screening* (European Commission, 2017);
- *Environmental Impact Assessment of Projects: Guidance on Scoping* (European Commission, 2017);
- *Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report* (European Commission, 2017); and

- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment,* (Department of Housing, Local Government and Heritage, August 2018).

Environmental Impact Assessment Reports require the assimilation, co-ordination and presentation of a wide range of relevant information in order to allow for the overall assessment of a proposed development. To allow for ease of presentation, and consistency when considering the various environmental factors considered, a systematic structure is used for the main body of the Report.

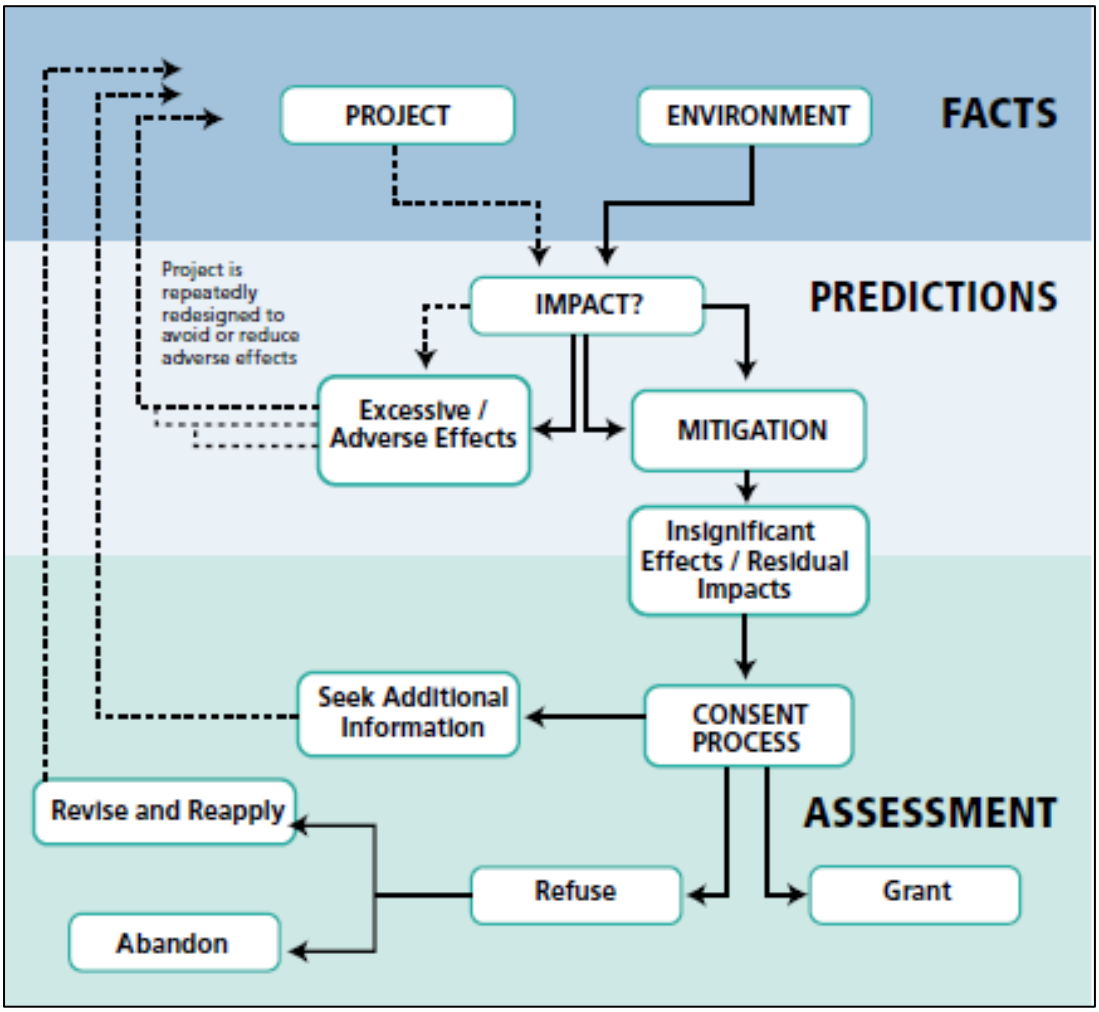


Figure 1.4: Flow chart illustrating the key stages in the preparation of an EIAR. (Source: *Guidelines on the information to be contained in Environmental Impact Assessment Reports*, 2017, EPA; Figure 2.1.)

The structure of the EIAR is outlined below.

Chapter	Aspects of the Environment Considered	Contributor
Chapter 1	Introduction & Methodology	Tom Phillips + Associates (TPA)
Chapter 2	Site Location & Context (incl. Receiving Environment)	TPA
Chapter 3	Description of Development / Proposed Project	TPA / Henry J Lyons (HJL)
Chapter 4	Key Alternatives Considered	TPA / HJL
Chapter 5	Population and Human Health	TPA
Chapter 6	Biodiversity	ERM
Chapter 7	Land and Soils	ERM
Chapter 8	Hydrology	Cronin Sutton (CS)
Chapter 9	Air and Climate	ERM
Chapter 10	Noise and Vibration	ERM
Chapter 11	Material Assets – Waste (Construction & Demolition)	CS
Chapter 12	Material Assets – Road & Traffic	CS
Chapter 13	Material Assets – Site Services (incl. Energy Demand)	Axiseng and CS
Chapter 14	Cultural Heritage (incl. Archaeology)	Irish Archaeology Consultants (IAC)
Chapter 15	Interactions	TPA
Chapter 16	Mitigation	TPA
Chapter 17	Difficulties Encountered	TPA
Volume 2	Heritage, Townscape and Landscape Visual Impact Assessment	City Designer
Non-Technical Summary	All Aspects of outlined in EIAR Volume 1 & 2	All contributors outlined above

Table 1.2: EIAR Chapter Headings and Contributors

1.6.1 Receiving Environment (Baseline Situation)

A description of the current state of the environment related to the subject site, and a description of its likely evolution in the event that the Project is not implemented.

1.6.2 Characteristics of the Proposed Development

A description of the location, nature and extent of the project along with its construction and operational characteristics. The description includes estimates of any residues, emissions, or waste produced during the construction and operational stages.

1.6.3 Environmental Factors Affected

A list of the environmental factors impacted by the Project.

1.6.4 Likely Impact of the Proposed Development and Remedial and Mitigation Measures

This section allows for a description of the direct and indirect impacts that the proposed development is likely to have on aspects of the environment affected. This is done with reference to both the *Receiving Environment* and *Characteristics of the Proposed Development* sections, while also referring to the magnitude, duration, consequences (including use of natural resources) and significance of any impact.

1.6.5 Assessment of Alternatives

This part of the EIAR describes the reasonable alternatives considered and provides a rationale for the chosen Option. An example of an alternative considered is the North Wall Tower designed by London Architects Zaha Hadid, which is outlined in more detail in Chapter 4 of this EIAR.

1.6.6 Avoidance, Mitigation or Compensation Measures

This section provides a description of the measures envisaged to prevent, reduce and (where possible) offset any significant adverse effects on the environment that are practicable or reasonable, having regard to the potential impacts.

1.6.7 Monitoring

This section outlines monitoring measures (for both construction and operational stages), where appropriate, in cases where significant adverse impacts have been identified.

1.6.8 Non-Technical Summary

As per the requirements of the Directive, the Non-Technical Summary (NTS) comprises an easily accessible summary of the EIAR, using non-technical language. It is formulated to be understandable to those without a prior background to the project or particular environmental expertise.

1.6.9 EIAR Study Team and Guarantee of Competency and Independence

The *Environmental Impact Assessment Report* was completed by a project team led by Tom Phillips + Associates, who also prepared a number of the chapters.

In accordance with EIA Directive 2014/52/EU, we confirm that the experts involved in the preparation of this EIAR are fully qualified and competent in their respective fields. Each has extensive proven expertise in the relevant field concerned, thus ensuring that the information provided herein is complete and of high quality.

The members of the team and their respective inputs and competency of the EIAR contributors to the EIAR detailed in Appendix 1.A.1.

1.7 The Developer

The development is proposed by the Applicant, Waterside Block 9 Developments Limited (incorporated and registered in Ireland), the registered office of which is Units 15/16 The Courtyard, Carmanhall Road, Sandyford, Dublin 18, D18 YD27. (See footnote 1.)

APPENDIX 1A: COMPETENCIES OF EIAR CONTRIBUTORS

1.A1 EIAR Team - Roles and Responsibilities Including Qualifications

Chapter Number	Chapter Title	Company Name	Person Responsible
Chapter 1	Introduction & Methodology	Tom Phillips + Associates (TPA)	Tom Phillips
Chapter 2	Site Location & Context (incl. Receiving Environment)	TPA	Tom Phillips
Chapter 3	Description of Development / Proposed Project	TPA	Tom Phillips
		Henry J Lyons (HJL)	Orlaith Swords
Chapter 4	Key Alternatives Considered	TPA	Tom Phillips
		HJL	Orlaith Swords
Chapter 5	Population and Human Health	TPA	Tom Phillips
Chapter 6	Biodiversity	Environmental Resources Management (ERM)	Diane Corfe Bethan Cainey
Chapter 7	Land and Soils	ERM	Peter Rodgers
Chapter 8	Hydrology	CS Consulting Group (CS)	Robert Fitzmaurice Niall Barrett
Chapter 9	Air and Climate	ERM	Dr. Chris Hazell-Marshall
Chapter 10	Noise and Vibration	ERM	Jamie Hogg
Chapter 11	Material Assets – Waste (Construction & Demolition)	CS	Robert Fitzmaurice Niall Barrett
Chapter 12	Material Assets – Road & Traffic	CS	Robert Fitzmaurice Niall Barrett
Chapter 13	Material Assets – Site Services (incl. Energy Demand)	CS	Robert Fitzmaurice Niall Barrett
		Axiseng	Cian Dowling
Chapter 14	Cultural Heritage (incl. Archaeology)	Irish Archaeological Consultancy (IAC)	Faith Bailey
Chapter 15	Interactions	TPA	Tom Phillips
Chapter 16	Mitigation	TPA	Tom Phillips
Chapter 17	Difficulties Encountered	TPA	Tom Phillips
Volume 2	Heritage, Landscape, Landscape Visual Impact Assessment	City Designer	Richard Coleman

1.A1 EIAR Team Qualifications + Affiliations

Tom Phillips (Tom Phillips + Associates Town Planning Consultants (and Adjunct Associate Professor of Architecture, Planning and Environmental Policy, UCD))
Qualifications: BA (Hons), MRUP, MA (Urb Des), MRTPI, FIPI.

Orlaith Swords (HJL)
Qualifications: BA, MArch, PG Dip. Arch, ARB, MRIAI.

Diane Corfe (ERM)
Qualifications: BSc (Joint Hons) MSc, CBiol, MRSB, MCIEEM.

Bethan Cainey (ERM)
Qualifications: BSc, MSc GradCIEEM.

Peter Rodgers (ERM)
Qualifications: BSc (Hons), DIS, MSc, CEnvP.

Dr. Chris Hazell-Marshall (ERM)
Qualifications: BSc, PhD, MIAQM, MIES.

Jamie Hogg (ERM)
Qualifications: Dipl, BSc (Hons), MSc, MIOA.

Robert Fitzmaurice (CS)
Qualifications: B.Eng (Hons), Post. Grad. Dip EE, M.I.E.I, C.Eng, MIEI.

Niall Barrett (CS)
Qualifications: B.Eng (Hons), CEng, M.I.E.I, Cert Health & Safety, Cert RSA.

Cian Dowling (Aixseng)
Qualifications: BSc (Eng), Dip Eng, CEng, MIEI, FConsEI.

Faith Bailey (IAC)
Qualifications: BA, MA, MCIFA; Associate Director IAC.

Richard Coleman (City Designer)
Qualifications: Dip Arch, ARB, RIBA, RIAI.

2.0 SITE LOCATION AND CONTEXT

2.1 Location of the Subject Site

The subject site of 1.1 ha is principally bounded by: Mayor Street Upper to the north; North Wall Quay to the south; North Wall Avenue to the east; and the residual City Block 9 lands of 0.85 ha to the west. The overall site is located within City Block 9, as identified, in the *North Lotts and Grand Canal Dock SDZ Planning Scheme 2014*. (Figure 2.1.)

Figure 2.1: Approximate outline of the subject site in red. (Source: Bing Maps; annotated by TPA, January 2021.)

A concurrent SDZ-compliant (commercial) scheme forms the basis of an Application lodged on 28 January 2021 with Dublin City Council on a site of 0.921 ha. That site includes some 710 sq m (or 0.071 ha) of lands common to the SHD Scheme, to allow Dublin City Council to impose a condition to the SDZ Scheme requiring the provision of a pocket park on the lands in the event that the development of the SDZ Site predated development of the SHD site.

Dublin City Council facilitated a similar arrangement in two applications, for the lands, submitted in 2017.

The Venn Diagram in Figure 2.2 illustrates the overlap of sites. However, both Schemes are fully independent of each other.

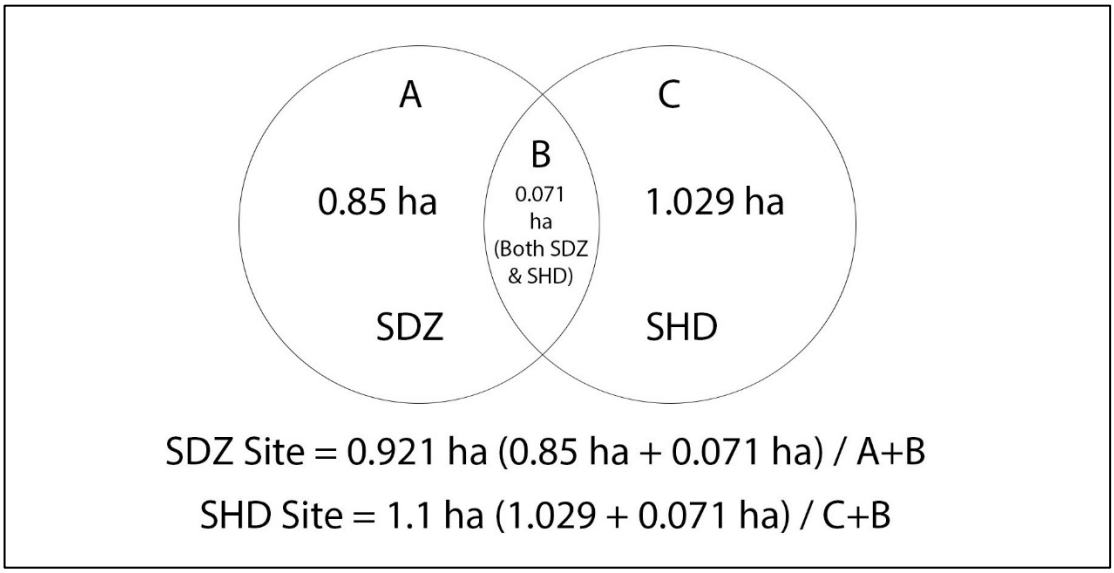


Figure 2.2: Venn Diagram showing SDZ and SHD (Subject Site) lands which overlap and lands which do not. (Source: TPA, January 2021.)

The above Figure 2.2 shows the quantum on land (hectares) which compose the Subject Site (SHD). The SHD site is 1.1 ha which is broken down into 1.029 ha of land and 0.071 ha of land, which overlaps with the concurrent SDZ Commercial Scheme.

The wider locality is characterised by a mix of employment, retail, commercial and residential uses. To the north of the site on Mayor Street Upper, are:

- Macken House (39/40 Mayor Street Upper); a 6-storey office building with retail units at ground floor. Current commercial tenants include Bulgari and a number of media companies including radio stations FM104 and Q102. Insomnia (a coffee chain) operates from one of the retail units;

- The corner of Block K of the Castleforbes Square residential development addresses Mayor Street Upper. The apartments of that residential development are located directly above the Insomnia café unit;

- 5 No. two-storey houses at Nos. 34-38 Mayor Street Upper, inclusive. These properties are in the ownership of the Applicant and are currently unoccupied; and

- Castleforbes House (at the corner of Castleforbes Road and Mayor Street Upper); a 6-storey office building. Current commercial tenants include Radio Nova; Fenergo Limited; Sunshine Radio; and 4FM.

Figure 2.3: View of northern site boundary, looking west along at Mayor Street Upper. (Source: TPA, November 2020.)

To the west of the site, across Castleforbes Road is the Dublin Landings development, measuring c. 2.35ha[1]. Developed by Ballymore, that project is approaching completion of the construction process. When fully operational, it will comprise, *inter alia*: 268 No. apartments; some 70,000 sq m of commercial floor space; retail and leisure facilities measuring c.1,600 sq m; and a variety of residential and commercial amenities. (Figure 2.3.)

The presence of 2 No. former electricity substations on Castleforbes Road, abutting City Block 9, is noted. These buildings are not on the Record of Protected Structures – however, they are listed on the *National Inventory of Architectural Heritage* (Reg. No. 50011185.).

Figure 2.4: 2 No. former electricity substations on Castleforbes Road. (Source: *Report on the Architectural/ Historical Significance of the Former Electrical Substation and Pump House, Castleforbes*

[1] https://www.ballymoregroup.com/project/detail/dublin-landings.

Road, Dublin 1 & observations on the Impact of the Commercial Development on the Adjoining Site, dated January 2021.)

The Applicant commissioned David Slattery Conservation Architects to prepare a report (*Report on the Architectural/ Historical Significance of the Former Electrical Substation and Pump House, Castleforbes Road, Dublin 1 & observations on the Impact of the Commercial Development on the Adjoining Site*), dated January 2021, to accompany this Application.

Section 4 of that document deals with 'Assessment of Cultural Significance'.

That section states, *inter alia*:

"The two structures are included on the National Inventory of Architectural Heritage, with a significance rating of 'Regional'. The structures are on the list of recommendations for inclusion on the Record of Protected Structures, as available on the NIAH website.

However, to date, the subject buildings have not been added to the Dublin City Council Record of Protected Structures. In addition, the structures have not been included in the comprehensive 2007 ESB publication A Heritage Inventory of ESB Buildings in Ireland."

It should be noted that no works are proposed to those structures, which are external to the site of the SDZ Application.

Figure 2.5: The Dublin Landings development highlighted in blue, with the subject site approximately outlined in red. The Mayson Hotel is located on Castleforbes Road Junction. (Source: Barrow Coakley Photography, September 2020; annotated by TPA, January 2021.)

Figure 2.6: View of the Dublin Landings site (Central Bank to the left) from Sir John Rogerson's Quay, showing City Block 9 to the right. (Source: TPA, November 2020.)

To the south, the site is bounded by the natural edge formed by the River Liffey and the R801 regional, road which travels in an east to west direction. That road links the 3Arena and Dublin Port with the north Liffey quays as far as Custom House to the west.

Figure 2.7: View along R801 from the southern boundary of the subject site, looking east towards Dublin Port, with the River Liffey located to the right of the image. (Source: TPA, November 2020.)

To the east at City Block 10, 2 No. sites (North Dock 1 and 2) are currently in the final stages of the construction process, with planning permission obtained under, *inter alia*: Reg. Ref. DSDZ3800/17 and Reg. Ref. DSDZ3805/17.

The development at that location comprises, *inter alia*: a 241 No. bedroom aparthotel; and a 7-9-storey office building.

Beyond those construction sites lies the 3Arena – a multipurpose venue with a capacity of 9,000 persons fully seated and 13,000 persons fully standing[2]; and the Exo Building (currently under construction), which will be a 17 No. storey office building upon completion[3].

Figure 2.8: View to the north up North Wall Avenue, showing the hoarding of the subject site to the left. (Source: TPA, November 2020.)

Figure 2.9: 'North Dock' to the east of subject site on North Wall Avenue, with the 3Arena and the Exo Building (under construction) located further to the east. (Source: TPA, November 2020.)

[2] https://3arena.ie/faq
[3] https://www.theexobuilding.com/

The subject site is characterised as a highly accessible location, having regard to:

1. Luas Red Line with services operating from The Point to Saggart (via Belgard) and Tallaght (via Belgard). The closest Luas Stop to the site located at The Point, within c. 100m of the Site;

2. Existing Dart line with close proximity to Connolly Station and Grand Canal Dock Station;

3. Proposed Dart Underground with station proposed at City Block 2;

4. Bus Routes 33D, 33X, 41X, 53A, 142 and 151; and

5. Its location in the Dublin 1 postcode area.

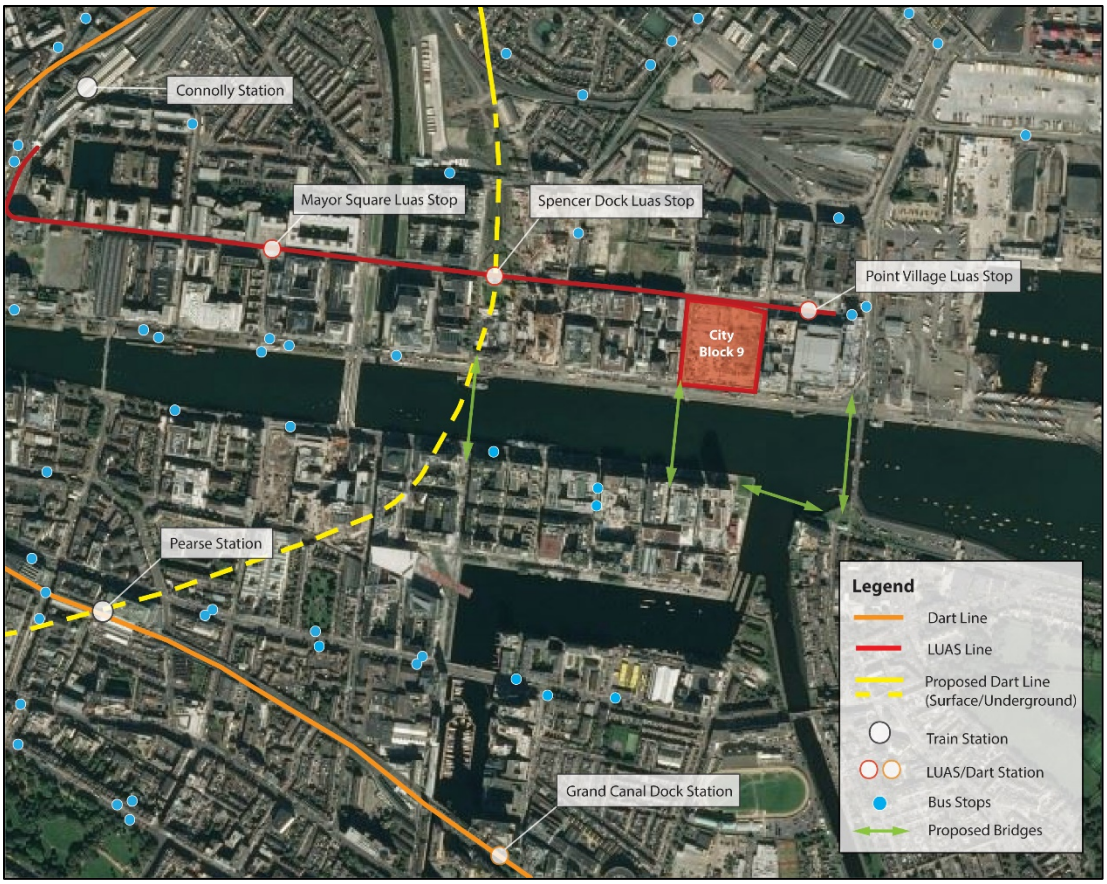


Figure 2.10: Map showing transport routes and nodes located proximate to subject site at City Block 9. (Source: Bing Maps, 2020, annotated by TPA, January 2021.)

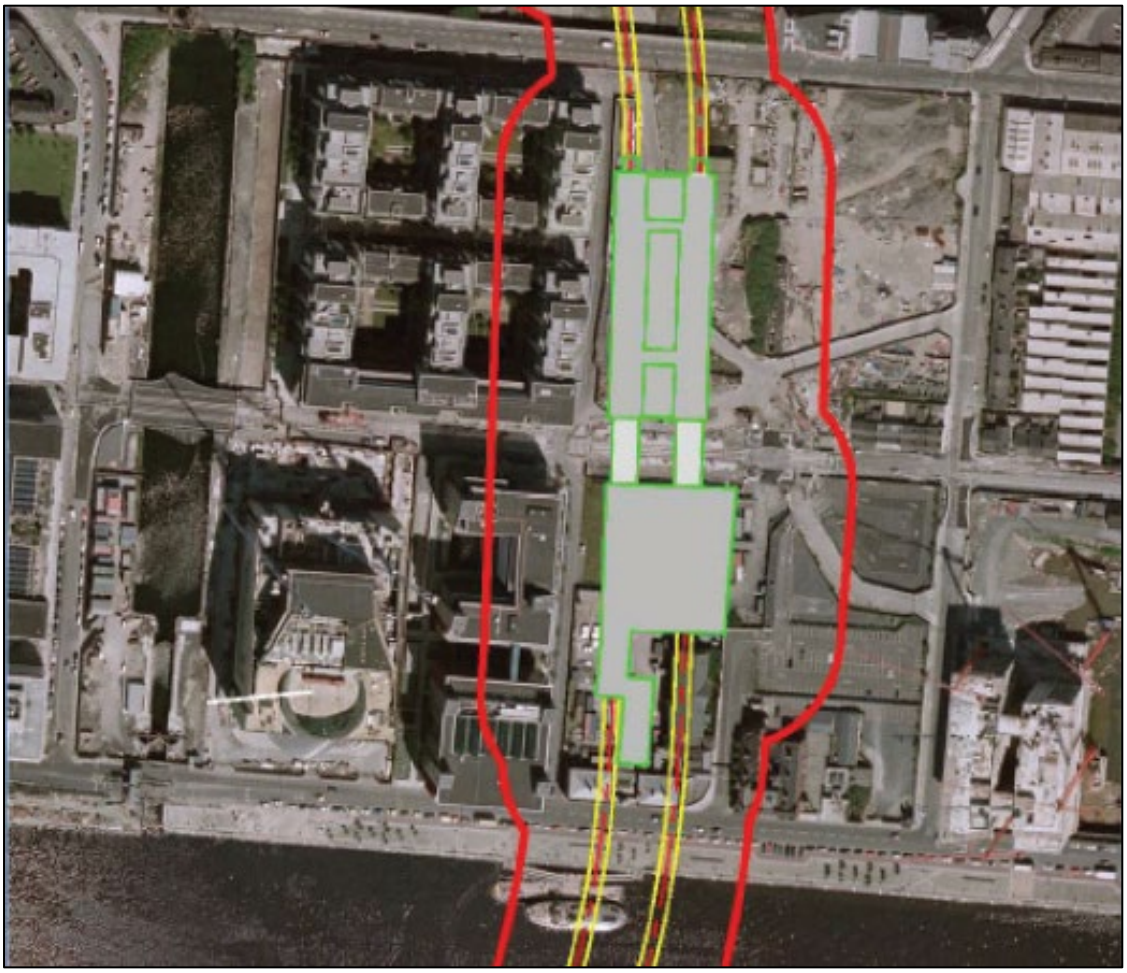


Figure 2.11: Proposed Dart Underground station at City Block 2. (Source: *North Lotts & Grand Canal Dock Planning Scheme,* 2014.)

Figure 2.12: Photograph of Luas tram exiting Point Village Luas Station along Mayor Street Upper. (Source: TPA, November 2020.)

The site is located c. 1.9km west of O'Connell Street in Dublin City Centre.

Figure 2.13: Context Map of Surroundings, with approximate site boundary indicated in red. (Source: Bing Maps; annotated by TPA, January 2021.)

Further north of the subject site, the area comprises primarily residential use, with associated retail use. In addition, some industrial/warehousing units are located on Sheriff Street Upper.

An edge is formed at Sheriff Street Upper by the railway sidings associated with Dublin Port.

Beyond that rail facility, to the north, is the established residential area of East Wall.

2.2 Existing Site Context

The site is brownfield, having been cleared of its previous warehousing and industrial structures, with the benefit of grants of planning permission received under Reg. Ref. DSDZ2242/16 and Reg. Ref. DSDZ3831/16.

Figure 2.14: Aerial image of City Block 9 (not to scale) showing the subject site's brownfield condition. (Source: Google Earth, 2021.)

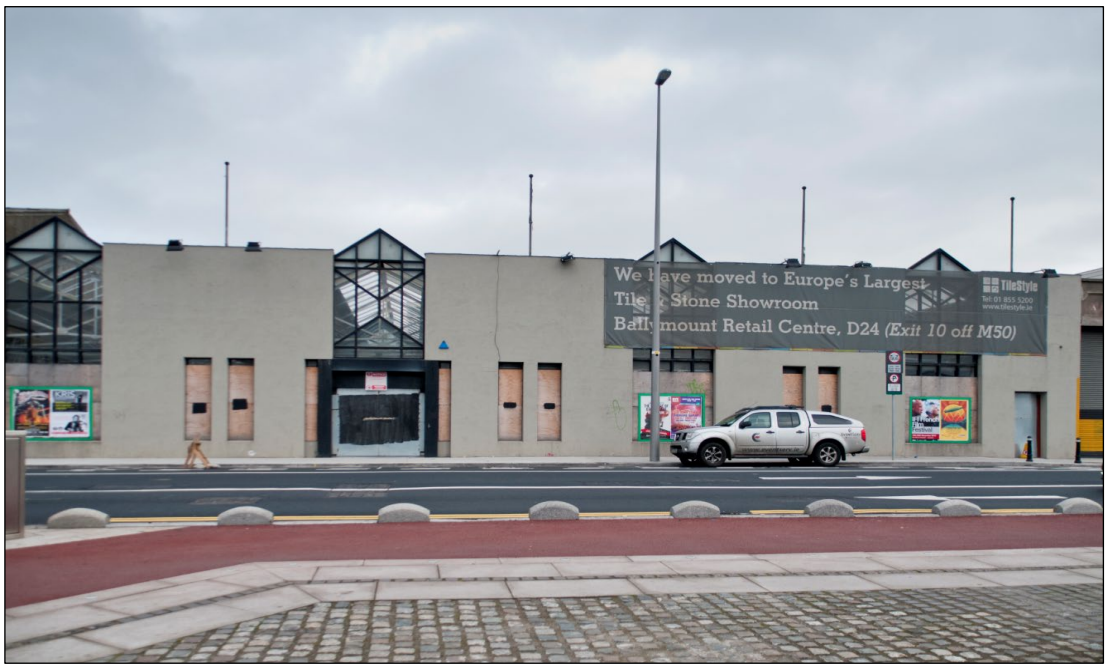


Figure 2.15: Photograph of the TileStyle retail showroom (located at the south eastern corner of the subject site), which was demolished with the benefit of planning permission obtained under Reg. Ref. DSDZ2242/16. (Source: TPA, 2013.)

2.3 Planning Context

As illustrated by Figure 2.16, the subject site is located in zone Z14 *Strategic Development and Regeneration Areas (SDRAs)* with the objective:

> *"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".*

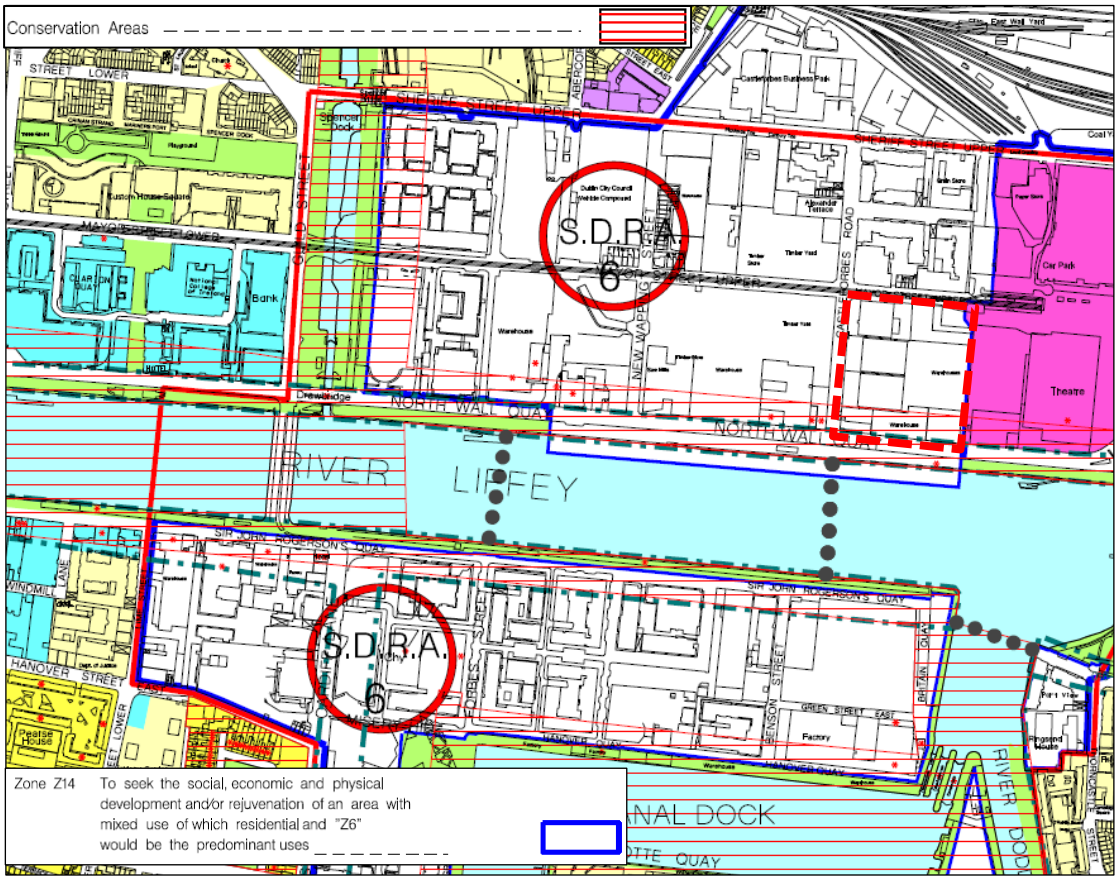


Figure 2.16: Extract of Map E of the *Development Plan*, showing City Block 9 outlined with the dashed red line. (Source: *Dublin City Development Plan 2016-2022*; annotated by TPA, 2020.)

'Residential', 'offices' and 'childcare facilities' are "permissible uses" under the zoning objective Z14.

SDRA 6 - Docklands (SDZ and Wider Docklands Area)

For Strategic Development and Regeneration Area (SDRA) 6 (which includes the subject site), the following housing objectives, *inter alia*, are outlined in Section 15.1.1.7 of the *Dublin City Development Plan 2016-2022*:

- *"To provide for residential choice with schemes conducive to family living, long term rental and home-ownership.*
- *To achieve successful interaction between the SDZ scheme and surrounding streets and public realm to retain and foster a strong sense*

of neighbourhood within communities.

- *To ensure that residential developments optimise the unique Docklands character in terms of visual context, maritime location, heritage assets and community identity.*
- *To provide physical, social and amenity infrastructure in tandem with new housing.*
- *"To ensure that all proposals for residential development meet the obligations under Part V and Dublin City Council's housing strategy. (…)",*

There are no Protected Structures or proposed Protected Structures within the boundaries of the site. The site is not located in or within the vicinity of an Architectural Conservation Area (ACA).

There are 9 No. Protected Structures within c. 500 m to the north, east and west of the subject site, as per Table 2.1.

RPS No.	Location	Classification	Distance from Development
5835*	North Wall Quay	Granite ashlar quay walls, stone setts, mooring rings, steps, bollards, lamp standards and machinery	c. 20m south
5836*	North Wall Quay	CIE goods depot, including curved wall and chimneys	c. 350m west
5837*	North Wall Quay	The Wool Store, including hexagonal lantern	c. 350m west
5838*	North Wall Quay	Former British Rail hotel	c. 340m west
5839*	North Wall Quay	Granite walls at former British Rail hotel, railings, gates, and adjoining setts in cul-de-sac	c. 330m west
5840*	North Wall Quay	Façade	c. 60m west
5841*	North Wall Quay	Business premises	c.20m west
5842*	North Wall Quay	Business premises	c. 20m west
5843*	North Wall Quay	Former goods depot (The O2)	c. 70m east

Table 2.1: Record of Protected Structures (RPSs) in immediate vicinity of subject site. (Source: Record of Protected Structures.)

* Listed on the RMP and NIAH Survey

There are 2 No. monuments on the Record of Monuments and Places (RMP) located within c. 500 m of the subject site, as per Table 2.2.

RMP No.	Location	Classification	Distance from Development
DU018-020201	Sir John Rogerson's Quay	Quay	c. 500m south west
DU018-020564	North Wall Quay	Quay	c. 20m south

Table 2.2: Monuments within 500m of subject site. (Source: Record of Monuments and Places.)

There are 15 No. sites or groups of sites within 500 m radius of the site, which are included within the *NIAH* Survey for County Dublin. The nearest are the Electricity Substations, which directly abut the subject site.

No.	NIAH No.	Location	Classification	Distance from Development	Description
1	50010196	7 Mayor Street Upper	Architectural Artistic	210m west	House
2	50010011	North Wall Quay, Dublin 1	Architectural Historical Technical	330m west	Quay/wharf
3	50010012	North Wall Quay, Dublin 1	Architectural Artistic Historical Social Technical	350m west	CIE Goods Depot
4	50010013	North Wall Quay (off), Dublin 1	Architectural Technical	330m west	The Wool Store
5	50010014	North Wall Quay, Dublin 1	Architectural Artistic Historical Social Technical	285m west	CIE Offices
6	50010015	North Wall Quay, Dublin 1	Architectural Artistic Technical	320m west	British Rail Hotel / London & Western Hotel (gates/railings)
7	50011165	North Wall Quay, Dublin 1	Architectural	90m west	Richford Motors
8	50011166	North Wall Quay, Dublin 1	Architectural Social	30m west	Vallence and McGrath
9	50011167	North Wall Quay, Dublin 1	Architectural Technical	20m west	Warehouse
10	50011168	North Wall Quay, Dublin 1	Architectural Artistic Technical	55m east	Building
11	50011169	North Wall Quay, Dublin 1	Architectural Cultural Historical Social Technical	70m east	Point Depot
12	50011185	Castleforbes Road, Dublin 1	Architectural Technical	Directly abutting	Electricity Substations

13	50020465	Sir John Rogerson's Quay, Dublin 2	Architectural Social Technical	460m southwest	Quay/wharf
14	50020495	Hanover Quay, Dublin 2	Architectural Social	320m south	Dublin Granaries
15	50020496	Grand Canal Dock, Dublin 2	Architectural Historical Social Technical	350m south	Westmoreland, Buckingham and Camden Locks

Table 2.3 (previous page): List of sites or groups of sites within 500 m radius of the subject site. (Source: National Inventory of Architectural Heritage (NIAH).)

2.4 Seveso III

The subject site is located in close proximity to Dublin Port which contains a number of Seveso III sites[4].

A review of the consultation distances for each Upper Tier and Lower Tier Seveso III site indicates that the subject site is not located within any of those distances (please see Table 2.4 below).

The closest Seveso site to the subject site is the Topaz Energy facility at Alexandra Road, Dublin 1. The distance between the two sites is c. 775m.

The next nearest site is the ESB site at the North Wall Generating Station. The distance between that site and the subject site is c. 1.2km.

At that Topaz Energy site, the consultation distance for Terminal 1 is 400m from the perimeter; and the consultation distance for Yard 3 is 300m from the perimeter.

The impact of potential major accidents will be assessed in the context of the Major Accidents and Disasters Chapter of this EIAR.

Seveso III Site	Location	Consultation Distance
Calor Teoranta	Tolka Quay, Dublin 1	600m from perimeter
Esso Ireland Ltd, JFT Dublin	Alexandra Road, Dublin Port, Dublin 1	400m from perimeter
Fareplay Energy Ireland	Tankfarm 1, Alexandra Road and Tankfarm 2, Tolka Quay Road, Dublin Port, Dublin 1	400m from perimeter
Indaver Ireland Ltd	Tolka Quay Road, Dublin Port, Dublin 1	700m from perimeter
Tedcastles Oil Products	Yard 2, Tolka Quay Road, Dublin Port, Dublin 1	400m from perimeter
Electricity Supply Board	North Wall Generating Station, Alexandra Road, Dublin 1	300m from bund wall

[4] Sites which pose a risk due to chemical storage. Named after the Italian town of Seveso, which in 1976 suffered a catastrophic industrial accident.

Iarnród Éireann	Alexandra Road, North Wall, Dublin 1	300m from bund wall
Tedcastles Oil Products	Yard 1, Promenade Road, Dublin Port, Dublin 1	400m from perimeter
Topaz Energy Limited	Terminal 1, Alexandra Road, Dublin Port, Dublin 1	400m from perimeter
Topaz Energy Limited	Yard 3, Alexandra Road, Dublin Port, Dublin 1	300m from perimeter

Table 2.4: List of Seveso III sites in the local area. (Source: Appendix 12.1 of the *Dublin City Development Plan 2016-2022.*)

3.0 DESCRIPTION OF PROPOSED DEVELOPMENT REQUIRES

3.1 Introduction

Tom Phillips + Associates have prepared this chapter of the *Environmental Impact Assessment Report*, in conjunction with Henry J Lyons Architects. It provides a detailed description of the project, together with details of the existing environment surrounding the site. In accordance with Article 5(1)(a) of the 2011 EIA Directive as amended by Directive 2014/52/EU, the description of the proposal should comprise "…*information on the site, design, size and other relevant features of the project*".

In summary, the proposed development comprises 3 No. residential blocks ranging in height from 8 – 45 storeys over basement levels; and supporting uses including office use in Block C, a childcare facility, residential study zone, restaurants, a foodhall, a Farmer's Market, cafés and a public bar/function room. The scheme, totalling 125,388 sq m, provides 22,499 sq m at basement levels, with 102,889 sq m from ground upwards.

The blocks are positioned to provide pedestrian routes through the site and incorporating a landscaped public pocket park. Further landscaping is proposed at various levels throughout the blocks.

A more detailed description is set out below.

3.2 Characteristics of the Proposed Development

3.2.1 Site Location

The subject site is principally bounded by: Mayor Street Upper to the north; North Wall Quay to the south; North Wall Avenue to the east; and the residual (0.85 ha) lands of City Block 9 and Castleforbes Road to the west. The overall site is located within City Block 9, as identified, in *the North Lotts and Grand Canal Dock SDZ Planning Scheme*.

The area identified as 'B' in Figure 3.1 on the next page (measuring some 710 sq m (0.071 ha) is common to both Applications, whilst it principally forms part of the SHD Application, its inclusion (to the same pocket park design) is to facilitates the imposition, by Dublin City Council, of a condition regarding the inclusion of a pocket park in any construction should development of the adjacent SDZ Scheme precede the SHD proposal significantly.

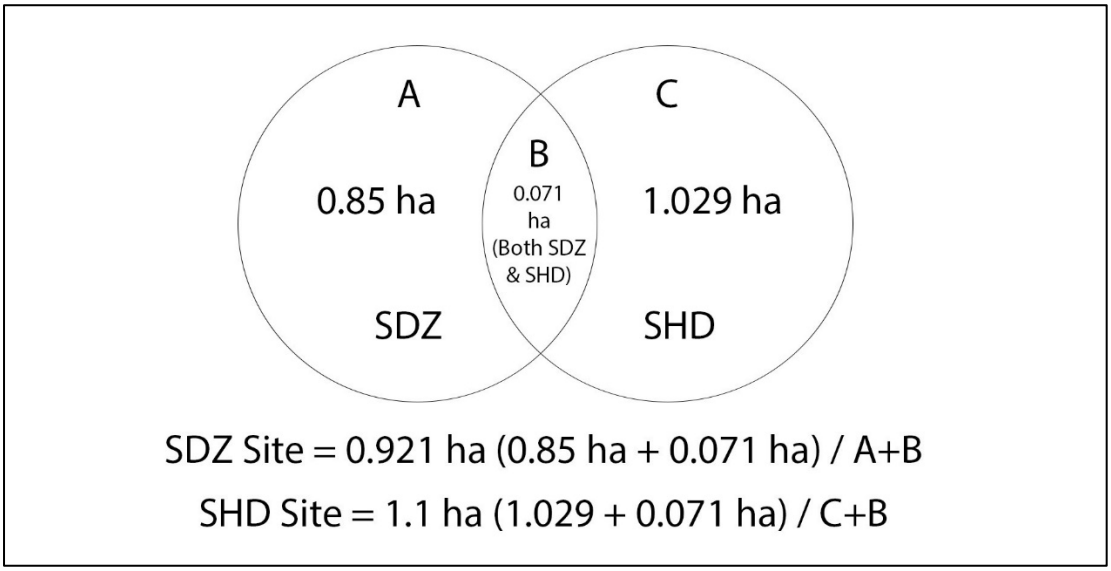


Figure 3.1: Venn Diagram showing SHD site area and concurrent SDZ Commercial site are. (Source: TPA, January 2021.)

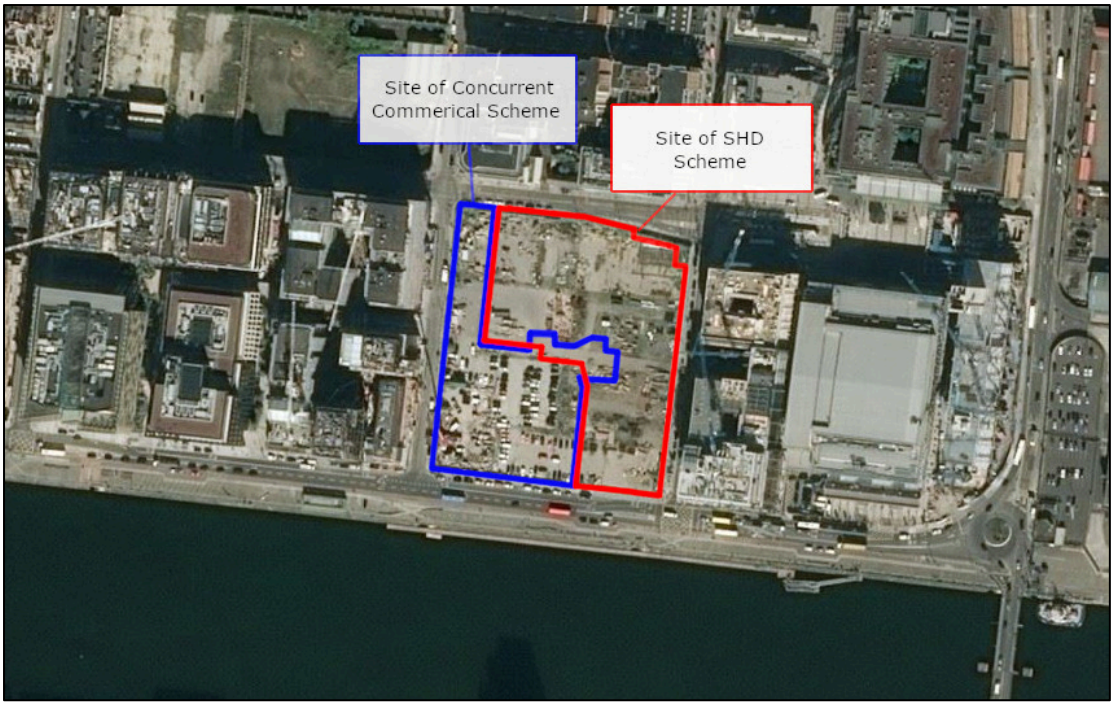


Figure 3.2: Location of Subject Site and Concurrent Commercial Site. (The 710 sq m at the centre of City Block 9 is included in both Schemes.) (Source: Bing Maps, annotated by TPA, January 2021.)

3.2.2 Site Area

The site has an overall area of c. 1.1 hectares (c. 2.72 acres).

3.2.3 Density of Development

The proposed development has density of 914 No. units per hectare. The density, whilst high, is appropriate for the site, having regard to National Planning policy guidelines, as set out in the complementary TPA planning documents that form part of this Application.

3.2.4 Detailed Description of Development

The scheme is defined in the statutory notices as follows:

1. Construction of 1,005 No. residential units (with balconies and winter gardens on all elevations) arranged in 3 No. blocks ranging in height from 8 No. storeys to 45 No. storeys over a triple-level basement (including mezzanine plant level), the former comprising: Block A (8-14 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 116 No. 1-bed; and 92 No. 2-bed; with landscaped terraces at Level 1 (south east elevation), Level 8 (south west elevation), Level 11 (south west elevation) and Level 14 (roof level)); Block B (8-41 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 172 No. 1-bed; and 247 No. 2-bed; with landscaped terraces at Level 5 (south west elevation), Level 8 (north west elevation and south west elevation), Level 11 (north elevation), Level 12 (west elevation), Level 13 (east elevation), Level 14 (east elevation), and at Level 41 (roof level)); and Block C (11-45 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 207 No. 1-bed; 168 No. 2-bed; and 3 No. 3-bed units; with landscaped terraces at Level 11 (north elevation), Level 24 (south, west and east elevation), Level 32 (south, west and east elevation), and Level 45 (roof level), incorporating a public viewing deck at Levels 44 and 45).

2. Provision of ancillary residential amenities and support facilities including: a residential study area (321 sq m), a gym/spa reception (52 sq m), a residents' games room (91 sq m), a residents' common room (110 sq m), a residents-only social space (193 sq m), a management office (96 sq m), a security office (50 sq m), concierge spaces (GFA of 369 sq m) all located at ground floor level; a residents' games room (122 sq m) located at Level 1 of Block B; a residents' common room (86 sq m) located at Level 14 of Block B; a residents' wellness club and common room (408 sq m) located at Level 24 of Block C;

3. Construction of a triple level basement, comprising two levels of basement and a mezzanine plant level (total basement area 22,499 sq m), accommodating: waste storage areas (659 sq m), plant rooms (4,228 sq m), maintenance / management offices (GFA of 92 sq m), residents' courier / parcel rooms (GFA of 210 sq m), residents' laundry rooms (GFA of 138 sq m), ancillary residential storage (GFA of 291 sq m), residents' WCs (65 sq m), a residents' gym / spa (1,529 sq m) and ancillary gym storage room (100 sq m), residents' screening rooms (240 sq m), a residents' indoor plant cultivation room (356 sq m), 176 No. car parking spaces, 10 No. motorcycle parking spaces and 1,693 No. bicycle parking spaces, with vehicular access provided by ramp from North Wall Avenue.

4. Provision of 4,307 sq m of "other uses" as defined by the *Planning and Development (Housing) and Residential Tenancies Act 2016,* comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmers' Market/foodhall (299 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Levels

41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C.

5. Provision of 84 No. surface-level bicycle parking spaces, a pocket park, an external market area, a winter garden/seating area, and new pedestrian lanes from North Wall Quay, North Wall Avenue and Mayor Street Upper to the centre of the site.

6. All enabling and site development works, landscaping (including living walls), lighting, services and connections, waste management, interim site hoarding, and all other ancillary works above and below ground including the use of existing secant piling permitted under Reg. Ref. DSDZ3779/17 and DSDZ3780/17 (as amended by DSDZ3042/19).

3.2.5 Demolition of Structures on Site and Site Clearance

The site is brownfield, having been cleared of its previous warehousing and industrial structures, with the benefit of grants of planning permission received under Reg. Ref. DSDZ2242/16 and Reg. Ref. DSDZ3831/16.

As such, the site has no existing structures and has been cleared and has been prepared for permitted construction activity.

Figure 3.3 below show an extract from the Henry J Lyons Ground Floor Site Layout Plan.

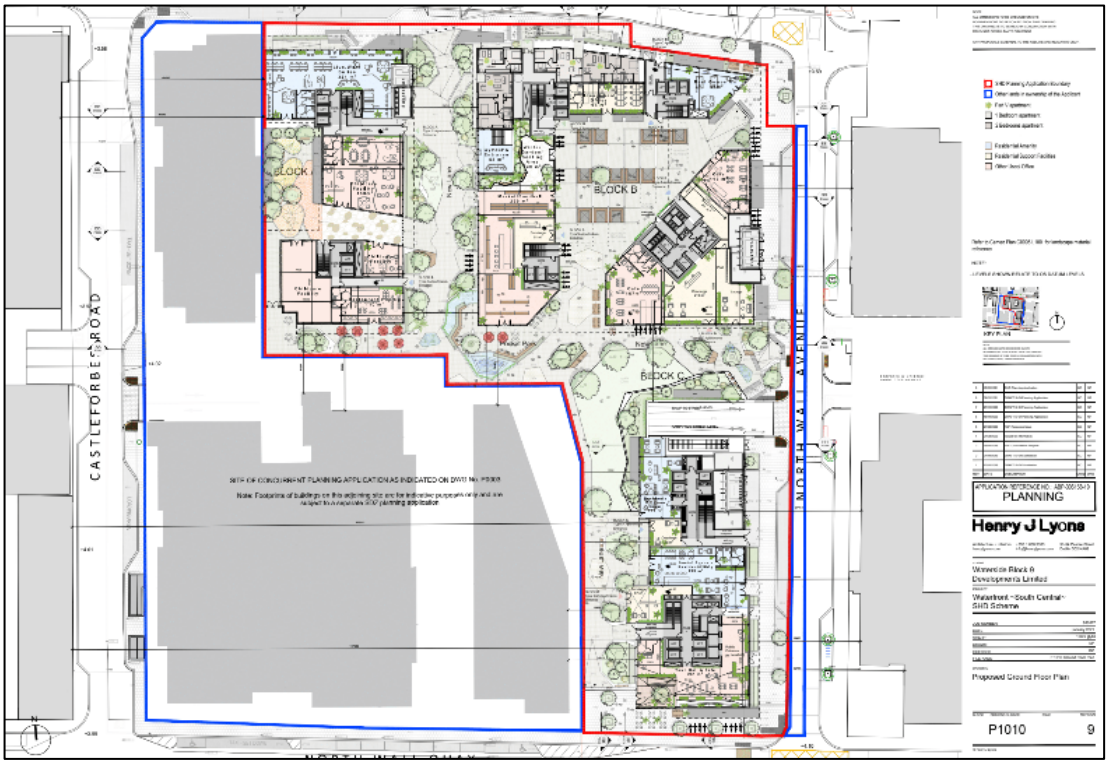


Figure 3.3: Extract from Site Layout Plan – Ground Floor Level – Drawing No. P1010 Rev. 9. (Source: Henry J Lyons Architects, 2021.)

3.2.6 Building Height/Form/Massing

This section provides a summary description of the layout and design of the proposed development. Henry J Lyons has prepared a document, titled *Design Statement - SHD Application to An Bord Pleanála,* dated January 2021, to accompany this Application.

That document provides a full design rationale for the Scheme in terms of layout design, uses, building heights and sustainability.

The proposed layout for the site, as shown in Figure 3.1 on the previous page, provides a series of blocks that front to pedestrian routes through the scheme, providing access from North Wall Quay to the south of the Site; North Wall Avenue to the east of the Site; and from Mayor Street Upper to the north of the Site.

The pedestrian route incorporates a public plaza / square, with a childcare facility, a residential study zone, a restaurant, a Farmers' Market and 3 No. cafés fronting at ground level. Access points to shared residential facilities are also accessed from this route.

The overall heights within the scheme vary from 8 to 45 storeys over basement level in height, with the overall heights of the blocks ranging from +32.45m OD to +171.4m OD, with the ground level at c. +4.45m OD.

3.2.7 Design and Building Materials

There is a broad range of materials proposed within this development, varying depending on the height of the block in question. In general, the elevations of the two taller blocks comprise extensive use of glazing and planting, with the tint of the glazing progressively becoming lighter from the base as the elevation rises.

Block A

Block A, the 14-storey building, will comprise a unitised curtain wall with Jura limestone; and frame and fluted bronze anodised aluminium panels.

Figure 3.4: Block A Façade Diagram. (Source: Extract from Henry J Lyons *Design Statement - SHD Application to An Bord Pleanála*, dated January 2021.)

Block B

The upper levels of Block B, the 41-storey building, will comprise unitised curtain walls, with living wall panels. At lower levels, unitised curtain walls will also be used, with variation in the materials addressing Mayor Street Upper and North Wall Avenue.

The elevation facing Mayor Street Upper will comprise unitised curtain walls with Jura limestone frames and solid panels.

The elevation facing North Wall Avenue will comprise unitised curtain walls with Jura limestone frames and a mixture of living wall panels and solid panels.

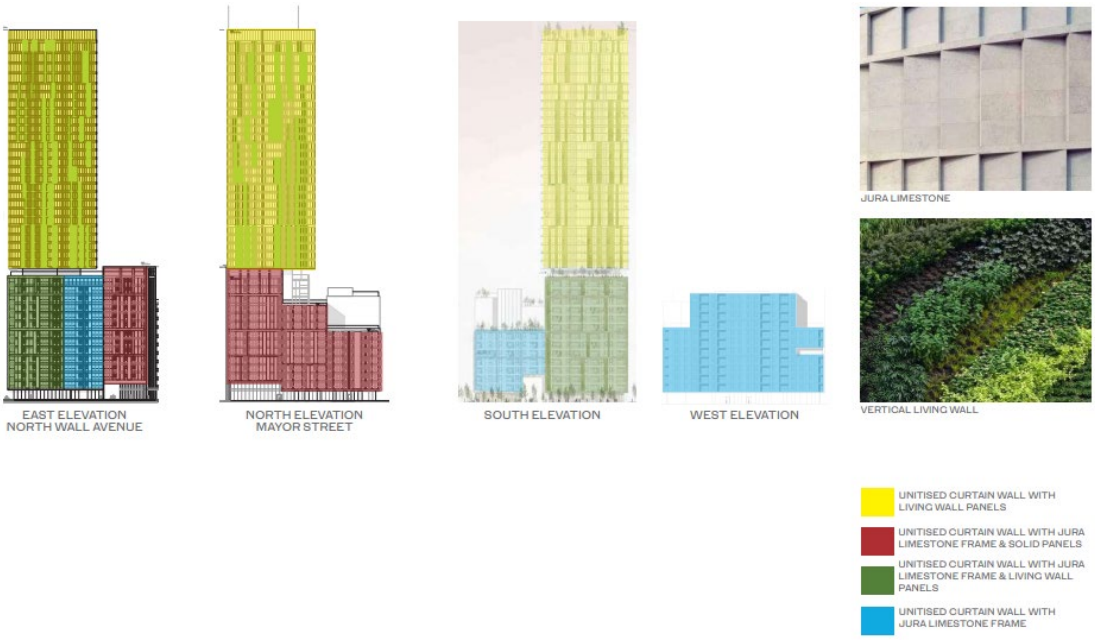


Figure 3.5: Block B Façade Diagram. (Source: Extract from Henry J Lyons *Design Statement - SHD Application to An Bord Pleanála*, dated January 2021.)

Block C

Block C is the tallest structure in the proposed development (45-storey building). At its uppermost levels, twin skin detailing will be used, while the majority of the structure (and the entirety of the south elevation) will comprise unitised curtain walls with Jura limestone frames. Unitised curtain walls with Jura limestone frames and living wall panels will be located at the lower levels on the east and west elevations, while the lower levels of the north elevation will solely be comprised of unitised curtain walls with Jura limestone frames.

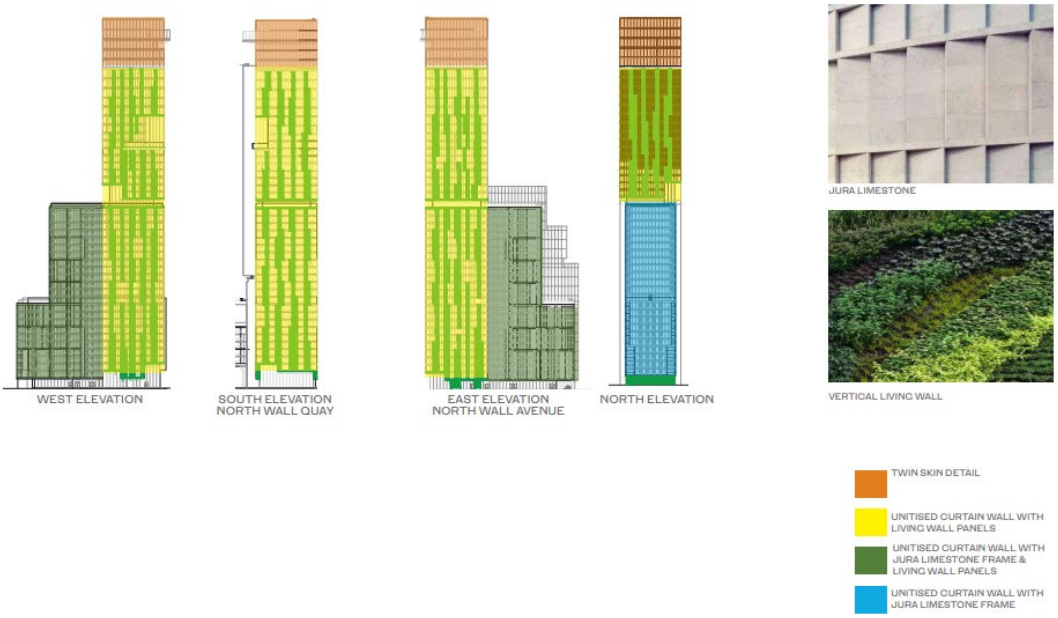


Figure 3.6: Block C Façade Diagram. (Source: Extract from Henry J Lyons *Design Statement - SHD Application to An Bord Pleanála*, dated January 2021.)

3.4.6 Residential Use

The proposed development comprises a total of 1,005 No. residential units throughout the scheme. The proposed development has been designed to exceed standards as set out in the *Sustainable Urban Housing: Design Standards for New Apartments: Guidelines for Planning Authorities*, 2018, prepared by the Department of Housing, Planning and Local Government.

Residential Accommodation

The proposed development comprises 1,005 No. apartment units, in a mix of 1-bed, 2-bed and 3-bed units, with resident support facilities, services and amenities located principally at ground floors of the blocks, with various residential amenities located at various floors throughout each block.

The residential accommodation will be a mixture of privately owned and privately rented units. For clarity, no element of the proposed development will comprise Build To Rent (BTR)

units, as defined in the *Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities* (definition extracted from *BUILD TO RENT: A Best Practice Guide for* Ireland, 2017):

> *"Purpose-built residential accommodation and associated amenities built specifically for long-term rental that is managed and serviced in an institutional manner by an institutional landlord".*

Apartments

The proposed development comprises 1,005 No. apartment units located within Blocks A-C. The unit split of the proposed SHD is: 495 No. 1 bed units; 507 No. 2 bed units; and 3 No. 3 bed units.

The Scheme includes 10% Part V provision.

3.4.7 Office Provision

As part of the 4,500 sq m allowable for 'other uses' permitted under section 3 (d) (ii) (I) of the *Planning and Development (Housing) and Residential Tenancies Act, 2016,* office use (c. 1,894 sq m) is proposed at Levels 41-43 of Block C.

As stated in the statutory notices, the total "other uses" provision is 4,307 sq m.

3.4.8 Retail/Restaurant/Cafe Provision

A variety of units are proposed to serve the needs generated by the proposed development with regard to retail and restaurants/cafes. It is also anticipated that these uses will attract visitors from the local area and beyond.

At ground level, the following elements are proposed: a restaurant (110 sq m), foodhall/Farmers' Market (299 sq m), and 3 No. café units (110 sq m, 167 sq m, 261 sq m and 192 sq m, respectively). In addition, a restaurant will be located at Level 32 of Block C, while a publicly accessible bar/function room will be located at Level 44 of Block C.

3.4.9 Crèche Provision

The proposed development includes 1 No. childcare facility measuring c. 450 sq m GFA located at ground floor level of Block A, with additional outdoor play areas measuring c. 340 sq m.

Tom Phillips + Associates undertook a *Childcare Demand Assessment*, which accompanies this Application, was undertaken for the proposed development which determined that there is likely demand for non-parental childcare for between 52-95 No. children, arising from the development, which could be accommodated within the proposed development.

The proposed childcare facility has been designed to address this requirement. The proposed childcare facility has been positioned to be readily accessible from any location in the proposed development.

3.4.10 Access Arrangements

Vehicular access to the proposed development shall be via a priority-controlled junction on North Wall Avenue, at the eastern boundary of the development site. The development access is ramped up to the level of the existing footpath, ensuring ease of pedestrian movement across the access and emphasising pedestrian priority. The development access leads directly to a ramp serving the development basement; this ramp begins at the back of the existing footpath.

Pedestrian and cyclist access to the open areas at the centre of the development shall be possible from North Wall Avenue, Mayor Street Upper, Castleforbes Road, and North Wall Quay, ensuring full north-south and east-west permeability of the development site. Direct pedestrian accesses to all development buildings shall also be provided on North Wall Avenue and on Mayor Street Upper. Segregated paths throughout the site shall provide safe movement for both pedestrians and cyclists.

(We refer to Chapter 12 Material Assets – Traffic and Transportation, which provides full description of access arrangements.)

3.4.11 Landscaped Spaces

The proposed landscape architecture has been designed to create a sense of place, supporting the urban design layout in the creation of streetscapes, civic plaza and residential amenity courtyards and roof gardens.

The design strategy aims to:

- Promote sociability, providing places for social interaction and the creation of a sense of community;
- To provide play facilities for all ages throughout the site; and
- Implement SuDs and biodiversity throughout.

The strategy has been prepared in the context of the provisions of the *North Lotts and Grand Canal Dock Planning Scheme, 2014* for City Block 9.

The proposed landscape design for the site, has been designed in tandem with the architectural design of the site, and as a result, the landscape components are inherent to the architectural layout of the scheme. The development includes extensive areas of landscape architecture at ground, podium and roof levels.

Key components of the landscape design include the creation of streetscapes, a civic plaza, residential courtyards and roof gardens.

The proposed streetscape design incorporates a number of components that are intended to create a sense of place and identity to the boundary of the proposed redevelopment to the existing environs.

The treatment includes:

- Suitability of form and the eventual scale of planting in relation to the space and elevation;
- The use of tree, shrub and perennial planting to enhance the design by responding to the articulation of space in opening vistas, defining and hiding views;
- Planting to be appropriate to setting, not posing threat or nuisance, for example; through the specification of clear stem trees adjacent to public routes; and
- Species selection to elevate local biodiversity levels.

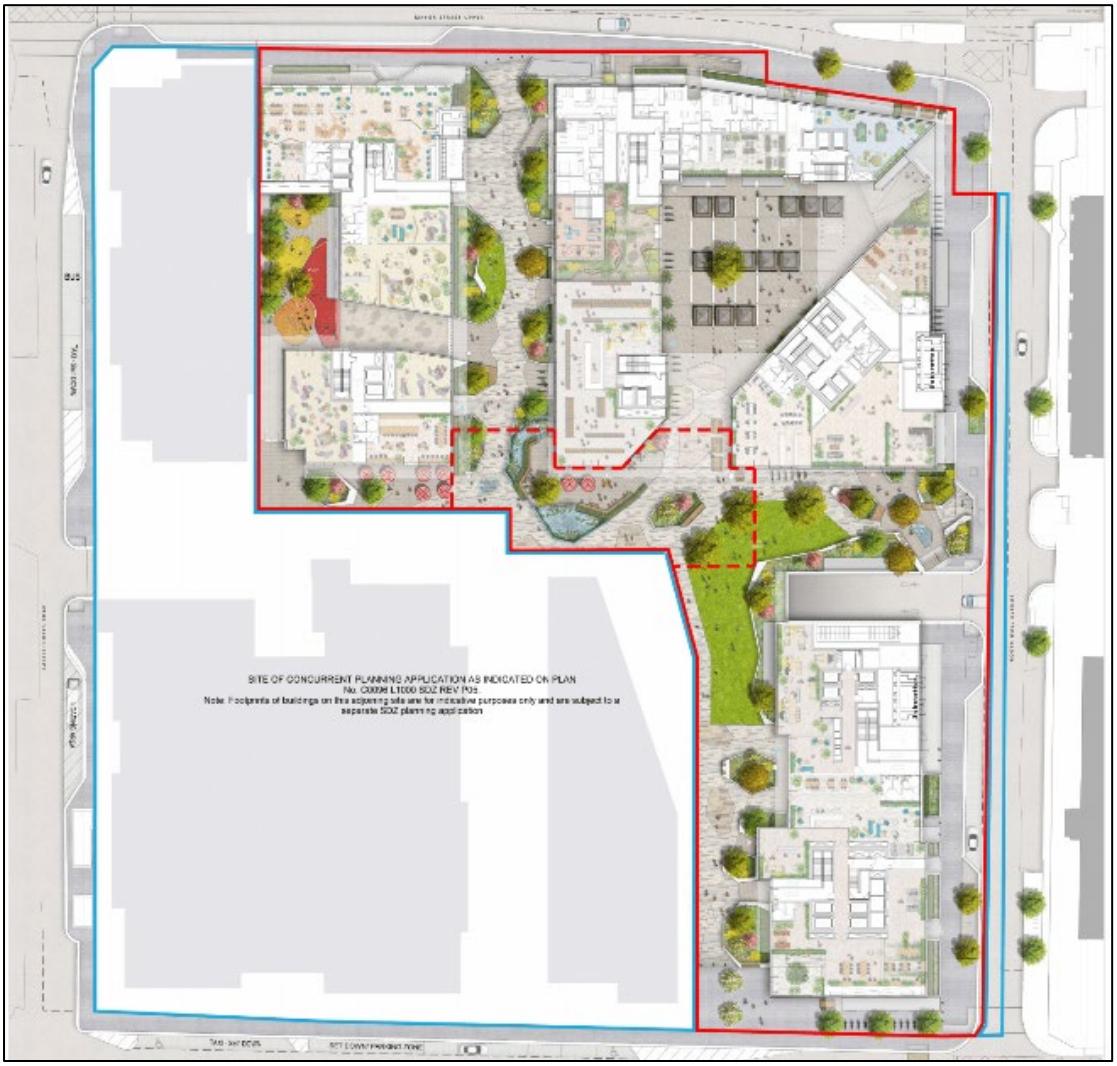


Figure 3.7: Extract from Landscape Masterplan; C0096 L.1000 SHD, Rev. 03. (Source: Cameo and Partners, 2021.)

The location of the pocket park (dashed red line) has been designed taking account of aspect and microclimatic assessment; with landscape treatment along the pedestrian landscaped routes which extend from the west, south-west and north-east of the site, as illustrated in Figure 3.7.

The layout comprises uses at ground floor which utilise the civic plaza space, including café / restaurant / bar uses with external seating, restaurant and café uses, and access points to the office building, and amenity uses. Detailed landscape proposals including a broad range of materials and finishes are proposed in this area.

Residential courtyards are located at podium level and provide passive and visual amenity for prospective residents within the scheme. The treatment includes an internal and external band of decorative planting adjacent and circulation routes, providing buffers to residential units. Tree planting is proposed within the courtyards which has been positioned to mitigate the impact of wind, providing opportunity for biodiversity, providing visual and environmental amenity to the courtyards and the overall development.

Figure 3.8: Tree planting proposed within courtyards. (Source: *Landscape Access & Design Statement (SHD)* prepared by Cameo & Partners, January 2021.)

Finally, the proposed rooftop spaces have been designed to encourage active use for the residential community within the scheme. The design and layout of these spaces have been designed having regard to micro-climatic assessment. These spaces will provide a mix of amenity uses, such as beehives, barbecue and amenity spaces, areas to grow food.

We refer to the *Landscape Design & Access Statement (SHD),* dated January 2021, and to the following drawings prepared by Cameo and Partners:

- *Ground Floor Landscape Masterplan*, Drawing No. C0096 L.1000 SHD, Rev. 03; and
- *Landscape Combined Roof General Arrangement Plan BABC (Roof Gardens)*, Drawing No. C0096 L150 SHD BABC, Rev. 01.

3.4.12 Drainage Infrastructure

Foul Drainage

The proposed development will require a new internal foul drainage system to be constructed. The new internal system will outfall into the existing public 375mm foul sewer located to the north of the subject lands in Mayor Street before ultimate treatment and disposal in the Regional Ringsend Wastewater Treatment Plant.

All design, storage and materials are to be in accordance with Irish Water & Dublin City Council's requirements. The proposed development shall adhere to the requirements of Irish Water for the provision of potable water resources.

As required a Pre-Connection Enquiry was received from Irish Water indicating that the proposed development can be accommodated by local Irish Water infrastructure.

Surface Water Drainage

The proposed re-development of the site will require a new separate storm water collection and attenuation system in accordance with the requirements of Dublin City Council Drainage Division. Attenuation for the site will be provided and this will ensure that hydraulic capacity in the public sewer system is increased as the new development will restrict storm waterflows from the site to 2.4l/s.

The proposed development will also provide an attenuation storage system, in the form of an underground tank, to withhold storm water from a 1 in 100-year extreme storm event suitably up-sized by 20% to address the predicted increase in precipitation due to climate change factors.

The proposed new drainage system will outfall into the existing 225 mm storm sewer located in Mayor Street to the north of the adjacent site. In addition to the provision of storm water attenuation, which aids in the prevention of off stie flooding during extreme stormwater events a range of sustainable urban drainage measures, SuDs, are proposed for the site.

These measures to include green roofs & landscaping areas will ensure that the overall quality of stormwater discharged from the site shall have improved water quality prior to ultimate discharge.

Water

In accordance with the requirements of Irish Water, the proposed connection location and internal details, including fittings and potable water storage will adhere to Irish Water's standards and specifications.

It is proposed to take the new potable water connection off the existing 225mm HPPE main located to the north of the subject lands along Mayor Street.

The proposed development shall adhere to the requirements of Irish Water for the provision of potable water resources.

As required, an *Irish Water Pre-Connection Enquiry Response* was received from Irish Water indicating that the proposed development can be accommodated by local Irish Water infrastructure. That document is addressed to CS Consulting, dated 07 November 2019, and accompanies this Application.

3.4.13 Demolition and Construction Programme

The main construction works will require approximately 4 years from Q4 2021 to Q4 2025. This start date will be dependent on obtaining the required planning permission.

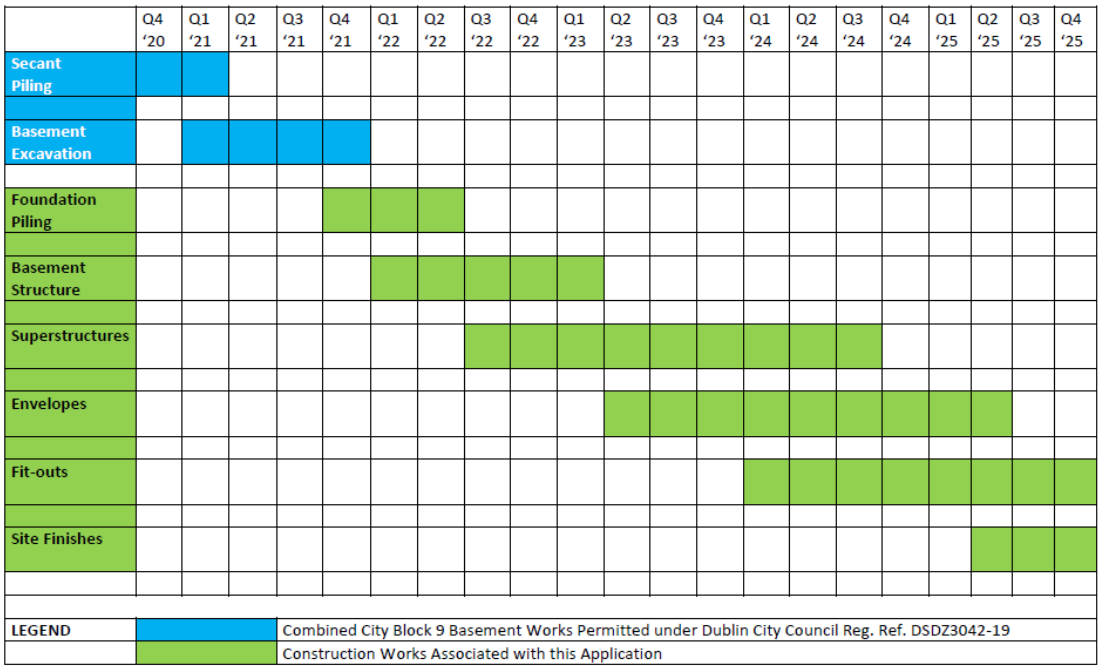


Figure 3.9: Overview of construction commencement dates, dependent on obtaining planning permission. (Source: *Outline Construction Management Plan*, PJ Hegarty & Sons, January 2021.)

Details of the demolition and construction programme are outlined in greater detail within the *Outline Construction Management Plan*, prepared by PJ Hegarty & Sons.

3.4.14 Development Projects Proximate to Subject Site

The following projects are known to have permission / be under construction in the wider area:

Reference No.	Address	Project Description	Distance from Subject Site	Status
DCC Reg. Ref. DSDZ2186/20.	Northbank House, City Block 3, Sheriff Street Upper Dublin 1.	Development consists of 472 No. residential units in 5 No. blocks ranging in height from 2 to 7 No. storeys, sitting partially over single level basement, and at ground floor of existing Northbank	c. 200 m north west.	Final Grant, 26/03/20.

Reference No.	Address	Project Description	Distance from Subject Site	Status
	(Under Construction)	House (c. 37,358 sq m gross floor area excluding basement c. 5,410 sq m gross floor area).		
DCC Reg. Ref. DSDZ3273/20.		Minor amendments.		Granted by DCC, 22/10/20.
DCC Reg. Ref. DSDZ4087/19.	Coopers Cross City Block 3, Castleforbes Road Dublin 1. (Under Construction)	Development consists of 2 No. commercial blocks over 2 No. level basement (45,328 sq m gross floor area - inclusive of basement) was granted in January 2020. Block 1 and Block 2 are both part-5 No. storey and part-6 No. storey buildings.	c. 150 m north west.	Final Grant, 24/01/20.
DCC Reg. Ref. DSDZ3350/20.		Minor amendments resulting in floor are increase of 500 sq m.		Final Grant, 3/11/20.
DCC Reg. Ref.: DSDZ3632/15; DSDZ3686/16; and DSDZ3776/17.	The Exo Building, City Block 10, North Wall Quay Dublin. (Under Construction)	Development consists of an office building ranging in height from 8 to 17 No. storeys. The total gross floor area above ground of this building will be circa 19,263 sq m. The building is raised at ground level to 8m and supported by three elliptical cores.	c. 230 m east.	Final Grant, 24/03/16, 09/09/16, and 27/10/17.
DCC Reg. Ref. DSDZ3754/18.		Amendments including an increase of permitted balustrade at Level 8 by 0.5m in height and 1.5m extension in length towards the southern elevation and alterations to the permitted glass canopies at Level 8 and Level 1. This along with other modifications increased the overall floor space by 730.2 sq m.		Final Grant, 15/10/18.
DCC Reg. Ref. DSDZ2896/18.	Spencer Place North, City Block 2, Mayor Street Upper Dublin 1.	Development at a site of 1.26 ha consists of 325 No. residential units and aparthotel in 2 blocks. Block 1 to the north of the site will be 7 No. storeys in height and	c.250 m north west.	Final Grant, 05/09/18.

Reference No.	Address	Project Description	Distance from Subject Site	Status
	(Under Construction)	Block 2 to the south of the site will be part 6 and part 7 No. storeys.		
DCC Reg. Ref. DSDZ2590/20.		Amendments consisting of link bridge, reconfiguration, facade changes etc.		Granted by DCC, 17/9/20.
DCC Reg. Ref. DSDZ2661/17.	Spencer Place South, City Block 7, North Wall Quay Dublin 1. (Under construction)	Development consists of the refurbishment of the former British Rail Hotel building (a protected structure) and the provision of an 8 No. storey building (Building 1B Office/Hotel).	c.250 m west.	Final Grant, 05/09/17.
DCC Reg. Ref. DSDZ2970/20.		Amendments to signage.		Granted by DCC, 28/08/20.
DCC Reg. Ref. 3433/19.	Castleforbes Business Park East, Sheriff Street Upper Dublin 1. (Permitted)	Development consists of the demolition of all structures on the site and the construction of a 270 No. bedroom (9,644 sq m) hotel and an (10,265 sq m) office. The hotel will range in height from 7 to 10 No. storeys, and the office will range in height from 6 to 9 No. storeys.	c. 250 m north	Final Grant, 07/01/20.
DCC Reg. Ref. 3197/20.		Minor amendments.		Final Grant, 16/11/20.
DCC Reg. Ref. 2143/20.	Castleforbes Business Park West, Sheriff Street Upper Dublin 1. (Permitted)	Development consists of the demolition of all existing structures on the site and the construction of a 219 No. bedroom hotel ranging in height from 6 to 9 No. storeys with total gross floor area of c. 9,241 sq m.	c. 350 m north west	Final Grant, 06/08/20.
ABP Reg Ref. PL29N.308827.	Castleforbes Business Park, Sheriff Street Upper & East Road, Dublin 1.	Demolition of all the structures on the site, 702 No. Build to Rent residential units, creche and associated site works.	C 250 m north west.	Pending decision by ABP. Case is due to be

Reference No.	Address	Project Description	Distance from Subject Site	Status
	(Pending Decision)			decided by 06/04/21.
ABP Reg. Ref. PL29N.304710.	Nos. 1-4 East Road Dublin 1. (Under Construction)	SHD consists of 3 to 15 No. storey mixed-use development of 554 No. apartments, commercial/enterprise space, crèche and associated site works on a 2.3 ha. site immediately north of the rail line.	c. 500 m north.	Grant w/ Conditions by ABP, 01/10/19.
ABP Reg. Ref. PL29N.306778.	Docklands Innovation Park, 128-130 East Wall Road Dublin 1. (Permitted)	SHD consisting of the demolition of most of the existing structures on the site and the construction of 336 No. residential units. The proposed development provides for 6 Blocks ranging from 4 to 10 No. storeys.	c. 650 m north	Grant w/ Conditions by ABP, 17/08/20.
DCC Reg. Ref. Ref. 3794/18.	Tara House, Tara Street Dublin 2. (Under Construction)	Development consists of the demolition of the existing Tara House Office Building and associated buildings at Nos. 2-16 Tara Street. Construction of a new 22 No. storey landmark office and hotel development with a rooftop restaurant over 2 No. levels of basement accommodation, to include an upgraded public concourse serving Tara Street Station. The new building will accommodate hotel accommodation in a podium element extending from 1st to 4th floor. Office accommodation is provided in the taller element from the 5th to the 20th floor.	c. 1.5 km west.	Final Grant, 02/04/19.
DCC Reg. Ref. 4054/19.		Amendments to planning application Reg. Ref 3794/18 (ABP Ref. 302980-18). The amendments consist of an additional hotel floor and mezzanine floor within the permitted envelope, but with		Final Grant, 07/1/20.

Reference No.	Address	Project Description	Distance from Subject Site	Status
		no overall change to the building height.		
DCC Reg. Ref. 4170/19.	Apollo House & College House Dublin 2. (Under Construction)	There has been a major update to permissions regarding these formerly separate sites; these sites have merged to form one. The development consists combined height of 21 No. storeys on part of the site.	c. 1.5 km west.	Grant w/ Conditions by ABP, 15/09/20.
DCC Reg. Ref. 2583/20.		Amendments consisting of a site increase of 0.09 ha. As well as other minor alterations.		Granted by DCC, 15/07/20. (Appealed) Appeal Withdrawn, 30/11/20.
DCC Reg. Ref. 3037/16.	Hawkins House, Hawkins Street Dublin 2. (Permitted)	Development consists of the demolition of the existing Hawkins House located on Hawkins Street and Poolbeg Street, and the construction of a commercial office building ranging in height from 6 to 10 No. storeys.	c. 1.5 km west.	Final Grant, 14/06/17.

Table 3.1: Development Projects Proximate to Subject Site. (Source: Information compiled by TPA from DCC and ABP websites, 2021.)

3.5 Production of Waste

An *Outline Construction Management Plan* prepared by PJ Hegarty & Sons, dated January 2021, and *Operational Waste Management Plan* prepared by ERM, dated November 2020, have been prepared in order to document the anticipated levels of and types of waste generated by the proposed development.

Please refer to those documents appended to Chapter 11 of this EIAR for details regarding the anticipated waste generation on foot of the proposed development, potential impacts, and proposed mitigation measures to ameliorate any anticipated negative impacts.

In summary, all waste generated during the construction and operational periods is proposed to be appropriately disposed of in accordance with the Waste Management Plans.

3.6 Emissions and 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 noise and vibration and air quality is contained in Chapters 9 and 10 of this EIAR respectively.

In addition, the preliminary *Outline Construction Management Plan* details the mitigation measures proposed to ameliorate any potential negative impacts.

3.7 Risk of Accidents

The risk of accidents arising as a result of the proposed development at both construction and operational phases will be minimised through detailed design considerations and health and safety management. Details of these design considerations and management measures are contained in the Preliminary *Outline Construction Management Plan* within this *EIAR*.

3.8 Secondary Projects

The subject proposal is not reliant on the completion of secondary projects and is thus a fully functioning independent project.

Whilst it abuts the site of a commercial proposal on the west on portion of the City Block 9 lands (and 'shares' some 710 sq m), both Schemes are totally mutually exclusive.

4.0 EXAMINATION OF ALTERNATIVES

4.1 Introduction

Tom Phillips + Associates prepared this chapter of the *Environmental Impact Assessment Report,* in conjunction with Henry J Lyons Architects. It examines the alternative development options that were considered for the subject site during the design development process.

The requirement to consider alternatives within an EIAR is set out in Annex IV (2) of the EIA Directive (2014/52/EU) and in Schedule 6(1)(d) of the *Regulations,* which require the following information to be included:

> "*A description of the **reasonable alternatives** studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics and an indication of the main reasons for the options chosen, taking into account the effects of the proposed development on the environment*".
>
> [Our emphasis].

"Reasonable alternatives" may relate to project design, technology, location, size and scale that were studied in the preparation of the EIAR relevant to the proposed development and its particular characteristics, together with an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

The *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* of August 2018 provide further guidance on this matter as follows:

> "*The types of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each. A 'mini-EIA' is not required for each alternative studied*".

Thus, the consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process.

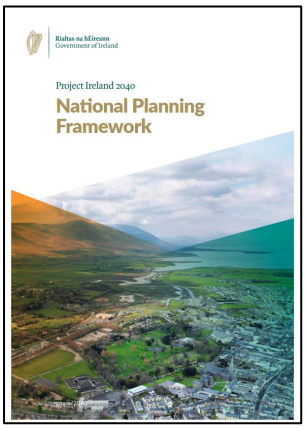
4.2 Rationale for the Proposed Development

The rationale for the development is to provide a high quality residential and mixed use development, comprising a significant quantum of residential accommodation, and complementary office use, with commensurate commercial, community uses, and residential amenity uses to serve the development.

This is fully supported in national, regional and local planning policy. In this regard, the *National Planning Framework 2040 - Our Plan (2018)*, identifies the need for consolidated growth in urban areas:

> "*making better use of under-utilised land and buildings, including 'infill', 'brownfield' and publicly owned sites and vacant and under-occupied buildings, with higher*

housing and jobs densities, better serviced by existing facilities and public transport". (*National Planning Framework*, 2018, pg. 22.)

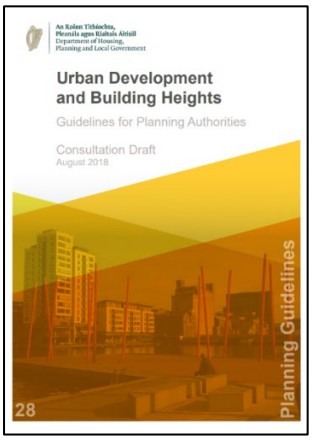


The provision of high density apartment development is advocated in the *Urban Development and Building Heights for Planning Authorities* (2018), under which the site is classified as a 'Central and/or Accessible Urban Location'. The Guidelines recognise the importance of increasing building height and promoting compact urban development in existing urban areas.

Section 1.4 of the Guidelines states:

> *"However, in recent years, local authorities, through the statutory development and local area plan process, have begun to set generic maximum height limits across their functional area. Frequently, such limits have resulted from local level concerns, like maintaining the character of an existing built up area, for example.* ***However, such limits, if inflexibly or unreasonably applied can undermine wider national policy objectives to provide for more compact forms of urban development*** *as outlined in the National Planning Framework and instead continue an unsustainable pattern of development whereby many of our cities and towns continue to grow outwards rather than consolidating and strengthening the existing built up area. Such blanket limitations can also hinder innovation in urban design and architecture leading to poor planning outcomes". (Urban Development and Building Heights for Planning Authorities,* 2018, pg. 1.)

[Our Emphasis]



The redevelopment of the site is also supported under the *Eastern & Midland Regional Assembly - Regional Spatial & Economic Strategy 2019-2031* (RSES) Objective (RPO) 4.3, which seeks the consolidation and re-intensification of infill / brownfield sites:

> "*to provide high density and people intensive uses within the existing built up area of Dublin city and suburbs and ensure that the development of future development areas is co-ordinated with the delivery of key water infrastructure and public transport projects.*" (*Eastern & Midland Regional Assembly - Regional Spatial & Economic Strategy 2019-2031,* pg. 52.)

The RSES identifies, in the *Metropolitan Area Strategy* of the *Eastern & Midland Regional Assembly - Regional Spatial & Economic Strategy 2019-2031*, the objective of achieving a population capacity of 60,000 (35,000 in the short term; 10,000 in the medium term and 15,000 in the long term), providing:

> *"significant brownfield lands in South Dublin and Dublin City Council areas, with potential for residential development and more intensive employment/ mixed uses".* (*Eastern & Midland Regional Assembly - Regional Spatial & Economic Strategy 2019-2031*, pg. 104.)

As referenced in Chapter 2 of this EIAR, the site is subject to the zoning objectives under the *Dublin City Development Plan 2016-2022* and is located in zone Z14 "Strategic Development and Regeneration Areas" (SDRAs) with the objective:

> *"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".*

As detailed in Section 2 of this EIAR, the site is within immediate proximity of existing and proposed high frequency public transport services, notably the Luas Red Line which terminates some 50m north east of the site.

Figure 4.1 below shows the context of public transport proximity to City Block 9 where the Site resides.

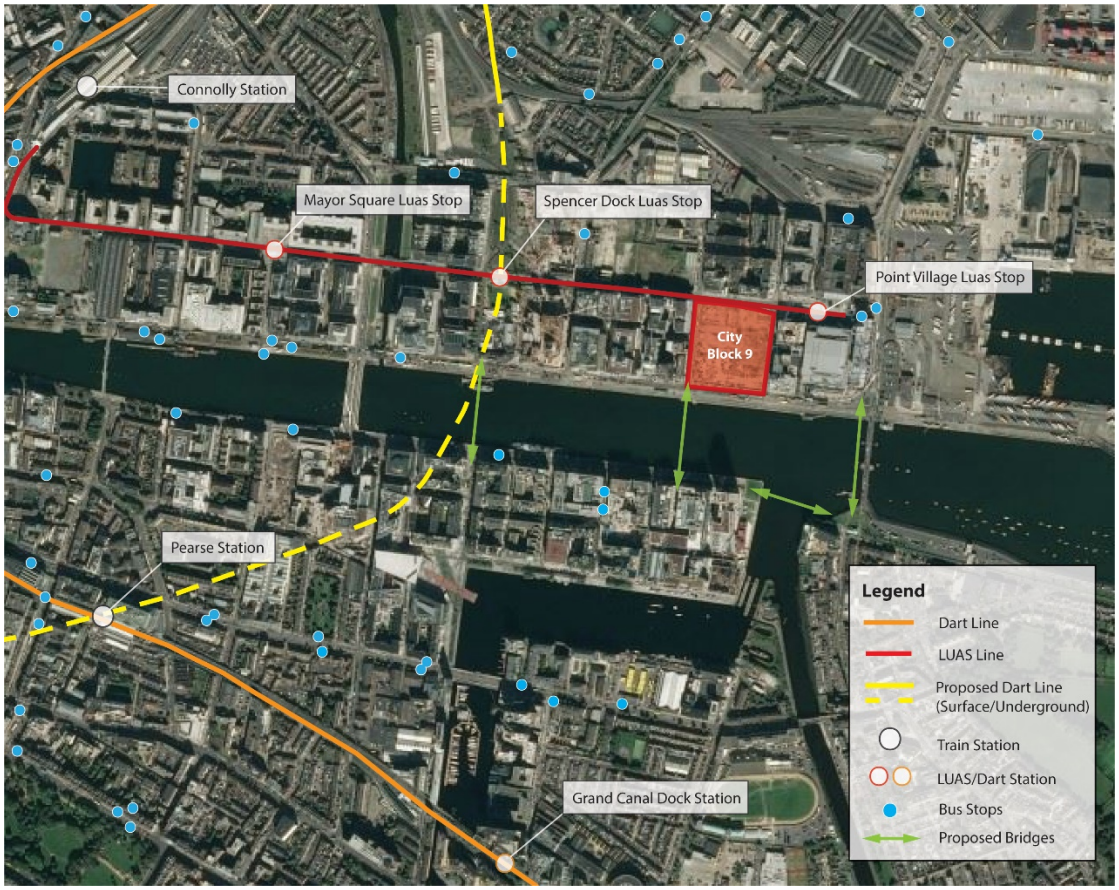


Figure 4.1: Map showing context of public transport proximity to City Block 9. (Source: Bing Maps, annotated by TPA, January 2021.)

The proposed development comprises the construction of 1,005 No. residential units arranged in 3 No. apartment blocks ranging in height from 8 No. storeys to 45 No. storeys over triple-level basement, with a cumulative gross floor area above ground of c. 102,889 sq m.

The development will also provide 4,307 sq m of "other uses" as defined by the *Planning and Development (Housing) and Residential Tenancies Act 2016,* comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmers' Market/foodhall (299 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Levels 41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C.

The proposed development includes a significant quantum of residential and employment generating uses, and will support local, regional and national policies in this regard.

4.3 Main Alternatives Studied

The main alternatives studied during the development of the project comprise alternative design solutions and layouts for the redevelopment of the eastern portion of City Block 9 to provide a primarily residential development on the site, in accordance with national, regional and local planning policy guidelines, as discussed further in Section 4.3.4 below.

4.3.1 Alternative Locations

Given the project comprises the redevelopment of the last remaining City Block within the North Lotts and Grand Canal Dock Strategic Development Zone, the consideration of alternative locations is not relevant in this instance.

The Planning Scheme is relatively prescriptive as to the appointment of commercial and residential land uses.

4.3.2 "Do-Nothing" Alternative

In the "Do-Nothing" scenario, the subject site remains a cleared, brownfield state with no useful purpose, and the potential to redevelop the site to provide for a residential and mixed use development, in accordance with national, regional and local planning policy would not be realised.

That would be contrary to the Development Plan's Regeneration initiative and the Government's designation of the Strategic Development Zone (SDZ)

4.3.3 Alternative Processes

This is not considered relevant to this EIAR having regard to the nature of the proposed development, which contains over 100 residential units and as such, it is mandatory that the planning application be submitted to An Bord Pleanála as a Strategic Housing Development under the *Planning and Development (Housing) and Residential Tenancies Act 2016*, where the "other uses'" portion does not exceed 4,500 sq m.

4.3.4 Alternative Design Approach

At the outset, the project architects undertook an extensive site appraisal to determine the appropriate scale, mass, and layout of this scheme. The design process commenced in 2018. We refer to the *Design Statement* (SHD) prepared by Henry J Lyons Architects dated January 2021 in this regard.

The analysis includes an assessment of the:

- Characteristics of the site and wider environs, proximity to the City Centre, as described in Chapter 2 of this EIAR;

- Existing and permitted development adjoining the site and within the wider area which changes the character of the site environs; and the

- Provisions of local, regional and national planning policy as referenced above and in particular, the provisions of the *North Lotts and Grand Canal Dock SDZ Planning Scheme 2014* which sets out proposed uses, masterplan form, and building heights, and recent National Policy (*Building Height Guidelines, 2018* and the *Apartment Guidelines, 2018*).

The masterplan for the site has been informed by the guidance set out in the *North Lotts and Grand Canal Dock SDZ Planning Scheme 2014* with respect to the placement of blocks on the site. Various options were considered as the scheme progressed and key considerations and design amendments were analysed having regard to the key environmental issues pertaining to the lands.

The environmental issues that have most informed the design process, to date, relate to visual impact, ecological considerations, water, noise impacts, and the potential impacts upon existing and future traffic and transportation in the area. These matters informed the consideration of alternative designs, layouts, and access arrangements up to the formalisation of the scheme submitted in this final application to the Board.

4.4 Alternative No. 1 – Reg. Ref. DSDZ3780/17

Alternative No. 1 studied comprised the previously permitted commercial development as proposed on this portion of the overall City Block 9 (Reg. Ref. DSDZ3780/17).

On 19 December 2017, Dublin City Council issued a Final Decision under Section 170 of the *Planning and Development Acts 2000* (as amended) for the development of *inter alia*:

- 4 No. commercial office buildings ranging in height from 6 storeys to 8 storeys;
- Construction of one level of basement beneath the proposed commercial building accommodating 360 bicycle parking spaces, 90 car parking spaces, plant, storage areas and other associated facilities, with access from the new north-south road to the east; and
- A public plaza, located onto North Wall Quay between Block D1 and D2, accessed from North Wall Quay, a new pedestrian route from the new north-south street to the East and a temporary new north-south pedestrian route centrally located through Block 9 connecting North Wall Quay and Mayor Street Upper.

That planning application was lodged concurrently with Reg. Ref. DSDZ3779/17 located on the western portion of City Block 9, which provided for a residential development and was granted permission on 19 December 2017, for the development of *inter alia*:

- 2 No. residential buildings ranging in height from 6 storeys to 11 storeys, a with a total gross floor area above ground of c. 41,364 sq m accommodating 420 No. apartments;
- A crèche of c. 281 sq. metres and 4 No. cafe/restaurant/retail units with a total floor area of 763.5 sq m;
- Construction of one level of basement beneath the residential buildings, accessed from a secure ramp on Castleforbes Road, accommodating 450 No. bicycle parking spaces, 288 No. car parking spaces, plant, storage areas and other associated facilities; and
- A pocket park of 760 sq m.

It should be noted that the primary land uses of each application under Reg. Ref. DSDZ3780/17 and Reg. Ref. DSDZ3779/17 have now been amended under the current proposal for the site whereby the subject residential proposal is now located primarily on the eastern portion of the site and the commercial proposal is located on the western portion of the site.

Figure 4.2 below shows the proposed site layout by Shay Cleary Architects for City Block 9, which was granted permission on 19 December 2017.

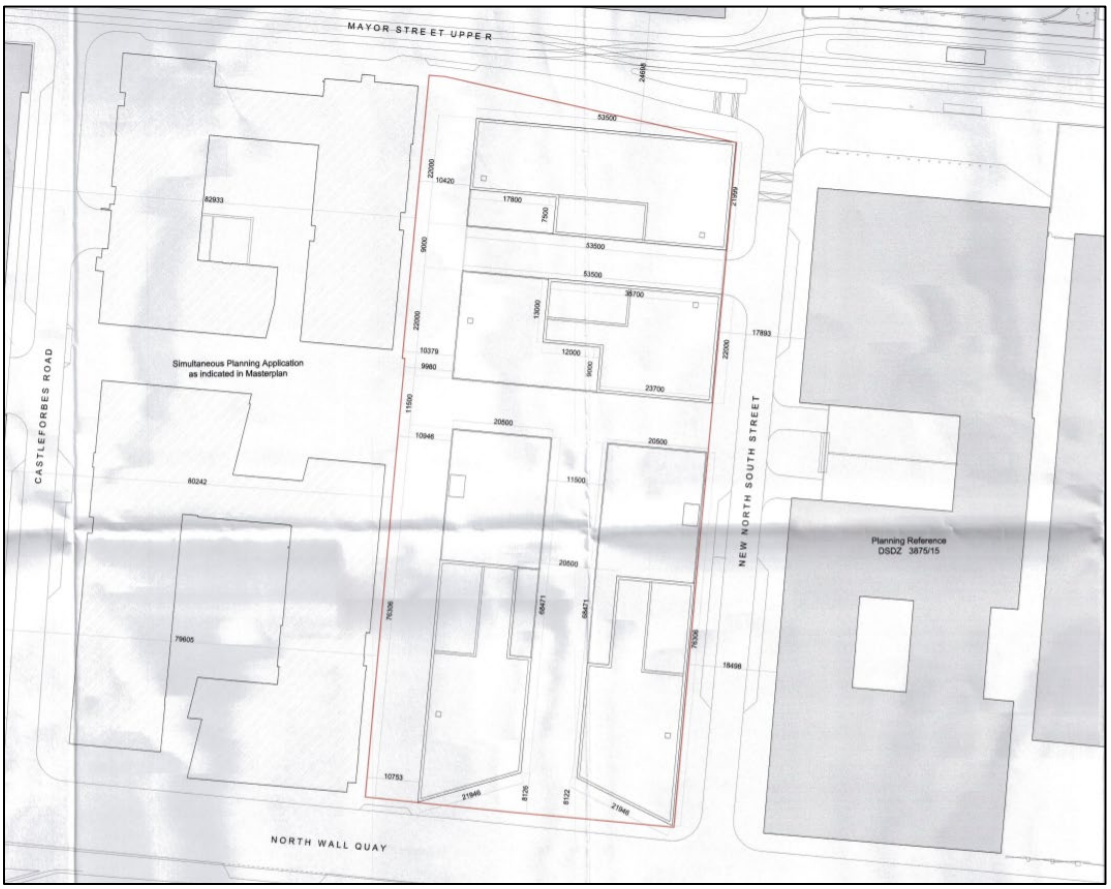


Figure 4.2: Proposed Site Layout (Source: Shay Cleary Architects, as submitted with Reg. Ref. DSDZ3780/17.)

It should also be noted that a third planning permission was granted on the overall City Block 9 site. Dublin City Council granted planning permission (Reg. Ref. DSDZ3042/19) on Wednesday, 22 January 2020 for the amalgamation of both basements as permitted under Reg. Ref. DSDZ3780/17 and Reg. Ref. DSDZ3779/17.

Ultimately, it was decided that the permitted schemes did not present the most appropriate density and quantum of uses for City Block 9 having regard to this City Block being the last remaining landholding with the North Lotts area which is undeveloped.

Further regard was had to National planning policies as published subsequent to the granting of planning permission for the extant schemes on the site and it was considered that more sustainable use of the lands could be achieved. It was also considered that a new proposal for the site could bring an opportunity to improve the environmental sustainability of the proposal by suing best international practice in terms of sustainable energy, encouraging and promoting biodiversity and creating a 'liveable city'.

The above rationale is considered to be in the interest of sustainable development, and the existing and future population of the North Lotts area.

4.5 Alternative No. 2 – The North Wall Tower

In 2008, proposals were underway to develop a landmark tower comprising 50,000 sq m of office space designed by London Architects Zaha Hadid. The design was considered to act as a complementary tower to that permitted on the south side of the River Liffey whereby plans were approved for a landmark tower of 130 m in October 2006 (Reg. Ref. DD492). Known as the U2 Tower, construction plans were cancelled in October 2008 due to the economic downturn.

The concurrent proposal by Zaha Hadid on the subject site did not progress towards a planning application for reasons also related to the economic downturn. Notwithstanding this, the rationale for a tall, landmark building at this location remains relevant. The subject site acts as a gateway to the City and arguably comprises the last remaining opportunity to provide for an architectural landmark for the docklands area.

However, whilst the rationale for a tall, landmark structure remains, the overall design rationale for the site has evolved having regard to the focus on the environmental sustainable and emphasis on the liveability of the new proposal. Therefore, the proposed development is considered to present a more suitable design response to the site which retaining the landmark status of the Zaha Hadid scheme.

Figure 4.2: Proposal by Zaha Hadid Architects for a landmark tower at the subject site c.2008. (Source: https://archiseek.com/2010/2009-north-wall-quay/ , accessed by TPA, November 2020.)

4.6 Final Proposed Development

The proposed development has been subject to a number of amendments since the submission of the earlier Pre-Application Consultation request to An Bord Pleanála, submitted on 13 December 2019. The proposal has evolved due to the feedback received from all relevant parties throughout the Pre-Application Consultation process.

There are a number of key differences between the originally proposed developments (December 2019 and May 2020) and the currently proposed development (January 2021).

These differences, *inter alia*, include:

- An increase from 999 No. residential units to 1,005 residential units;
- A reduction in the floor space allocated to "other uses", including office use and the provision of an increased level of retail/café use at lower ground and ground floor level, while remaining within the permitted 'other uses' floorspace use of 4,500 sq m; and
- Basement: clarification on the size and interface of the basement.

The scheme as proposed has had final refinements as a result of the design process with respect to engineering, mechanical and electrical inputs, as well as landscape design inputs to the overall layout.

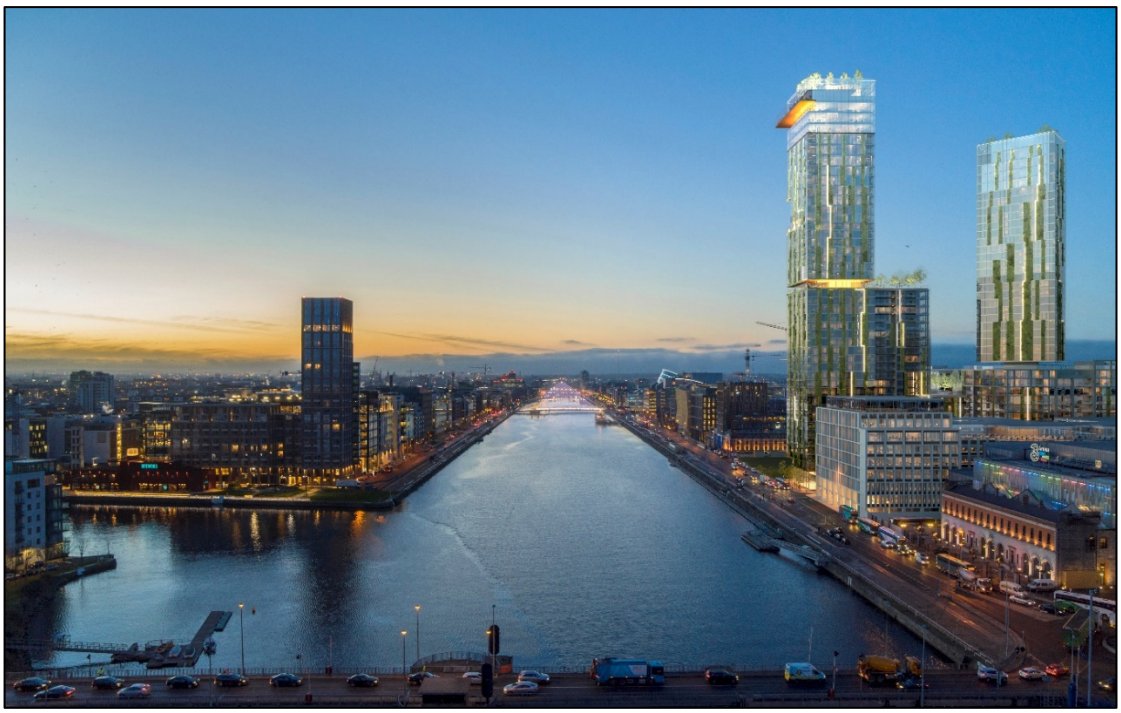


Figure 4.3: CGI of proposed scheme. (Source: Renderare, November 2020.)

4.6.1 Landscape Design

The overall design approach with respect to landscape design has not altered during the course of the design process. The proposed development includes significant levels of landscaping at all levels, ground, podium and roof level, as described in Chapter 3 of this EIAR. Extensive new public realm proposals and a pocket park are also proposed as required by the *North Lotts and Grand Canal Dock SDZ Planning Scheme 2014*.

Figure 4.4: Imagery of proposed public realm and landscaping. (Source, Cameo and Partners, *Landscape Access & Design Statement (SHD),* January 2021.)

4.7 Alternative Land Use Mix

The allowable use mix in respect of the subject site is led by the requirements of the *North Lotts and Grand Canal Dock SDZ Planning Scheme 2014*. It is stated that *"For City Block 9, it is an objective to secure the 50:50 residential: commercial use mix."*

This EIAR relates to the SHD Application, which provides for a primarily residential development, but with an element of "other uses", as facilitated by the 2016 Act. It is noted that the Applicant has lodged a concurrent Application for a commercial development on the balance of City Block 9 – its form to be guided by the content of the 2014 Planning Scheme.

As per the requirements of the *North Lotts and Grand Canal Dock SDZ Planning Scheme 2014*, a report titled, *City Block Roll Out Agreement - Proposal for an SHD Development at City Block 9*, has been prepared by Tom Phillips + Associates, dated 28 January, in respect of City Block 9. The *CBRA* demonstrates that the required mix will broadly be achieved at City Block 9 through the provision of a commercial development on the western portion (c. 0.85 ha), and a residential development on the eastern portion (c. 1.1 ha) of the site. Thus, a ratio of 1:0.84 or 50:41.5 (residential / commercial) is achieved. (The 0.85 ha site what might be called the "net SDZ site" as it excludes the 710 sq m that is also in the SHD site, to avoid double counting.)

It is therefore concluded that as the required land use mix has been achieved, no further alternatives should be considered.

4.8 Alternative Mitigation Measures

The mitigation measures which are outlined in the various chapters of the EIAR are considered appropriate to the location, nature and extent of the project and its potential impacts. As such, no alterative mitigation measures were considered.

4.9 Conclusion

Having examined various reasonable alternative designs it is considered that the proposed development is the preferred option in terms of the sustainable development of the subject site.

5.0 POPULATION AND HUMAN HEALTH

5.1 Introduction

Tom Phillips + Associates prepared this chapter of the *Environmental Impact Assessment Report* to examine the likely impacts of the proposed development on population and human health.

The scope of the work includes an evaluation of the likely direct and indirect effects on human beings and addresses any likely impacts on amenity and the local economy.

5.2 Methodology

The following guidelines informed the preparation of this Chapter:

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

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

- *Childcare Act* (1991) - *(Early Years Services) Regulations 2016;*
- *DoHPLG (2017) - Rebuilding Ireland – Action Plan for Housing and Homelessness;*
- Tusla Early Years Inspectorate Reports – Registered Childcare Facilities 2019;
- Census Boundaries and Statistics (2011 – 2020);
- ESRI (2020) - *Quarterly Economic Commentary, Winter 2020;*
- European Commission (2020) – *Autumn 2020 Economic Forecast: Ireland;*
- Health Safety Authority – www.hsa.ie;
- HSE Service Records – www.hse.ie; and

- Google Maps and Places.

5.3.1 Study Area Definitions

In order to assess the likely significant impacts of the proposed development on population and human health, we undertook an analysis of recent Census data. Data relating to the economic, demographic and social characteristics of the Local Authority (LA) area within which the subject site is located were examined.

Two study areas were used in the demographic analysis in order to assess the impacts of the proposed development on the surrounding population, as shown in Figures 5.1 and 5.2. The first study area (shown in Figure 5.1) provides information with respect to the Local Electoral Division (ED) context and includes 7 No. EDs that lie within the SDZ in which the subject site also lies. The EDs include: 'North Dock B' to which the site belongs; 'North Dock A'; 'North Dock C'; 'Mansion House A'; 'South Dock'; 'Pembroke West A'; and 'Pembroke East A', respectively.

The SDZ Study Area is shown on the next page. (See Figure 5.1.)

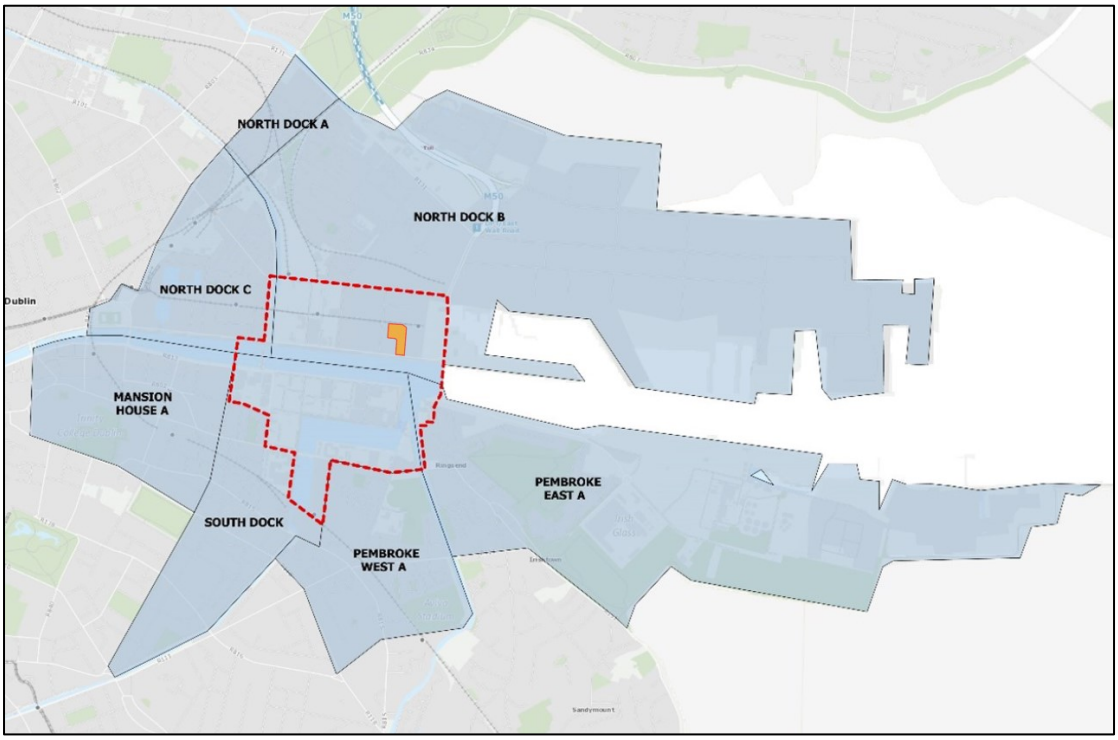


Figure 5.1: Extent of 2016 Census Electoral Districts representing the Docklands Study Area (shown in blue) with respect to the SDZ Study Area (shown in red dash). (Source: 2016 CSO boundaries, overlaid with DCC SDZ boundaries, produced by TPA, 2021.)

The second study area provides information with respect to the wider LA context in terms of economic and social impacts and includes the LA in which subject site resides - 'Dublin City'.

The Local Authority Study Area is shown on the next page. (See Figure 5.2.)

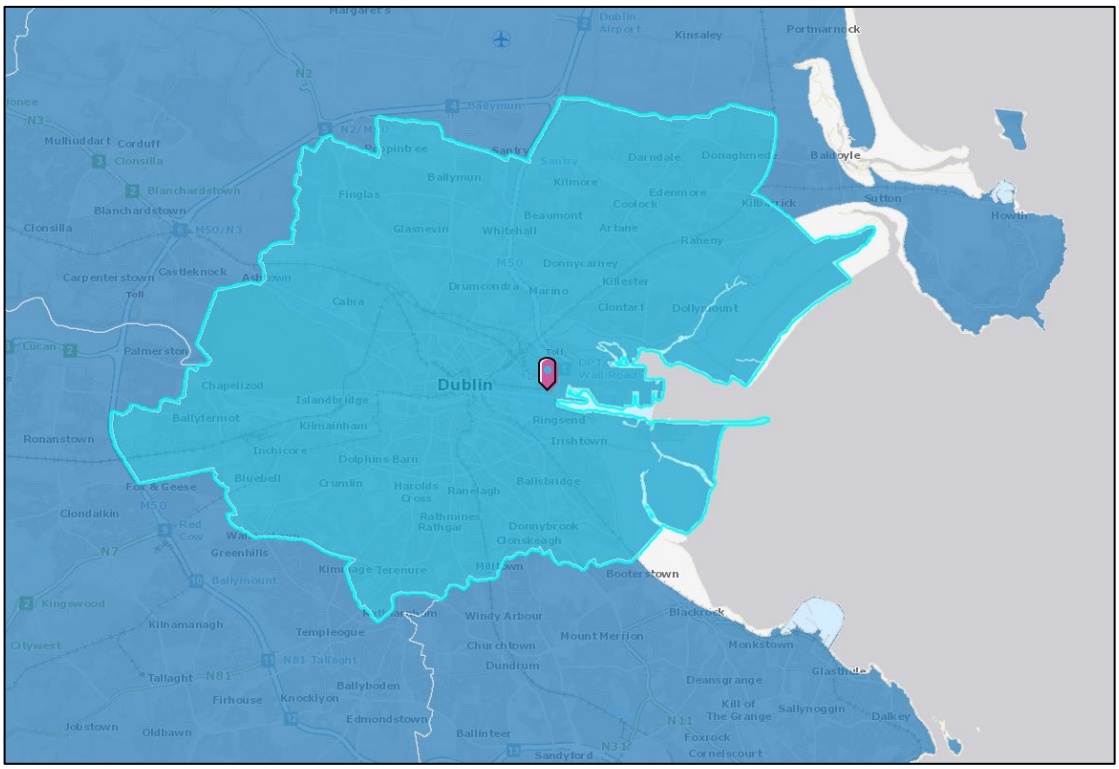


Figure 5.2: Extent of Local Authority Study Area 2016; Subject Site indicated by pink marker. (Source: OSI Open Data, annotated by TPA, January 2021.)

5.3 Project Description

The scheme, totalling 125,388 sq m, provides 22,499 sq m at basement levels, with 102,889 sq m from ground upwards. The development will consist of the:

1. Construction of 1,005 No. residential units (with balconies and winter gardens on all elevations) arranged in 3 No. blocks ranging in height from 8 No. storeys to 45 No. storeys over a triple-level basement (including mezzanine plant level), the former comprising: Block A (8-14 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 116 No. 1-bed; and 92 No. 2-bed; with landscaped terraces at Level 1 (south east elevation), Level 8 (south west elevation), Level 11 (south west elevation) and Level 14 (roof level)); Block B (8-41 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 172 No. 1-bed; and 247 No. 2-bed; with landscaped terraces at Level 5 (south west elevation), Level 8 (north west elevation and south west elevation), Level 11 (north elevation), Level 12 (west elevation), Level 13 (east elevation), Level 14 (east elevation), and at Level 41 (roof level)); and Block C (11-45 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 207 No. 1-bed; 168 No. 2-bed; and 3 No. 3-bed units; with landscaped terraces at Level 11 (north elevation), Level 24 (south, west and east elevation), Level 32 (south, west and east elevation), and Level 45 (roof level), incorporating a public viewing deck at Levels 44 and 45).

2. Provision of ancillary residential amenities and support facilities including: a residential study area (321 sq m), a gym/spa reception (52 sq m), a residents' games

room (91 sq m), a residents' common room (110 sq m), a residents-only social space (193 sq m), a management office (96 sq m), a security office (50 sq m), concierge spaces (GFA of 369 sq m) all located at ground floor level; a residents' games room (122 sq m) located at Level 1 of Block B; a residents' common room (86 sq m) located at Level 14 of Block B; a residents' wellness club and common room (408 sq m) located at Level 24 of Block C;

3. Construction of a triple level basement, comprising two levels of basement and a mezzanine plant level (total basement area 22,499 sq m), accommodating: waste storage areas (659 sq m), plant rooms (4,228 sq m), maintenance / management offices (GFA of 92 sq m), residents' courier / parcel rooms (GFA of 210 sq m), residents' laundry rooms (GFA of 138 sq m), ancillary residential storage (GFA of 291 sq m), residents' WCs (65 sq m), a residents' gym / spa (1,529 sq m) and ancillary gym storage room (100 sq m), residents' screening rooms (240 sq m), a residents' indoor plant cultivation room (356 sq m), 176 No. car parking spaces, 10 No. motorcycle parking spaces and 1,693 No. bicycle parking spaces, with vehicular access provided by ramp from North Wall Avenue.

4. Provision of 4,307 sq m of "other uses" as defined by the *Planning and Development (Housing) and Residential Tenancies Act 2016,* comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmers' Market/foodhall (299 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Levels 41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C.

5. Provision of 84 No. surface-level bicycle parking spaces, a pocket park, an external market area, a winter garden/seating area, and new pedestrian lanes from North Wall Quay, North Wall Avenue and Mayor Street Upper to the centre of the site.

6. All enabling and site development works, landscaping (including living walls), lighting, services and connections, waste management, interim site hoarding, and all other ancillary works above and below ground including the use of existing secant piling permitted under Reg. Ref. DSDZ3779/17 and DSDZ3780/17 (as amended by DSDZ3042/19).

5.4 Baseline Scenario

5.4.1 Population Trends

We obtained population demographics for each of the study areas from the Central Statistics Office (CSO) for the purposes of this assessment, and these are summarised in Tables 5.1 and 5.2.

As outlined in Section 5.3, the local study area comprises 7 No. EDs, which adjoin the subject site – 'North Dock B' (to which the subject site belongs); 'North Dock A'; 'North Dock C'; 'Mansion House A'; 'South Dock'; 'Pembroke West A'; and 'Pembroke East A'.

The total population of the Docklands Study Area increased by more than 4% from 2011 to 2016, with a recorded population of c. 35,000 No. persons in 2016. For comparison, the Dublin City population increased by 5%, and the State population by 4%, for the same 5-year period.

Table 5.1 on below outlines the population trends over the last 3 Census years at State, LA, Docklands, and SDZ study areas.

Percent Change in Total Population 2006-2016					
Total Population	**2006**	**2011**	**2016**	**2006-2016 Growth %**	**2011-2016 Growth %**
State	4,239,848	4,588,252	4,761,865	12%	**4%**
Dublin City	506,211	527,612	554,554	10%	**5%**
Docklands	30,605	33,621	35,013	14%	**4%**
SDZ Study Area[1]	5,101	6,508	7,077	39%	**9%**

Table 5.1: Population Trends at State, LA, Docklands and SDZ Study Area (Source: Census 2006, 2011, 2016, by TPA, January 2021).

(With respect to the local population recorded for the North Lotts and Grand Canal Dock SDZ Study Area, we note that it is not always possible to compare the Small Area Population figures directly, as these boundaries can change from one Census period to the next.)

However, the closest approximation of population change recorded for the SDZ Area was made using the available datasets and shows an increase of 9% in the most recent 5-year period (2011-2016) and nearly 40% in the recent 10-year period (2006-2016). There were 7,077 No. persons recorded within the SDZ Study Area in 2016, which represented approximately 20% of the wider Docklands population at the time of the Census.

5.4.1.1 Population Profile

The age profile of the North Lotts and Grand Canal Dock SDZ Area is young, with the majority of residents falling within the 'Adults' cohort (64% of the total population). The remaining age cohorts each comprise less than 15% of the total population, with the highest proportions belonging to the 'Older Adults' cohort (14%) and 'Young Adults' cohort (10%).

The SDZ Area was stated to comprise much lower percentages of the 'School Age', 'Older Adults' and 'Elderly' cohort than the rest of Dublin City, with c. 10% less of the total population recorded in each category. With respect to this, the 'Adults' (25-44 years) cohort was much higher in the SDZ than in Dublin City, comprising approximately 25% more of the total population.

[1] The extent of the SDZ Area comprises those Small Areas were shown intersect the SDZ boundary by c. 20% or more and contain identifiable residences within the boundary area. We note that 26 No. Small Areas were identified within the extents from the 2011 Census period and 31 No. Small Areas were identified within the extents from the 2016 Census period. We note that 6 No. City Enumeration Areas were identified within the extents from the 2006 Census period, which were used to approximate similar population values for the earlier period.

Table 5.2 below outlines the population numbers by age in the SDZ and LA study areas.

Population by Age Cohort				
Age Cohort	**SDZ Area**	**% Total**	**Dublin**	**% Total**
Pre-school (0-4 years)	279	**4%**	30,683	**6%**
School Age (5-18 years)	341	**5%**	74,487	**13%**
Young Adults (19-24 years)	727	**10%**	51,308	**9%**
Adults (25-44 years)	4,499	**64%**	207,338	**37%**
Older Adults (45-64 years)	974	**14%**	118,383	**21%**
Elderly (65+ years)	257	**4%**	72,355	**13%**
Total Population	**7,077**	**-**	**554,554**	**-**

Table 5.2: Population by age cohort in the SDZ Study Area. (Source: Census 2016, by TPA, January 2021.)

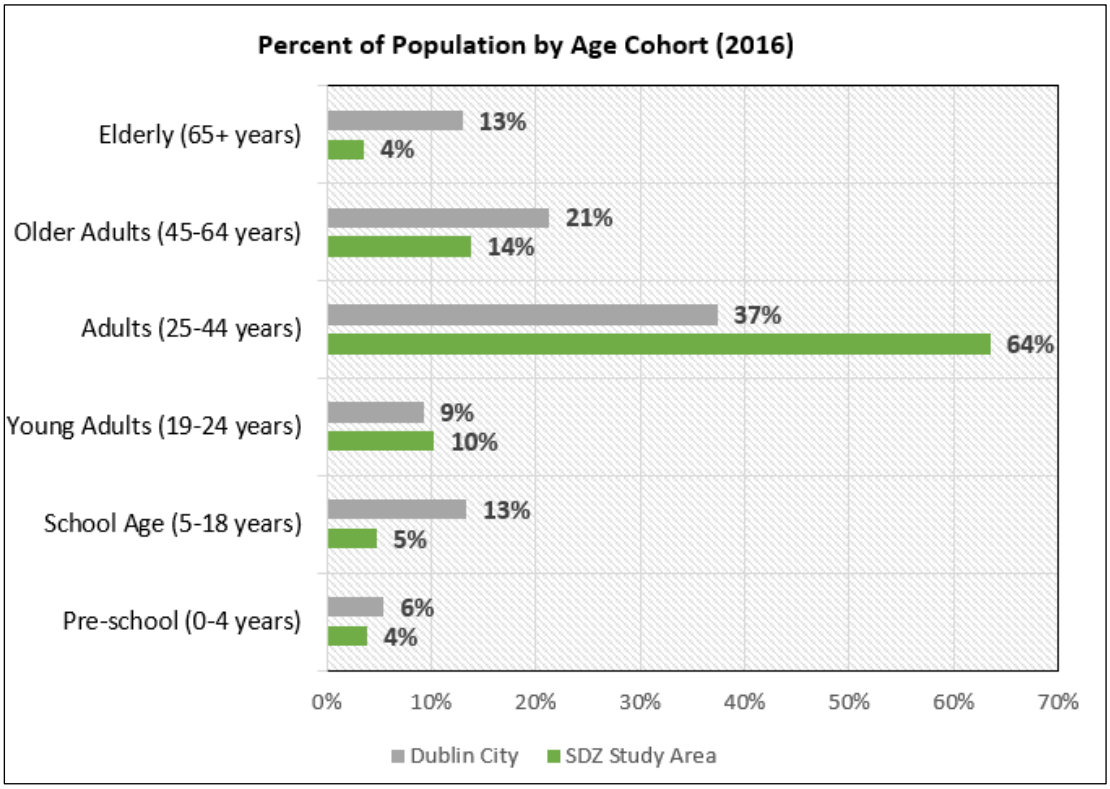


Figure 5.3: Percent of population by age cohort in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

Local Authorities	Average Age	Total Population	Dependent Population[2]	Dependency Ratio
Dublin City	37.9	554,554	155,568	28.1
State	**37.4**	**4,761,865**	**2,509,503**	**52.7**

Table 5.3: Dependency Ratio of Local Authority Population. (Source: CSO 2016.)

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

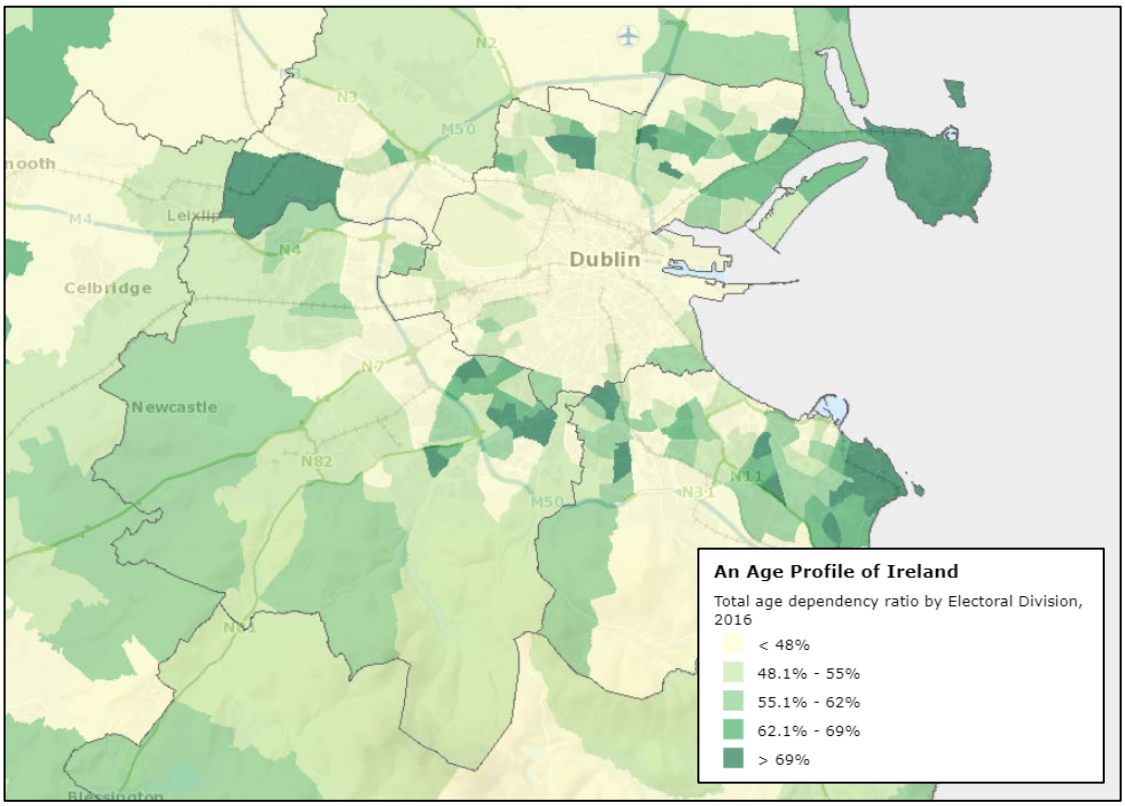


Figure 5.4: Extract of 'Age Dependency Ratio by Electoral Division, 2016' Map showing concentrations of older and younger populations within Dublin City. (Source: Census data, 2016, by TPA, January 2021.)

5.4.1.2 Resident Nationalities

A diverse and multi-cultural population exists within the SDZ area, with: 47% of the total population recorded as being Irish; 23% "European" (i.e. rest of Europe); and 12% from the rest of the world in 2016. This represents a slight decrease in the percentage of Irish persons living in the area in 2011 (decrease from 53% of total population).

Nationality Profile of SDZ Area				
Reported Nationality	**2011**	**% of Total**	**2016**	**% of Total**
Irish	3,436	**53%**	3,298	**47%**
Rest of Europe	1,568	**24%**	1,609	**23%**
Rest of World	761	**12%**	834	**12%**
Other/Not Stated	743	**11%**	1,336	**19%**
Total	**6,508**	**-**	**7,077**	**-**

Table 5.4: Nationality Profile of SDZ Study Area. (Source: 2016 Census data, as summarised by TPA, January 2021.)

5.4.1.3 Families and Households

Within the SDZ, the 'Pre-Family' units (i.e. married or cohabiting couple without children where female is under 45 years) dominate the population at 57% of the total family cohort, which aligns with the young age profile recorded for the area. The 'Pre-School' cohort (i.e. where oldest child is aged 0-4 years) formed the second highest category within the area (15%) and 'Adult' families (i.e. where oldest child is aged 20 years and over) ranked third (8%).

Families by Family Cycle					
Family Cycle		SDZ Area No. of Families	% Total	Dublin City No. of Families	% Total
No Children	Pre-Family	678	**56%**	22,925	**18%**
	Empty Nest	62	**5%**	9,880	**8%**
	Retired	10	**1%**	11,452	**9%**
With Children	Pre-School	179	**15%**	13,387	**11%**
	Early School	60	**5%**	12,487	**10%**
	Pre-adolescent	54	**5%**	10,648	**9%**
	Adolescent	61	**5%**	12,166	**10%**
	Adult	97	**8%**	32,255	**26%**
Total		**1,201**	-	**125,200**	-

Table 5.5: Families by Family Cycle in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

Family units with no children (62% of total) formed the highest proponent of the SDZ population, which was significantly higher than the same cohort within Dublin City (35%).

For those families with children, the majority were recorded as having one child (22%), and of those children, approximately 75% were recorded as being under 15 years of age.

Two-child family units ranked second highest within the area at 13%, with the remaining categories each comprising 2% or less of the total population.

Family Units with Children, by Size and Age of Children					
No. of Children	**All Children <15**	**All Children 15+**	**Children both <15 and 15+**	**Total**	**% Total**
No children	0	0	0	750	**62%**
1 child	198	67	0	265	**22%**
2 children	79	40	32	151	**13%**
3 children	14	5	7	26	**2%**
4 children	2	1	5	8	**0.1%**
5+ children	0	1	0	1	**0.1%**
Total	**293**	**114**	**44**	**1,201**	-

Table 5.6: Family units with children by size and age of children in SDZ Study Area. (Source: 2016 Census data, as summarised by TPA, January 2021.)

Household sizes within the SDZ area are small, with one-person households (28%) and two-person households (47%) comprising three-quarters of the area's population.

The number of two-person households in this area is much higher than the wider Dublin City area, where only 32% of the households were recorded as being 2-person units.

Private Households by Size				
Household Size	**SDZ Area No. of Households**	**% Total**	**Dublin City No. of Households**	**% Total**
1-person	843	**28%**	60,001	**28%**
2-person	1439	**47%**	67,707	**32%**
3-person	546	**18%**	36,277	**17%**
4-person or more	239	**8%**	47,762	**23%**
Total	**3,067**	-	**211,747**	-

Table 5.7: Private households by size in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

5.4.2 Housing

Housing completions across the State plummeted after the economic crash of 2008 with completions declining from almost 90,000 No. units per year in 2007 to approximately 11,000 No. units in 2014 (see Figure 5.5).

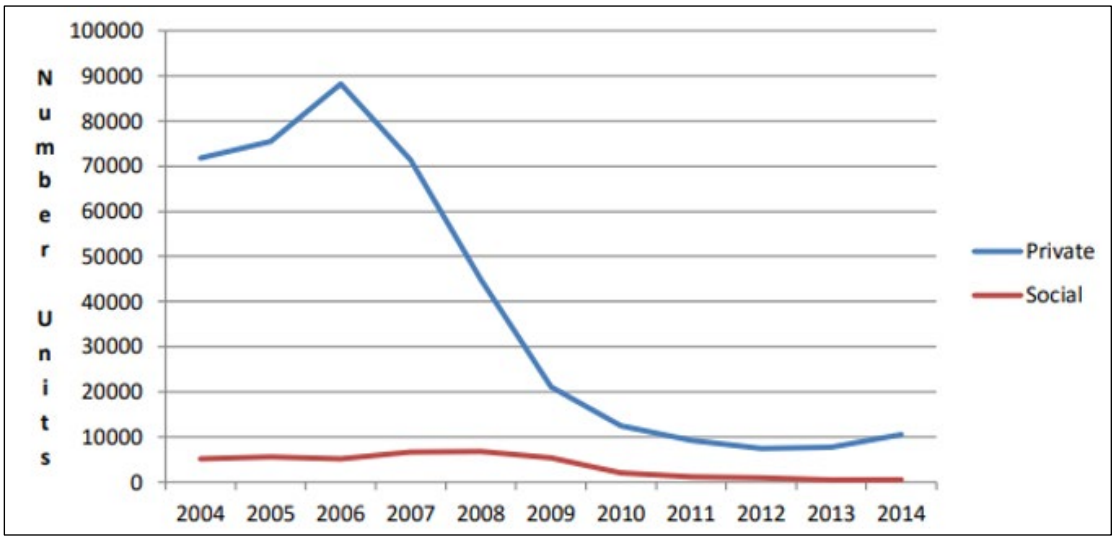


Figure 5.5: 'Housing Completions by Sector, 2004-2014'. (Source: Report of the *Committee on Housing and Homelessness,* June 2016.)

In response to this, a central objective of the Government's "*Rebuilding Ireland – An Action Plan for Housing and Homelessness*" (2016) policy document is to double the annual level of residential delivery across the country, as follows:

> *"This Plan sets ambitious targets to* ***double the annual level of residential construction to 25,000 homes and deliver 47,000 units of social housing in the period to 2021,*** *while at the same time making the best use of the existing housing stock and laying the foundations for a more vibrant and responsive private rented sector."*[3]

[Our emphasis.]

The latest Economic and Social Research Institute's (ESRI) *Quarterly Economic Commentary Winter 2020* notes that after a consistent gradual increase over the past decade, completions have fallen by approximately 10%:

> *"****In Q3 2020 there were 5,118 new residential completions, a 9.4 per cent decline on the same period the previous year****. While any decline in housing completions is unwelcome given the ongoing issue of undersupply in the market, the scale of the decline is* ***significantly less than that experienced in Q2 when the initial lockdown restrictions were in place.*** *For six weeks over this period all work on construction sites was prohibited as part of the administrative restrictions. As a result, there were just* ***3,247 completions in the country in Q2 2020, a decline of 32.6 per cent on the same quarter the previous year.****"*

[Our emphasis.]

[3] DHPCLG (2016) *Rebuilding Ireland – Action Plan for Housing and Homelessness*, p.6.

Due to the release and roll-out of Covid-19 vaccines ongoing in 2021, it is projected that housing demand will rise:

> *"In the event of a **vaccine becoming widely available in the country next year** it is likely that there will be a **significant reduction in both unemployment and uncertainty.** As noted in Allen-Coghlan et al. (2020), 12 this may result in significant **upward pressure on housing demand** through the latter part of 2021. While changes in the demand side of the housing market are likely to occur quite quickly, Allen-Coghlan et al. (2020) argue the impact on the **supply side of the market will likely take longer to pass through.**"*

[Our emphasis]

Thus, to meet this demand, housing completions must increase.

The total housing stock recorded for the SDZ study area comprised 13,923 No. units, of which some 3,645 No. units were located within the 'North Dock B' Electoral Division. The vacancy rate for the study area was lower than the national average but more than Dublin City at c. 11.3% in 2016, and we note that 443 No. housing units were identified as vacant within 'North Dock B.'

Year	2011			2016		
Area	**Total Stock**	**Vacant Stock**	**Vacancy Rate**	**Total Stock**	**Vacant Stock**	**Vacancy Rate**
North Dock B	3,681	548	14.9%	3,645	443	12.2%
SDZ Study Area	16,900	1952	11.6%	13,923	2076	11.3%
Dublin City	241,678	24,638	10.2%	240,553	18,424	7.7%
State	1,994,845	289,451	14.5%	2,003,645	245,460	12.3%

Table 5.8: Change in Total Housing Stock[4] in North Dock B (Subject Site ED), SDZ Study Area, LA and State. (Source: 2011-2016 Census data, as summarised by TPA, January 2021.)

The most recent Census figures for the area indicate that housing completions in Dublin 1, where the subject site is located, were comparatively low, with only 622 No. dwellings completed from Q1 2013 to Q4 2019 (see Table 5.10.)

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

Area	2013	2014	2015	2016	2017	2018	2019
Dublin 1	17	171	67	24	62	30	151
All Dublin Postcodes	660	1,359	1,447	2,987	4,704	5,309	5,207
Ireland	4,575	5,518	7,219	9,882	14,355	17,920	21,107

Table 5.9: New Dwelling Completions by Eircode Output and Year. (Source: CSO[5], as summarised by TPA.)

The 2016 Census recorded 2,914 No. private households[6] within the SDZ boundary, of which 94% were Apartments. Houses comprised 6% of the total housing stock, with all other types of accommodation comprising less than 1% each of the total. With respect to these statistics, a much higher proportion of the SDZ Area population were living in apartments at the time of the 2016 Census when compared to Dublin City (25%).

Table 5.10 outlines the number private households by type of accommodation in the SDZ and LA study areas.

Private Households by Type of Accommodation				
Type of Accommodation	**SDZ Area Households**	**% Total**	**Dublin City Households**	**% Total**
House/Bungalow	185	**6%**	133,709	**69%**
	2,720	**93%**	72,526	**25%**
	0	**0%**	2,011	**0.5%**
	3	**0.1%**	156	**0.1%**
	5	**0.2%**	3,345	**2%**
Total	**2,913**	**-**	**211,747**	**-**

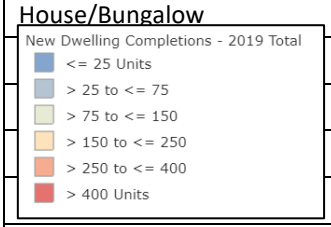


Table 5.10: Private Households by type of accommodation in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

Of the 3,779 No. permanent dwellings[7] reported within the SDZ Area, approximately 79% were occupied on the night of the Census. This equates to a higher percentage of vacant and unoccupied housing stock (16%) than was recorded for Dublin City (8%).

Occupancy Status of Permanent Dwellings on Census Night				
Occupancy Status	**SDZ Area Dwellings**	**% Total**	**Dublin City Dwellings**	**% Total**
Occupied	2,998	**79%**	213,224	**89%**
Temporarily absent	192	**5%**	7,883	**3%**
Unoccupied holiday homes	146	**4%**	1,022	**0.4%**

[5] New Dwelling Completions, Selected from CSO Statbank Table NDA01. Information for Eircode Routing Key is based on the substation of the dwelling for which there is missing data on some of the observations.
[6] A *private household* comprises either one person living alone or a group of people (not necessarily related) living at the same address with common housekeeping arrangements.
[7] A *permanent dwelling* is defined as a residence which was available for occupancy at the time of census enumeration. Communal establishments, temporary private households, along with dwellings categorised by the enumerators as being derelict, commercial only, or under construction are excluded from this definition.

Other vacant dwellings	443	**12%**	18,424	**8%**
Total	**3,779**	-	**240,553**	-

Table 5.11: Occupancy status of permanent dwellings on census night in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

In terms of tenure, households within the SDZ Area are primarily private rented (55%) with owner-occupied with mortgage (18%) and local authority rented (7%) units ranking second and third respectively. Within Dublin City, private rented units (30%) form the majority of households, with owner-occupied units without mortgage (27%) or with mortgage (23%) following close behind in the rankings.

Table 5.12 outlines the number of permanent private households by type of occupancy in the SDZ and LA study areas.

Table 09: Permanent Private Households by Type of Occupancy				
Type of Occupancy	**SDZ Area Households**	**% Total**	**Dublin City Households**	**% Total**
Owner occupied with mortgage	521	**18%**	48,209	**23%**
Owner occupied no mortgage	142	**5%**	57,064	**27%**
Rented from Private Landlord	1,597	**55%**	62,865	**30%**
Rented from Local Authority	205	**7%**	24,654	**12%**
Rented from Voluntary Body	86	**3%**	3,274	**2%**
Occupied free of rent	45	**2%**	2,761	**1%**
Not stated	314	**11%**	12,764	**6%**
Total	**2,910**	-	**211,591**	-

Table 5.12: Permanent private households by type of occupancy in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

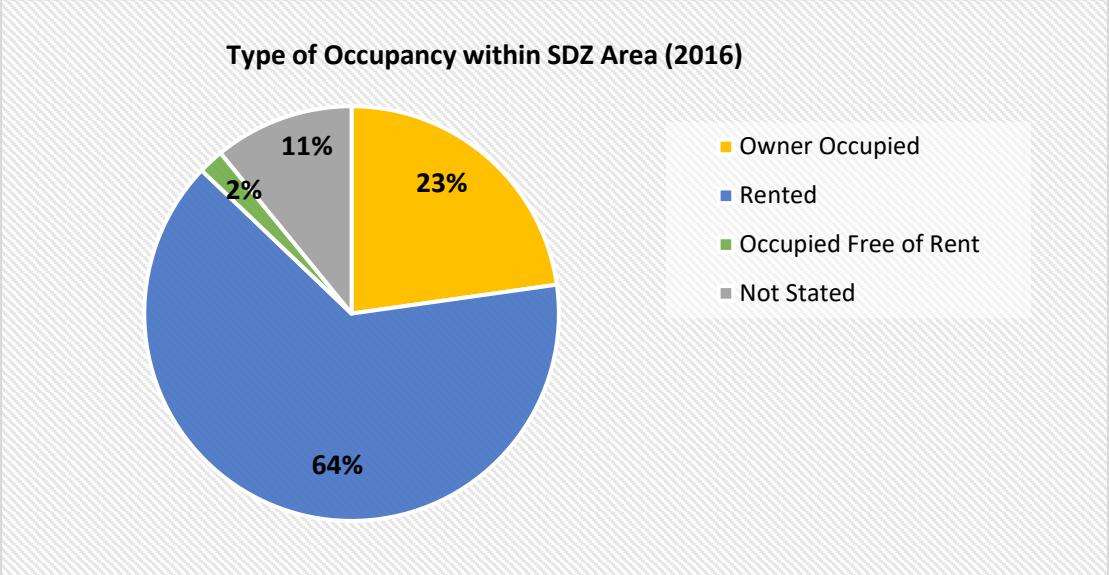


Figure 5.6: Type of occupancy in SDZ Study Area. (Source: 2016 Census data, as summarised by TPA, January 2021.)

Most of the residential units within the SDZ Area were built between 2001-2010 (58%), with an additional 15% built between 1991-2000. In total, some 60% of the recorded units have been built since 2001, contributing to a much younger collection of housing stock overall than is present in the greater city (only 15% built in Dublin City since 2001).

Older housing stock within the area (built pre-1990) accounts for only 10% of the total households of the SDZ, while the remaining 16% (Not stated) were uncategorised.

The number of rooms[8] recorded within private households provides some indication of the size and character of units occupied by the majority of the population. Within the SDZ Area, 3-room units top the ranks (34%), followed by 2-room units (23%) and 4-room units (21%). Single room units (studios) account for only 4% of the total households.

Overall, private households are much smaller within the SDZ than in Dublin City, which recorded a majority of 5-room units (19%) followed by 3- and 4-room units (15% each) in 2016.

Permanent Private Households by Year Built				
Period Built	**SDZ Area Households**	**% Total**	**Dublin City Households**	**% Total**
Pre 1919	82	**3%**	27,370	**13%**
1919 - 1945	21	**1%**	26,428	**13%**
1946 - 1960	48	**2%**	31,673	**15%**
1961 - 1970	41	**1%**	18,657	**9%**
1971 - 1980	22	**1%**	17,870	**8%**
1981 - 1990	50	**2%**	13,346	**6%**
1991 - 2000	432	**13%**	18,298	**9%**
2001 - 2010	1,674	**58%**	28,154	**13%**
2011 or later	77	**3%**	2,538	**1%**
Not stated	463	**16%**	27,257	**13%**
Total	**2,910**	**-**	211,591	**-**

Table 5.13: Permanent Private Households by Year Built in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

Permanent Private Households by Number of Rooms				
Number of Rooms	**SDZ Area Households**	**% Total**	**Dublin City Households**	**% Total**
1 room	109	**4%**	11,337	**5%**
2 rooms	665	**23%**	26,105	**12%**
3 rooms	998	**34%**	31,446	**15%**
4 rooms	616	**21%**	31,796	**15%**
5 rooms	156	**5%**	39,358	**19%**
6 rooms	37	**1%**	28,889	**14%**
7 rooms	10	**0.3%**	13,698	**7%**
8 or more rooms	5	**0.2%**	11,370	**5%**
Not stated	314	**11%**	17,592	**8%**

[8] The number of rooms includes kitchens, bedrooms and living rooms, but excludes bathrooms, storage space and utilities.

Total	**2,910**	**-**	**211,591**	**-**

Table 5.14: Permanent Private Households by Number of Rooms in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

5.4.3 Socio-Economic Status

With respect to the socio-economic status of local residents, the Pobal Deprivation Index utilises CSO statistics to analyse areas with high levels of affluence or disadvantage throughout the country. The 'North Dock B' Electoral District (including the subject site) was identified as an 'affluent' area in 2011 at 10.8 and 'affluent', again, in 2016 at 11.1 by Pobal, values which represent much higher levels of affluence than the surrounding local development company area and wider county.

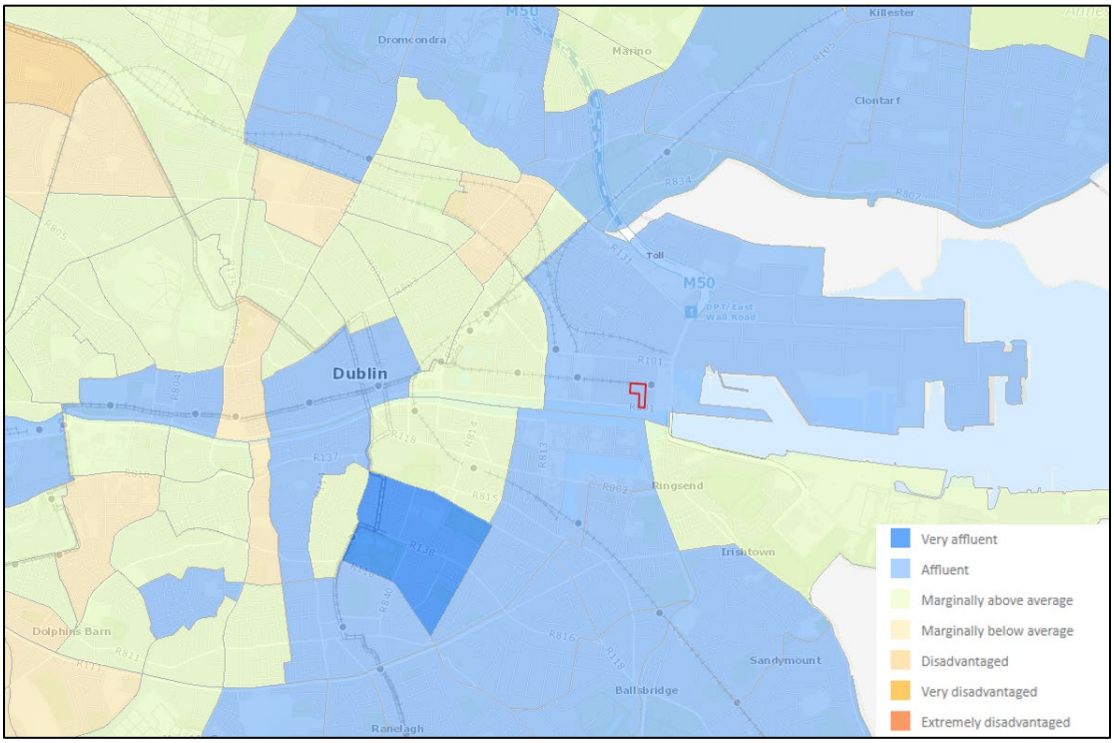


Figure 5.7: Extract of 'Deprivation Indices' Map showing 2016 deprivation index rates by Electoral Division – Indicative Location of Subject Site within Red line. (Source: Pobal 2021, based on Census 2016.)

Area Definition	2011	2016
'North Dock B'	10.8 Affluent	11.1 Affluent
SDZ Study Area	8.99 Marginally Above Avg	8.47 Marginally Above Avg
Dublin City	-4.5 Marginally Above Avg	-1.4 Marginally Below Avg
State	-6.4 Marginally Below Avg	-3.6 Marginally Below Avg

Table 5.15: Deprivation Indices for 'North Dock B', SDZ Study Area, LA and State. (Source: Pobal 2021, based on Census 2011, 2016.)

5.4.3.1 Employment Levels

The most recent *ESRI Quarterly Economic Commentary (Winter 2020)* shows that the national unemployment rate as a percentage of the total labour force is 21% as of November 2020[9]. This is approximately a 300% increase compared to 2019 levels. This large increase in unemployment has undoubtedly been because of the Covid-19 Pandemic of 2020 and the subsequent Government restrictions, which resulted in many businesses being forced to shut down.

With respect to the Census statistics produced every five years, the socio-economic status within the SDZ Area has been increasing. More than 80% of the total population was at work at the time of the 2016 Census, which is significantly higher than the 56% recorded for Dublin City.

The unemployment rate within the area was 4%, nearly half of the Dublin City rate of 7%.

This highlights the strong employment role of the SDZ, which has carried from the period in which the original *Planning Scheme* was published.

Population Aged 15+ by Principal Economic Status				
Status	**SDZ Area**	**% Total**	**Dublin City**	**% Total**
At work	5,539	**80%**	265,670	**56%**
Looking for first regular job	44	**1%**	4,686	**1%**
Unemployed having lost or given up previous job	271	**4%**	34,514	**7%**
Student	501	**7%**	53,067	**11%**
Looking after home/family	205	**3%**	28,734	**6%**
Retired	260	**4%**	63,637	**14%**
Unable to work due to permanent sickness or disability	86	**1%**	18,665	**4%**
Other	7	**0.1%**	2,368	**0.5%**
Total	**6,913**	**-**	**471,341**	**-**

Table 5.16: Population aged 15+ by principal economic status in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

[9] *ESRI (Winter 2020) Quarterly Economic Commentary*

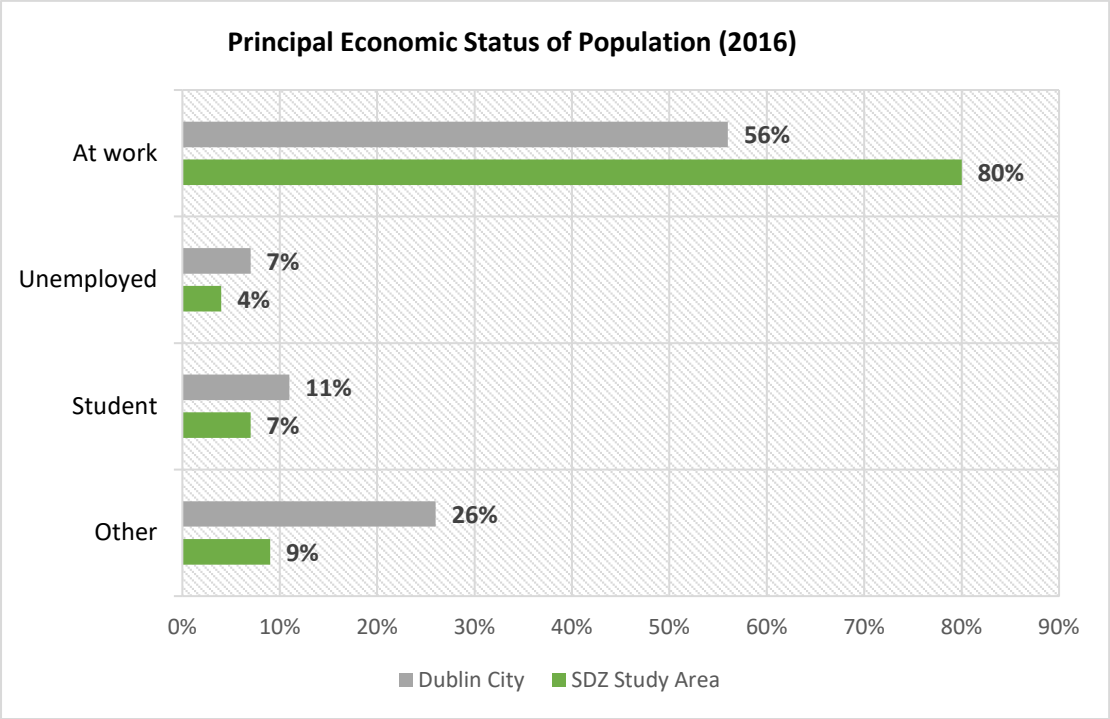


Figure 5.8: Principal Economic Status of Population (2016) in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

'Managerial and Technical' workers form the largest occupational class within the SDZ Area (35%), followed by the 'Professional' (14%) and 'Non-manual' (14%) classes.[10] Other types of worker classes comprise less than 5% each of the total population.

Managerial and technical workers similarly top the social class composition within Dublin City, comprising 27% of the total population in 2016. We note that the number of Professional workers has decreased from c. 35% in the previous 2011 Census period to 14% in 2016, which may indicate a reduced desire or ability for these persons to reside within the SDZ.

[10] The 'All others gainfully occupied and unknown' class (27%) has been excluded from these rankings, as this is a category where no precise allocation is possible and may be which may contain individuals from a number of the other listed classes.

Population by Social Class				
Status	**SDZ Area**	**% Total**	**Dublin City**	**% Total**
Professionals	994	**14%**	53,492	**10%**
Managerial and Technical	2,461	**35%**	147,267	**27%**
Non-manual	1,018	**14%**	89,661	**16%**
Skilled manual	332	**5%**	62,892	**11%**
Semi-skilled	275	**4%**	50,188	**9%**
Unskilled	92	**1%**	20,871	**4%**
All others gainfully occupied and unknown	1,905	**27%**	130,183	**24%**
Total	**7,077**	**-**	**554,554**	**-**

Table 5.17: Population by social class in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

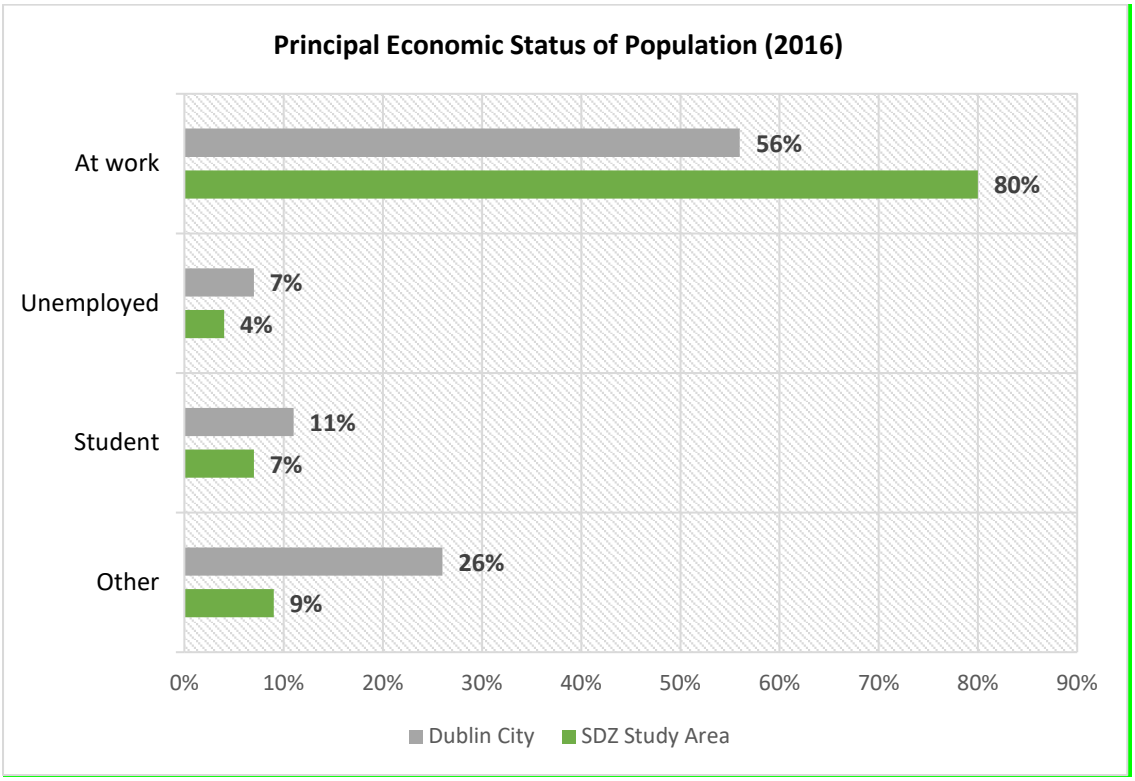


Figure 5.9: Principal economic status of population in SDZ and LA Study Areas (Source: 2016 Census data, as summarised by TPA, January 2021.)

The dominant industries represented within the SDZ are 'Commerce and Trade' (30%), 'Transport and Communications' (23%) and 'Professional Services' (11%). There is a relatively large proportion of 'Transport and Communications' workers within the SDZ Area when compared to the rest of Dublin City (13%), which highlights the importance that the communications' sector (particularly social media) has played in the development of the SDZ.

Persons at Work by Industry				
Industry	**SDZ Area**	**% Total**	**Dublin City**	**% Total**
Agriculture, Forestry and Fishing	4	**0.1%**	356	**0.1%**
Building and Construction	62	**1%**	7,955	**3%**
Manufacturing Industries	207	**4%**	14,444	**5%**
Commerce and Trade	1,556	**30%**	71,834	**27%**
Transport and Communications	1,202	**23%**	33,687	**13%**
Public Administration	178	**3%**	14,374	**5%**
Professional Services	599	**11%**	61,255	**23%**
Other	1,431	**27%**	61,765	**23%**
Total	**5,239**	**-**	**265,670**	**-**

Table 5.18: Persons at work by industry in SDZ and LA Study Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

5.4.3.2 Live Register

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

Area Definition	2020.10	2020.11	2020.12	1-mo. trend	3-mo. trend
Intreo Office at Parnell Street	2,507	2,190	2,397	+ 9.5%	- 4.4%
Co. Dublin	50,313	44,194	48,401	+ 9.5%	- 3.8%
Ireland	203,172	194,058	189,860	+2.1%	- 6.5%

Table 5.19: Persons registered at given months at the local Intreo Office at Parnell Street. (Source: cso.ie, summarised by TPA, January 2021.)

Live Register figures are available at a national, county or local level, with respect to the jurisdiction of DESP welfare offices[11]. We note that the number of people on the register decreased at the local Intreo Office at Parnell Street, county, and national level in the recent 3-month period. However, it is still up considerably since this time last year.

These high levels of register numbers shows that employment levels have been affected by the Covid-19 pandemic. It has seen an increase in the number of registered people over the recent one-month trend; this shows the affect of level 5 lockdowns. It would appear that

[11] https://data.cso.ie/ - Labour Markets – Live Register

urban areas, like Dublin City, have been hit hardest by the Covid-19 pandemic with many businesses unable to cope with the outflux of urban dwellers. Due to high rent prices and lack of housing in Dublin, and the fact that working from home has dramatically increased, means that Dublin workers have chosen to find cheaper alternatives in less urban parts of the country.

This could have negative future effects as an outflux of urban dwellers could result in increased suburban development. It is crucial that a strong urban living and work place/force are secured for after the Covid-19 pandemic, as, if there is not, Ireland's sustainability goals could be severely impacted.

5.4.4 Commuter Patterns

Most of the population residing within the SDZ Area travel to work, school or college on foot (45%), which is positive when compared to the lower overall rate for pedestrian travel within Dublin City (26%). Other sustainable modes of travel such as bicycle (11%), bus (8%) and Train/LUAS (8%), are used by approximately 26% of the total population. However, car drivers (11%) form the second highest category overall.

In Dublin City, the rates of pedestrian travel (26%) and car drivers (24%) are nearly equivalent, with travel by bus (16%) ranked third.

Population Aged 5+ by Means of Travel to Work, School or College				
Means of Travel	**SDZ Area**	**% Total**	**Dublin City**	**% Total**
On foot	2,323	**45%**	91,116	**26%**
Bicycle	573	**11%**	34,501	**10%**
Bus, minibus or coach	395	**8%**	58,407	**16%**
Train, DART or LUAS	426	**8%**	20,687	**6%**
Motorcycle or scooter	18	**0.3%**	1,709	**1%**
Car driver	579	**11%**	85,215	**24%**
Car passenger	110	**2%**	27,735	**8%**
Van	29	**1%**	5,613	**2%**
Other (incl. lorry)	3	**0.1%**	383	**0.1%**
Work mainly at or from home	66	**1%**	5,173	**1%**
Not stated	646	**13%**	27,167	**8%**
Total	**5,168**	**-**	**357,706**	-

Table 5.20: Population aged 5+ by means of travel to work, school or college in SDZ and LA Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

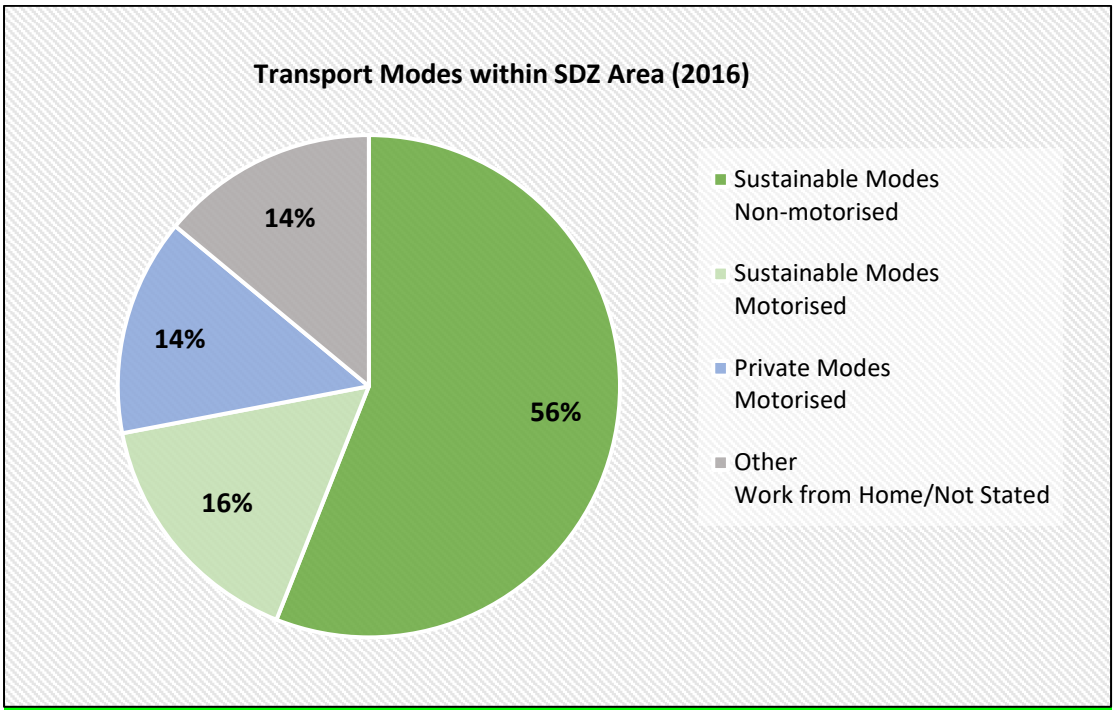


Figure 5.10: Transport modes in SDZ Area. (Source: 2016 Census data, as summarised by TPA, January 2021.)

With respect to average journey times, the typical commute within the SDZ Area is between 15 minutes and 30 minutes (34%) with minimum commutes of c. 15 minutes ranked second (24%). This represents a slightly lower average journey time when compared to Dublin City, which recorded 33% of the population were traveling between 15 minutes and 30 minutes to work, school or college at the time of the 2016 Census.

Population Aged 5+ by Journey Time to Work, School or College				
Journey time	**SDZ Area Persons**	**% Total**	**Dublin City Persons**	**% Total**
Under 15 mins	1,224	**24%**	67,024	**19%**
1/4 hour - under 1/2 hour	1,752	**34%**	114,947	**33%**
1/2 hour - under 3/4 hour	965	**19%**	82,857	**24%**
3/4 hour - under 1 hour	221	**4%**	25,878	**7%**
1 hour - under 1 1/2 hours	195	**4%**	19,722	**6%**
1 1/2 hours and over	34	**1%**	4,324	**1%**
Not stated	711	**14%**	37,781	**11%**
Total	**5,102**	-	**352,533**	-

Table 5.21: Population Aged 5+ by Journey Time to Work, School or College in SDZ and LA Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

We note that nearly half the population of the SDZ Area do not own a car (47%), a much higher percentage than in Dublin City (34%). This statistic supports the higher use of alternative transport means (primary pedestrian travel) within the SDZ Area.

Motorcar Availability				
Motor cars	**SDZ Area Households**	**% Total**	**Dublin City Households**	**% Total**
No motor car	1,377	**47%**	71,325	**34%**
1 motor car	992	**34%**	85,715	**41%**
2 motor cars	214	**7%**	35,531	**17%**
3 motor cars	25	**1%**	5,568	**3%**
4+ motor cars	4	**0.1%**	1,357	**1%**
Not stated	298	**10%**	12,095	**6%**
Total	**2,910**	**-**	**211,591**	**-**

Table 5.22: Motor cycle availability in SDZ and LA Areas. (Source: 2016 Census data, as summarised by TPA, January 2021.)

5.4.5 National Economy

The Economic and Social Research Institute's (ESRI) *Quarterly Economic Commentary Autumn 2020* stated that the Irish GDP had contracted, however, not by as much as previous commentaries had thought it may.

This had been primarily due to the Covid-19 Pandemic. As such, the Irish economy was not operating at its full potential.

With respect to future growth, that report stated:

> *"For 2021, under our Baseline forecast* ***we expect the Irish economy to recover quite strongly despite the ongoing presence of the COVID-19 restrictions****. Consumption and investment are expected to grow in a robust manner while net trade is also expected to contribute to growth in 2021. However, both exports and imports are set to grow on a more modest scale than in recent years as the global economy is still set to experience reduced growth rates in the coming year.* ***Overall, this results in an increase in Irish GDP of 6.3 per cent in 2021.****"*

[Our emphasis.]

Three months on, and with the beginnings of a vaccine roll-out, the Economic and Social Research Institute's (ESRI) *Quarterly Economic Commentary Winter 2020* states that the Irish Domestic Economy is set to continue to increase:

> *"As a result, in our baseline scenario* ***GDP is expected to increase in 2021 by 4.9 per cent,*** *with unemployment averaging 14.5 per cent for the year.* ***The presence or otherwise of a vaccine and the speed and efficiency with which one is rolled out to the general public will have major implications for the short- and medium-term outlook for the domestic economy****."*

[Our emphasis.]

5.4.6 Social Services Provision

Tom Phillips + Associates prepared a report titled, *Social Infrastructure Audit: Waterfront South Central (SHD)*. The report outlines an audit of the area surrounding the subject site by TPA in January 2021 using desktop survey methods. The findings of that audit, which are outlined in detail below, demonstrate that there is an adequate supply of education, childcare, recreational and healthcare facilities within walking distance of the subject lands.

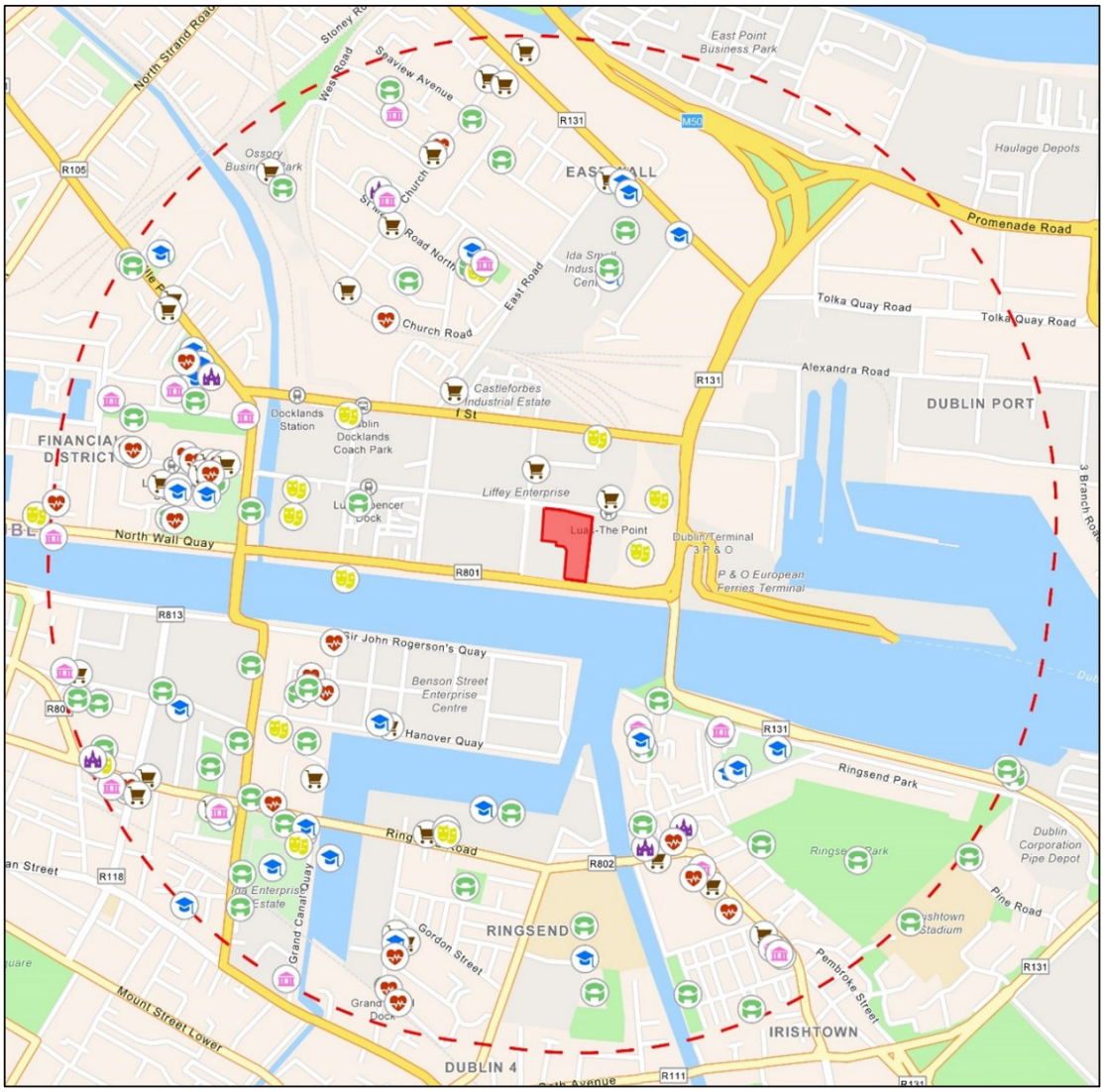


Figure 5.11: Indicative location of 100+ No. social infrastructure facilities identified in vicinity of subject site. (Source: TPA Social Infrastructure Audit: Waterfront South Central (SHD), 2021.)

In our opinion, there is sufficient existing provision of social infrastructure in the vicinity of the subject site to support the proposed development (i.e. within c. 1km radius), despite the commercial character of the Docklands area. As the above survey demonstrates, there is an adequate supply of education/childcare, healthcare, and cultural facilities within reasonable walking distance of the subject lands, as well as a variety of public parks and amenity areas, playing pitches and sporting facilities available to local residents.

On the basis of that audit, potential gaps in the existing service provision of the area are limited to higher order shopping centres and more significant facilities for the elderly (i.e.

nursing homes); however, the demographic assessment indicates that the elderly cohort of the population is lower in this area (6%) than the rest of the State (13%), and thus a higher proportion of community facilities may be required for the working population (70%).

We note that the proposed scheme includes a range of residential support amenities such as a childcare facility, a residential study zone, office suites, a public viewing deck, 2 No. restaurants, a food hall, a Farmers' Market, and 4 No. café units, which will support the local population and positively contribute to the amenity of the area once completed.

5.5 Likely Impacts and Proposed Mitigation Measures

Consideration is given to the likely impacts of the development on the factors outlined above in Section 5.4. This review outlines the potential overall impact if the development did not proceed, as well as the impact of the development on each of the above factors at the construction and operational phases of the development, respectively.

Due to the size of the development, the overall construction phase of the development will last approximately 4 years from the date of commencement.

5.5.1 Impacts on Population Profile and Trends

Do Nothing Scenario

Should the development not proceed, the existing state and use of the subject lands would remain as an unused brownfield site. We note that the subject site is proposed to be regenerated as a mixed-use development within *the North Lotts and Grand Canal Dock SDZ Planning Scheme.*

As such, a 'do-nothing' scenario would limit the potential of the site to meet the significant population and employment targets established for the *North Lotts and Grand Canal Dock SDZ Planning Scheme* and negatively impact the sustainable growth of the area.

Construction Phase

At the construction phase of the development there will be a neutral impact on the population trends and profile for the area as there would be no loss of residential development during the demolition phase and no new or additional population housed on site during construction.

Operational Phase

Construction of 1,005 No. residential units arranged in 3 No. apartment blocks ranging in height from 8 No. storeys to 45 No. storeys over triple-level basement, with a cumulative gross floor area above ground of c. 102,889 sq m comprising:

- Block A (14 No. storeys; Apartment mix: 116 No. 1-bed, 92 No. 2-bed);

- Block B (41 No. storeys; Apartment Mix: 172 No. 1-bed, 247 No. 2-bed); and
- Block C (45 No. storeys; Apartment Mix: 207 No. 1-bed, 168 No. 2-bed, 3 No. 3-bed units, incorporating a public viewing deck at Levels 44 and 45).

Provision of 4,307 sq m of "other uses" as defined by the *Planning and Development (Housing) and Residential Tenancies Act 2016,* comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmers' Market/foodhall (299 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Levels 41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C.

The average household size for the State recorded by the 2016 Census was 2.75 No. persons per unit, which generates a total indicative population of 2,764 No. persons within the development when applied to the proposed area schedule.

Once occupied, the proposed development will represent a sizeable increase of c. 3,000 No. persons within the local population, which will contribute positively to the regeneration of the North Lotts area as set out in *the North Lotts and Grand Canal Dock SDZ Planning Scheme*.

Proposed Mitigation Measures

No negative impacts have been identified in relation to the provision of a mixed-use development at a site zoned for such development and as such, no mitigation measures are required.

5.5.2 Housing Impacts

Do Nothing Scenario

The site is currently an unused brownfield site and does not currently provide any form of residential housing to the local community. Should the proposed development not proceed, the site would remain in this state and could significantly detract from the amenity of the area should surrounding sites be regenerated as per the *North Lotts and Grand Canal Dock SDZ Planning Scheme.* The impacts of a do-nothing scenario would therefore be negative in terms of local residential amenity and in terms of meeting targets for household growth.

Construction Phase

Generally, the potential impacts arising during the construction phase relate to quality of life including visual impact, local amenity, noise, air quality and transport. Where relevant, these impacts have been considered in the relevant chapters of the EIAR and mitigation measures proposed to ensure that the impact on residents in the area is minimised.

It is unlikely that these impacts will be of a scale to either encourage people to move from the area or discourage people from moving to the area. Therefore, the impact on existing housing will be imperceptible.

Operational Phase

The provision of various residential unit types within the development will help to address latent housing demand in the area by providing additional high-quality accommodation for local residents and new housing opportunities for external workers currently commuting into the 'North Dock B' Electoral District and the wider area each day for employment opportunities. This increased population will also generate additional spending within the area, which will positively contribute to local economic activity over time.

Proposed Mitigation Measures

No negative impacts have been identified in relation to the increased provision of additional residential units in this location and as such, no mitigation measures are required.

5.5.3 Employment Impacts

Do Nothing Scenario

If the subject site remained an unused brownfield site, the current levels of employment would be maintained. However, the proposed development will deliver increased employment opportunities through the provision of new office, commercial, and retail floorspace on the site (as detailed in Chapter 3.0), which could not be realised in the 'do-nothing' scenario. As such the impact on employment arising from the proposed scheme not progressing would be negative and long term.

Construction Phase

No employment will be lost during the construction phase of development, as no businesses currently reside on the subject site. However, employment will be gained through the recruitment of construction workers required for the proposed development.

It is anticipated that construction workers will likely be recruited from Dublin and the wider metropolitan area. The multiplier effect arising from these additional construction jobs will also lead to an increase in employment in local businesses providing services to construction workers. As a result, the project will have a positive impact on employment numbers in the North Lotts area during the construction phase.

Operational Phase

The proposed development will deliver significant new employment opportunities. The *Employment Density Guide (3rd Edition)*[12] provides guidance on calculating the number of workers per net floorspace area. The employment densities used in this analysis are presented below for reference.

[12] Homes & Communities Agency, UK Government Agency (2015).

Category	Sub Sector	Density (m^2)
Retail	High Street	1 employee for every 15-20 sq m
	Food Store	1 employee for every 15-20 sq m
Office		1 employee for every 12 sq m
Restaurants and Cafés		1 employee for every 15-20 sq m

Table 5.23: Employment Density by Use Class. (Source: Employment Density Guide, summarised by TPA.)

Based on the floorspace uses proposed of 4,505 sq m and the guidance above (note other guidelines may result in different figures), approximately 291 - 345 No. jobs will arise from the proposed development. In addition, 1,005 No. residential apartments are proposed with potential to house workers which have been previously commuting to the area for employment opportunities. The multiplier effect arising from the demand of additional residents for goods and services at local businesses is likely to increase in employment in those enterprises and further improve opportunities in the area.

Other uses	Floorspace sq m	No. of employees
Childcare facility	450	23 - 30
2 No. restaurants	719	36 - 48
Farmers' market/foodhall	299	15 - 20
3 No. cafes	538	27 - 36
Offices	1,894	158
Public bar / function room	407	20 - 27
Ancillary residential uses	Floorspace sq m	No. of employees
Gym/spa reception	52	2 - 4
Management office	96	8
Security office	50	4
Total	4,505	291 - 345

Table 5.24: Employment floorspace and estimated employee numbers. (Source: compiled by TPA, using Employment Density Guide.)

Proposed Mitigation Measures

Minor negative impacts have been identified in relation to the demolition of the existing employment centres on the site, however, the proposed large-scale redevelopment of the site will provide increased and more varied employment opportunities across the site, along with a significant increase in housing for workers at this location. Therefore, no mitigation measures are required.

5.5.4 Traffic

Do Nothing Scenario

In a do-nothing scenario, the existing traffic access arrangements will be unaffected and proposed improvements to sustainable pedestrian and cycling infrastructure at the site will not be implemented. As such, the impacts on population in terms of traffic in a do-nothing scenario would be negative, slight and long term.

Construction Phase

The lead contractor appointed for the construction of the development shall be required to prepare a Construction Management Plan (CMP) that shall include a plan for the scheduling and management of construction traffic.

As an indicative estimate, development traffic during the construction phase is likely to reach at most 80 vehicle movements per day at its peak (a maximum of approx. 16PCU/hr in each peak hour period, including both arrivals and departures).

Operational Phase

At operational stage, the proposed development will accommodate 1,005 residential units, together with c. 4,307 sq m of 'other uses', including office, retail and commercial/community uses. The greater density of uses in this location will increase trip movements to and from the site. However, after proposed mitigation measures are implemented, it is anticipated that the effect on population arising from traffic at operational stage will be slight, negative and long-term.

Proposed Mitigation Measures

A *Construction Traffic Management Plan* will be prepared to encourage sustainable travel modes for construction workers and outline an appropriate control and routing strategy for HGVs accessing the site.

At the operational stage of the development, the design approach to access and layout ensures a high degree of sustainability by maximising pedestrian spaces and providing significant cycling infrastructure. In order to ensure that sustainable transport means are encouraged, a Mobility Management Plan will be prepared. In particular, use of high-capacity traffic infrastructure proximate to the site will be encouraged.

5.5.5 Economy

Do Nothing Scenario

In a 'do-nothing' scenario, the economic investment arising from a large-scale construction project at this location would not be realised and the opportunity to maximise the full development potential of the site would be lost. As such, the economic impacts of the proposed development not progressing would be long term, significant and negative.

Construction Phase

During the construction phase, the additional investment in the area will temporarily generate new employment opportunities and increased consumption of building goods and services, which will contribute positively to the local economy in the short-term.

Operational Phase

Once complete, the development will house c. 3,000 new residents on the site, in addition to accommodating c. 300 employees throughout the office, commercial and some ancillary residential use areas proposed. These facilities are designed to the best international standards and will assist in attracting and retaining large businesses and workers to this area of the city. This represents a long-term, positive economic impact on the local economy through sustainable mixed-use of the site within the City Centre and a significant increase in the local population which will avail of local goods and services.

Proposed Mitigation Measures

No negative impacts have been identified in relation to the proposed large-scale investment at the subject site. Therefore, no mitigation measures are required.

5.5.6 Social Services and Amenities Provision

Do Nothing Scenario

Due to the subject site being an unused brownfield site, should the scheme not progress, no services or amenities would be provided; however, the opportunity for the provision of new integrated residential amenities including 1 No. childcare facility, 2 No. restaurants, 1 No. foodhall, 1 No. Farmers' Market, 3 No. café units, and 1 No. public bar / function room exist should the scheme progress.

Construction Phase

During the construction phase, the absence of demolition will result in no loss of social infrastructure and amenities. As such there would be no negative impact on the social infrastructure and amenities of the area.

Operational Phase

The proposed development is located on a highly accessible site that is zoned for mixed-use purposes. The proposed development would provide a significantly improved land use mix of residential, office, childcare facility, community, restaurant/bar and commercial uses in line with the site's zoning objective and would provide a long term, significant positive impact on the infrastructure and amenities available in this area of the city.

In addition, the critical mass generated by the proposal would likely create demand for new facilities and services, which would indirectly benefit the wider area.

Proposed Mitigation Measures

No negative impacts have been identified in relation to the proposed provision of redeveloped social infrastructure and amenities at the subject site. Therefore, no mitigation measures are required.

5.5.7 Health and Safety

Do Nothing Scenario

Were the proposed development not to proceed, health and safety issues at the site would relate to the existing safety considerations associated with an undeveloped brownfield site, which would remain unchanged. Accordingly, there would be a negative impact on health and safety in a do-nothing scenario.

Construction Phase

As with all construction projects, there will be inherent health and safety risks at this stage of the development. In order to manage these, a report, titled *Outline Construction Management Plan For Waterfront South Central, North Wall Quay,* has been prepared for the project to ensure that the relevant health and safety legislation is complied with.

Regarding Covid-19, it is ever present concern of potential contraction of the deadly virus; however, with the correct mitigation measures in place, the risks will be reduced and managed.

Resulting from that *OCMP*, it is considered that the construction impacts of the proposed development on health and safety will be neutral.

Operational Phase

During the operational phase, the principal health and safety concerns will be related to security. These are considered to be low risk and therefore the potential negative impact in terms of health and safety is not significant.

Proposed Mitigation Measures

During the construction phase, there is a requirement for adherence to the legal duties under the *Construction Regulations (Safety, Health and Welfare at Work (Construction) Regulations 2013*[13]).

Strict security measures will also be implemented to deal with all access to the site. These measures will require all vehicles and personnel visiting the site to be logged in and out.

At operational phase, proposed mitigation measures such as the provision of CCTV, the development of a building management plan and operational management plan are envisioned to reduce any potential security / anti-social behaviour issues.

Regarding Covid-19, precautions will be implemented on site in accordance with the Construction Industry Federation approved document. Management will keep up to date with the latest updates and ensure these are implemented on site. The *OCMP* states:

> *"Key control measures including hand sanitizing and social distancing through installation of walkways, extra canteens, drying rooms, outdoor facilities, etc. as shown over will be put in place. Covid-19 will be considered when preparing method statements and when carrying out the works on site. All works will be monitored by the Site Covid Compliance Officers and Safety Officers".*

5.6 Human Health – Potential Environmental Impacts on Human Beings & Amenity

Tom Phillips + Associates prepared this Chapter of the *EIAR* to assess the likely impacts associated with Human Health during the demolition, construction and operational phases of the proposed development at City Block 9, North Wall Quay, Dublin 1.

Construction of 1,005 No. residential units arranged in 3 No. apartment blocks ranging in height from 8 No. storeys to 45 No. storeys over triple-level basement, with a cumulative gross floor area above ground of c. 102,889 sq m comprising:

- Block A (14 No. storeys; Apartment mix: 116 No. 1-bed, 92 No. 2-bed);
- Block B (41 No. storeys; Apartment Mix: 172 No. 1-bed, 247 No. 2-bed); and
- Block C (45 No. storeys; Apartment Mix: 207 No. 1-bed, 168 No. 2-bed, 3 No. 3-bed units), incorporating a public viewing deck at Levels 44 and 45.

[13] Health and Safety Authority (2017)
http://www.hsa.ie/eng/Your_Industry/Construction/Construction_Duty_Holders/

Provision of 4,307 sq m of "other uses" as defined by the *Planning and Development (Housing) and Residential Tenancies Act 2016,* comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmers' Market/foodhall (299 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Levels 41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C.

This assessment is conducted by reviewing the existing health status in the areas surrounding the proposed development as well as nationally. The proposed development is located within the North Dock B Electoral Division (CSO, 2016).

5.7 Legislation and guidance

This assessment follows current Irish guidance as outlined in:

- *Environmental Protection Agency (EPA) Draft 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2017);*
- *European Commission 'Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report' (2017);*
- *EPA Draft 'Advice Notes for preparing Environmental Impact Statements' (2015); and*
- *National Road Authority (NRA) 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes', by the National Roads Authority (2009).*

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

> *"in an EIAR the assessment of impacts on population and human health should refer to the assessment of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under environmental factors of air, water soil etc".* (*Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports*, 2017, pg. 29.)

The Guidelines also note:

> *"The legislation does not generally require assessment of land-use planning, demographic issues or details socio-economic analysis. Coverage of these can be provided in a separated Planning Application Report to accompany an application for planning permission."* (*Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports*, 2017, pg. 29.)

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

5.8 Receiving Environment (Baseline Situation)

The subject site is a 1.1-hectare site located at City Block 9, North Wall Quay, Dublin 1.

The potential human receptors within the environs include residents of the North Inner City Local Electoral Area (LEA). According to Census 2016 results there are 72,982 people living within the study area.

5.8.1 Existing Health Status - National

The Department of Health's report '*Health in Ireland Key Trends 2019*' (Department of Health, 2020) provides statistical analysis on health in Ireland over the last 10 years. Chapters 1 and 2 of the Report deal specifically with Life Expectancy and Health.

Life expectancy data shows that there has been a continual upward trend for women since 1997 currently standing at 84 years. Male life expectancy has shown a continual rise since 2007. It is also noted in the report that the gap between male and female life expectancy has continued to narrow over the last decade (Ref Figure 5.13).

Overall life expectancy has increased by c. 33.5% at age 75 since 1997. An upward trend is evident in the life expectancy of older age groups reflecting decreasing mortality rates from major diseases. Older Irish people's life expectancy (65 years of age) to be lived in good health, is higher for both men and women compared with the EU average.

Overall improvements in mortality rates and relatively high levels of self-rated health can mask variations between religions, age groups and other population subgroups.

The Report also states that *"Ireland has the highest self-perceived status in the EU, with 82.9% of people rating their health as good or very good".* Overall population health at the national level shows decreasing mortality and a rise in life expectancy over the last ten years. The *Health in Ireland* report also goes on to state:

> *"Age-standardised death rates for major causes of death such as cancers and circulatory system diseases have declined by 10% and 25% respectively over the past ten years." (Ref Figure 5.13 below.)*

The number of transport accident mortality has fallen by 52.9%, infant mortality by 24.3% and suicide rates by 36.2% nationally between the years of 2009-2018.

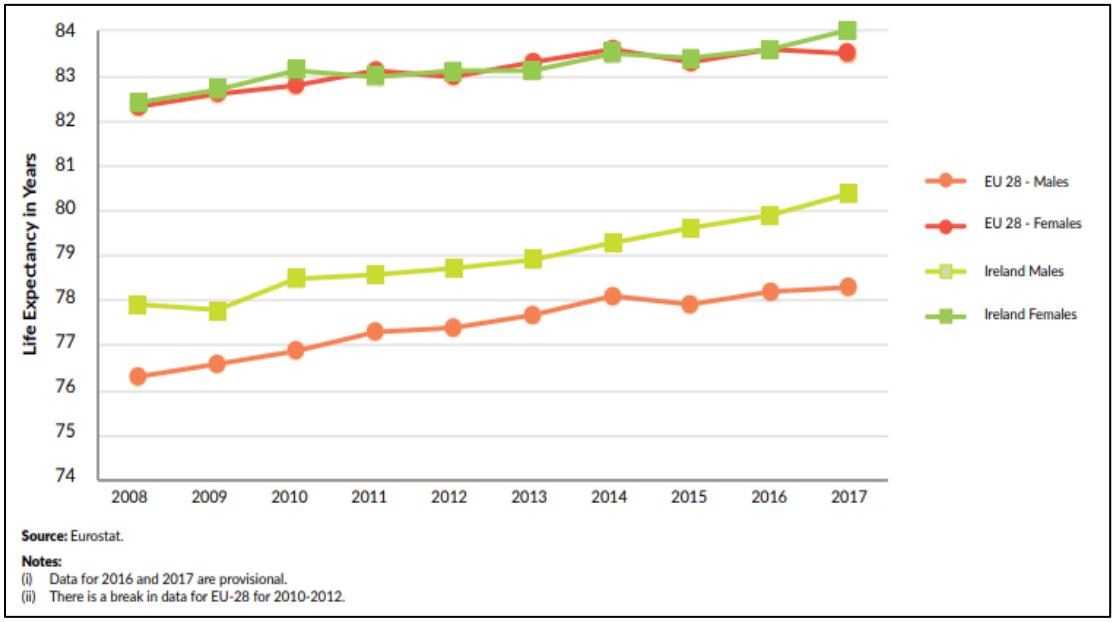


Figure 5.12 (above): Life Expectancy at Birth, Ireland and EU-28 by Gender. (Source: Department of Health, 2020.)

Figure 5.13 shows the principal causes of death and infant mortality rate: number and age standardised death rates per 100,000 population, 2009-2018.

		2009	2013	2017	2018(p)	% change 2009-2018	% change 2017-2018
All Causes	Number	28,380	29,504	30,418	31,116	9.6	2.3
	Rate	1092.4	1043.9	955.5	977.9	-10.5	2.3
Diseases of the circulatory system							
All Circulatory System Diseases:	Number	9,507	9,473	8,889	8,938	-6.0	0.6
	Rate	391.6	354.8	291.4	293.1	-25.1	0.6
Ischaemic Heart Disease:	Number	5,016	4,642	4,160	4,140	-17.5	-0.5
	Rate	204.0	171.6	133.8	133.3	-34.7	-0.4
Stroke:	Number	2,054	1,959	1,706	1,680	-18.2	-1.5
	Rate	86.5	75.0	56.6	55.6	-35.7	-1.6
Cancer							
All Malignant Neoplasms:	Number	8,336	8,725	9,141	9,198	10.3	0.6
	Rate	302.7	288.8	270.4	272.6	-10.0	0.8
Cancer of the Trachea, Bronchus and Lung:	Number	1,728	1,831	1,911	1,812	4.9	-5.2
	Rate	62.3	60.1	56.2	53.2	-14.7	-5.4
Cancer of the Female Breast:	Number	662	704	724	773	16.8	6.8
	Rate	41.6	40.6	37.8	40.4	-2.9	7.1
Diseases of the Respiratory system*							
All Respiratory System Diseases:	Number	3,606	3,504	4,059	4,165	15.5	2.6
	Rate	154.4	135.6	135.7	138.1	-10.5	1.8
Chronic Lower Respiratory Disease	Number	1,516	1,657	1,611	1,743	15.0	8.2
	Rate	62.0	61.6	52.2	56.1	-9.5	7.6
Pneumonia	Number	1,320	983	1,088	1,084	-17.9	-0.4
	Rate	59.8	40.5	38.4	37.8	-36.8	-1.5
External causes of injury and poisoning							
All Deaths from External Causes:	Number	1,726	1,491	1,299	1,341	-22.3	3.2
	Rate	44.4	38.1	32.5	33.9	-23.6	4.3
Transport Accidents:	Number	225	167	127	106	-52.9	-16.5
	Rate	4.9	3.9	3.0	2.5	-49.7	-18.8
Suicide:	Number	552	487	383	352	-36.2	-8.1
	Rate	12.2	11.1	8.3	7.6	-37.8	-8.5
Infant deaths							
Infant Mortality Rate (per 1,000 live births)	Number	247	245	174	187	-24.3	7.5
	Rate	3.3	3.6	3.0	3.1	-5.2	3.3

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

Notes:
(i) (p) The figures for 2018 are provisional. They should be treated with caution as they refer to deaths registered in these years and may be incomplete.
(ii) The rates provided in the table are age-standardised to the European standard population and are presented as rates per 100,000 population except for infant mortality rates which are expressed as deaths per 1,000 live births.
(iii) *Excludes cancer of the trachea, bronchus and lung.

Figure 5.13: Principal Causes of Death and Infant Mortality Rate: Numbers and Age Standardised Death Rates Per 100,000 population 2009 to 2018. (Source: Department of Health, 2020.)

5.8.2 Existing Health Status - Local

Table 5.24 below shows the percentage of the population who stated their health was bad or very bad for the seven EDs within the SDZ study area.

District Electoral Division	Code	% of the population who stated their health was bad or very bad - 2016
North Dock A	02076	2.0
North Dock B (Subject Site ED)	02077	1.6
North Dock C	02078	2.0
Mansion House A	02117	1.5
South Dock	02147	0.8
Pembroke West A	02130	0.8
Pembroke East A	02125	2.2

Table 5.25: Percentage of the population who stated their health was bad or very bad for the seven EDs within the SDZ study area. (Source: Census 2016, as summarised by TPA, January 2021.)

The results of the Census in 2016 reported that the vast majority of people in Dublin City (82.8%) reported that their health was good or very good. This is the lowest in Ireland. Some 2% reported bad or very bad health.

5.9 Potential and Predicted Impacts of the Proposed Development

This section provides an assessment of the predicted impacts on Human Health of the proposed development in accordance with the *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (2017)*. The predicted/residual impacts from the construction, demolition and operational phases as set out in the other sections of this EIAR.

5.9.1 Air Quality

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. The limit values are set for the protection of human health including the most vulnerable to health impacts due to poor air quality i.e. the infirm, elderly and children. These limit values provide short term (i.e. 24 hours or 1 hour) and long term (annual mean) limit values below which EU member states must keep the specified pollutants.

Air Pollution is the single largest environmental health risk in Europe. Heart disease and stroke are the most common reasons for early death and are responsible for 80% of cases. Health effects also include asthma, acute bronchitis, lung cancer, damage to nasal passages and respiratory tract inflammation. Links to cancers of the bladder, kidney, stomach, oral cavity, pharynx and larynx, multiple myeloma, leukaemia, Hodgkin's disease, and non-Hodgkin's lymphoma have also been linked to urban air pollutants.

The pollutants of most concern in Dublin with respect to human health are NO2 and PM10 as they are the two pollutants most likely to exceed the annual mean limit values (40 µg/m3).

Air quality monitoring programs have been undertaken in recent years by the EPA at a number of locations in Dublin city centre. The most recent annual report on air quality, "Air Quality in Ireland 2019" (EPA 2020), details the range and scope of monitoring undertaken throughout Ireland.

The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.). Long term averages for NO2, PM10, PM2.5, CO and benzene indicate that concentrations in Dublin are below the limit values set for the protection of human health.

Construction Phase

The greatest potential impact on air quality during the construction and demolition phase of the proposed development is from construction dust emissions and the potential for nuisance dust and PM10/PM2.5 emissions.

The Air Quality Impact Assessment (AQIA) provided as Appendix 9A of this EIAR illustrates that there are potentially significant impacts associated with construction dust. Mitigation measures are therefore recommended. Those mitigation measures are listed in detail in Table A.20 of Appendix 9A.20. The uptake and correct implementation of these mitigation measures are designed to result in impacts being reduced to negligible.

The construction of the project will generate traffic on nearby roads. The assessment illustrates that the impact to air quality as a result of emissions from this traffic are negligible. On this basis no mitigation is required.

The operation of the project will generate traffic on nearby roads. Stage 1 screening identified that there was the potential for significant impacts on North Wall Avenue. Stage 2 detailed modelling was therefore undertaken. The assessment illustrates that the impact to air quality as a result of emissions from this traffic are negligible. On this basis, no mitigation is required.

Operational Phase

There is the potential for a number of human health impacts during the operational phase of the development. In particular, vehicle related air emissions may generate quantities of air pollutants such as NO2, PM10/PM2.5, CO and Benzene. The pollutants of most concern are NO2 and PM10, as these pollutants are generated as a direct result of vehicles and have the greatest potential to exceed the air quality standards. There are no other impacts on air quality associated with the operational phase of the proposed development.

Air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the modelling results (Chapter 9), emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, the impact on human health will be neutral, long-term and not significant.

5.9.2 Noise and Vibration

Exposure to Excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report 'Noise Impacts on Health', (European Commission, 2015), the most common effects of noise on the vulnerable include:

- Annoyance;
- Sleep Disturbance;
- Heart and circulation problems;
- Quality of Life;
- Cognitive Process; and
- Hearing.

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes.

Construction Phase

It is predicted that the construction programme will create typical construction activity related noise on site. During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators.

With regard to construction activities, the contractor will ensure that all best practice noise and vibration control methods will be used. In this regard, various mitigation measures can be considered and applied during the construction of the proposed development, such as:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- Establishing channels of communication between the contractor/developer, Local Authority and residents;
- Appointing a site representative responsible for matters relating to noise and vibration;
- Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; and
- Keeping all site access roads even so as to mitigate the potential for vibration from lorries.

Furthermore, it is envisaged that a variety of practicable noise and vibration control measures will be employed. These may include:

- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of barriers as necessary around noisy processes and items such as generators heavy mechanical plant or high duty compressors; and
- Placing of noisy / vibratory plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

A more detailed outline of mitigation measures can be found in the *Outline Construction Management Plan,* which accompanies this EIAR.

Noise from traffic is predicted not to exceed 3 dB on all surrounding roads, except along North Wall Avenue adjacent to the site, where a small (0.1 dB) exceedance is predicted. However, the contribution to these noise increases from the project is predicted to be small; approximately 1 dB or less during the day, with negligible increases expected at night.

Operational Phase

Residential units will be designed to reduce external noise levels, to ensure adequate internal noise levels are achieved.

Noise from building services has been assessed using the standards set out in the EPA's *Guidance Note for Noise: Licence Applications, Survey and Assessments in Relation to Scheduled Activities (NG4) (2016)*. This guidance sets out different noise standards depending on the local noise environment. Following the screening guidance for Quiet Areas, it was determined that the site is not located in a Quiet Area as it fails the criteria for being more than 7.5 km from a motorway. As a result of the urban nature of the site setting, it is considered unlikely that the nearest NSRs fall within areas of 'Low Background Noise'.

5.9.3 Traffic

The World Health Organisation Report, *Health Effects and Risks of Transport Systems: The Hearts Project (World Health Organisation, 2006),* states that road traffic is a major cause of adverse health effects - ranking with smoking and diet as one of the most important determinants of health in Europe. The Report states:

> *"Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular*

impact on vulnerable groups such as children and elderly people, cyclists and pedestrians".

In the Department of Communications, Climate Action & Environment document Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy vehicle emissions are included as a key source of health impacts in Ireland (DOCCA&E, 2017).

An assessment of the additional traffic movements associated with the proposed development during the construction and operational phases is presented in Chapter 12 - Material Assets – Traffic and Transportation.

The impact of traffic generated by the proposed development on human health in relation to air quality and noise during both the construction and demolition phases of the proposed development is considered in Chapters 9 and 10 of this EIAR.

Construction Phase

During the construction & demolition stage of the project the potential impacts to human health will primarily be from onsite (plant and vehicle movement) and the increase in offsite plant and traffic movements.

An *Outline Construction Management Plan* has been prepared as part of the planning application with an associated which incorporates a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the development. These specifics are highlighted in section 12.5 of Chapter 12.

The lead contractor appointed for the construction of the development shall be required to prepare a *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. An *Outline Construction Management Plan* accompanies this Application.

Operational Phase

Following completion of the development, potential impacts will occur due to the increase in traffic movements from residential and commercial traffic using the internal roads and parking of the development and the surrounding routes for ingress and egress. Impacts and the increase in traffic numbers are included in section 12.5.2 of Chapter 12. Mitigation measures have been identified to off-set the additional local demand that the proposed residential development at the subject site could potentially generate as a result of the forecast increase in vehicle movements by residents.

During the operational phase, the subject development is therefore likely to result in a long-term slight adverse impact on the operational efficiency of the 5 No. existing junctions assessed, in comparison to the Do-Nothing Scenario. 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, traffic signalling redesign, or changes in general traffic flow restrictions) have the potential to improve the operational efficiency of these junctions generally, as well as to reduce vehicle trips to/from the subject development.

The overall impact to human health from the increase in traffic movement from the proposed development is neutral, not significant and long-term.

5.9.4 Landscape

The report 'Health Impacts on the Built Environment: A Review' (The Institute of Public Health in Ireland, 2006) states that deteriorating physical features of the urban environment can harm health. Architecture Ireland has also shown the link between the Built Environment and Mental Health (Architecture Ireland, 2015). The World Health Organisation (WHO) has undertaken research that shows urban environments that are aesthetically pleasing and landscaped encourage people to explore and access their local community by foot or bicycle when compared to the same urban space prior to renovations (WHO, 2016).

Construction Phase

There will be moderate and neutral to significant negative townscape impacts during the construction stage of the proposed development due to ongoing construction, delivery and storage of materials the erections of buildings, scaffolding etc, however these will be short term in duration. Visual impact on the local area will also be considered to be negative but similar to above will be short term in duration.

Operational Phase

The designed scheme seeks to harmonise and integrate the development within the existing landscape and the broader urban environment whilst adhering to national planning policy which seeks the densification and the provision of increased height on appropriate urban sites. The design rationale and detail employed seeks to mitigate potential negative effects on the landscape character and visual amenity. Once operational, the new development will contribute positively to the form and function of the local area. The improved town scape and visual settings will result in a positive impact on population and human health in area. This will result in a positive, significant and long-term effect on human health in the local area.

A detailed assessment of the proposed developments impact on the landscape is outlined in the *Heritage, Townscape, Landscape and Visual Impact Assessment (EIAR Volume 2)* prepared by City Designer.

5.9.5 Health and Safety

The proposed development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (S.I. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. 299 of 2007) as amended and associated regulations. The proposed development has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice.

The proposed development has the potential for an impact on the health and safety of workers employed on the site, particularly during the construction and demolition phase. The activities of contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) to minimize the likelihood of any impacts on worker's health and safety.

5.9.6 Residual effects

It is expected that the proposed development will have a neutral, **long-term** & **not significant** impact on the human health of the local population. There are no predicted adverse impacts with respect to human health.

All other environmental aspects relating to the human environment which have the potential to impact on the local population such as air quality and climate, noise and vibration, material assets and traffic are addressed in Chapters 9, 10, 11, 12 & 13 and in more detail in the relevant Sections of this EIAR.

Measures outlined in Section 5.5.5 will be put in place to ensure the health and safety of all site personnel during both construction and operational phases.

5.9.7 Cumulative effects

Future projects of a large scale would need to conduct an EIAR to ensure that no significant impacts associated with human health will occur as a result of those developments.

The cumulative impact of the development on the health of the surrounding area will be neutral, long-term & imperceptible.

5.10 References

- Architecture Ireland (2015) *The Built Environment and Mental Health.*
- Arts Council of England (2015) *The Health and Wellbeing Benefits of Public Libraries Full Report.*
- Central Statistics Office Ireland (CSO) (2016) *Census Results.*
- *CSO Statbank.*
- Department of Communications, Climate Action & Environment (2017) *Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy.*
- Department of Health (2020) *Health in Ireland, Key Trends.*
- Dublin City Council (2016) *Dublin City Local Economic Plan and Community Plan 2016-2022.*
- EPA (2017) *Guidelines on Information to be Contained in Environmental Impact Assessment Reports (Draft).*
- EPA (2020) *Air Quality in Ireland 2019.*
- *ESRI (Winter 2020) Quarterly Economic Commentary.*
- European Commission (2015*) Noise Impacts on Health.*
- *https://data.cso.ie.*
- ISOVARP (2010) *Urban Planning and Human Health in the European City – Report to the World Health Organisation.*
- The Institute of Public Health in Ireland (2006), *Health Effects of the Built Environment: A Review.*
- World Health Organisation (2006) *Health Effects and Risks of Transport Systems; the Hearths Project.*
- World Health Organisation (2016) *Urban Green Spaces and Health – A Review of Evidence.*

6.0 BIODIVERSITY

6.1 Introduction

Environmental Resources Management Ltd (ERM) has been commissioned to produce this document to assess the impacts on biodiversity for the proposed Strategic Housing Developing at City Block 9, Dublin docklands in the form of an Environmental Impact Assessment Report (EIAR).

This document will assess the significance of these impacts with particular attention to species and habitats protected under the Irish Wildlife Acts (2000) as amended as part of the Ecological Impact Assessment (EcIA).

A separate Appropriate Assessment (AA) and Natura Impact Statement (NIS)[1] has been completed in conjunction with this report assessing the cumulative impacts on the habitats and species protected under the European Habitat and Birds Directives. The Proposed Development is 1.1 ha in size. This purpose of this report is to assess the following:

- Establish baseline ecological data for the Proposed Development and adjacent lands;
- Determine the ecological value of the identified ecological features;
- Assess the impact of the Proposed Development on ecological features of value (flora and fauna) and identify if these result in significant effects;
- Apply mitigation measures to avoid, reduce, remedy or compensate impacts; and
- Identify any significant residual impacts after mitigation.

This report has been written by a suitably qualified ecologist; Jason Guile MCIEEM has 10 years of ecological experience.

6.1.1 Site Location and Development Description

The Proposed Development (the site) is located on North Wall Quay, Dublin 1, within Dublin city centre and Dublin docklands. The site is centered at Irish Grid Reference O 17789 34507. The 1.1 ha site is currently vacant and was historically used for light industrial uses including timber treatment and manufacturing. The habitats comprise bare ground and reclaimed bare ground.

Enabling works for the Proposed Development have been granted under the Planning Consent DSDZ3042/19. This consent grants permission to take the existing land on site down to 16 m below ground level (mBGL). Though these works have been granted, it is assumed in this report that the site's baseline is a cleared brownfield site with no excavations.

[1] Environmental Resource Management (2020). *Appropriate Assessment Screening & Natura Impact Statement: City Block 9, Dublin Docklands.* ERM, Dublin.

The Proposed Development is bounded on all sides by roads, Mayor Street Upper to the north, North Wall Quay to the south, North Wall Avenue to the east, and Castleforbes Road to the west (Figure 1). The overall site is located within City Block 9, as identified, in the North Lotts and Grand Canal Dock Strategic Development Zone (SDZ) Planning Scheme[2].

The surrounding landscape is urban and commercial in nature, with the River Liffey and Dublin city to the south, Dublin city to the north and west, and Dublin Docks to the east. Approximately 30 m south of the Proposed Development, North Wall Quay defines the boundary of the Lower Liffey Estuary. The North Wall Quay at this point is a man-made, hard engineered quay wall.

The water quality status for the River Liffey at this location is classified by the Environmental Protection Agency (EPA) as "unpolluted"[3]. This section of the River Liffey connects to the Liffey Estuary and the wider Dublin Bay area; roughly 2-3 km to the east. Across the River Liffey, 250 m to the south-east of the Proposed Development, the Dodder River flows into the River Liffey from the south.

The closest protected areas to the site are the non-statutory, proposed Natural Heritage Areas (pNHA) of the Grand Canal, located c. 330 m south, and Royal Canal located c. 600 m west of the site. There are 17 Natura 2000 sites within 15 km of the Proposed Development.

6.1.2 Legislative and Planning Context

The main legislative framework protecting habitats and species is the Wildlife Act (2000)[4] as amended. Section IV of the Wildlife Act protects flora, wild animals and wild birds and their nests.

Designated Sites

Special Areas of Conservation (SAC) are designated under the European Commission (EC) Habitats Directive (92/43/EEC)[5], which is transposed into Irish law through a variety of legislation including the Birds and Habitats Regulations[6] and the Planning and Development Acts. The legislation enables the protection of certain habitats (listed on Annex I of the Directive) and/or species (listed on Annex II). Special Protection Areas (SPA) are designated under the Birds Directive (2009/147/EC)[7]. This allows for the protection of protected bird species listed on Annex I of the Directive, regularly occurring populations of migratory species (such as ducks, geese or waders), and areas of international importance for migratory birds.

Natural Heritage Areas (NHAs) are designations under the Wildlife Acts in order to protect habitats, species or geology of national importance. Many of the NHAs in Ireland overlap with Natura 2000 sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the

[2] Dublin City Council (2014) North Lotts & Grand Canal Dock Planning Scheme.
[3] http://www.epa.ie/QValue/webusers/PDFS/HA9.pdf?Submit=Get+Results
[4] http://www.irishstatutebook.ie/eli/2000/act/38/enacted/en/print#partiv
[5] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
[6] the European Communities (Birds and Natural Habitats) Regulations 2011.
[7] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

meantime under planning legislation which requires that planning authorities give due regard to their protection in planning policies and decisions.

Dublin Planning

Under the *Dublin City Development Plan 2016-2022*[8] the subject lands are zoned under the Docklands (SDRA 6/Docklands SDZ) Strategic Development and Regeneration Areas objective (Zone Z14). Objective Z14 aims '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'.

These are areas that are capable of accommodating significant mixed-use developments especially for the provision of accommodation. Lands to the north and west of the Proposed Development are also under this objective. The southern part of Proposed Development is zoned under Conservation Areas: The conservation of these areas is a key objective of the City Council and this will assist in the delivery of the core strategy strand for: 'A compact, quality, green, well-connected city, which generates a dynamic, mixed-use environment for living, working and cultural interaction'. Land to the east of the Proposed Development is zoned under Objective Z4 – District Centre's: To provide for and improve mixed-service facilities.

[8] http://www.dublincity.ie/main-menu-services-planning-city-development-plan/dublin-city-development-plan-2016-2022

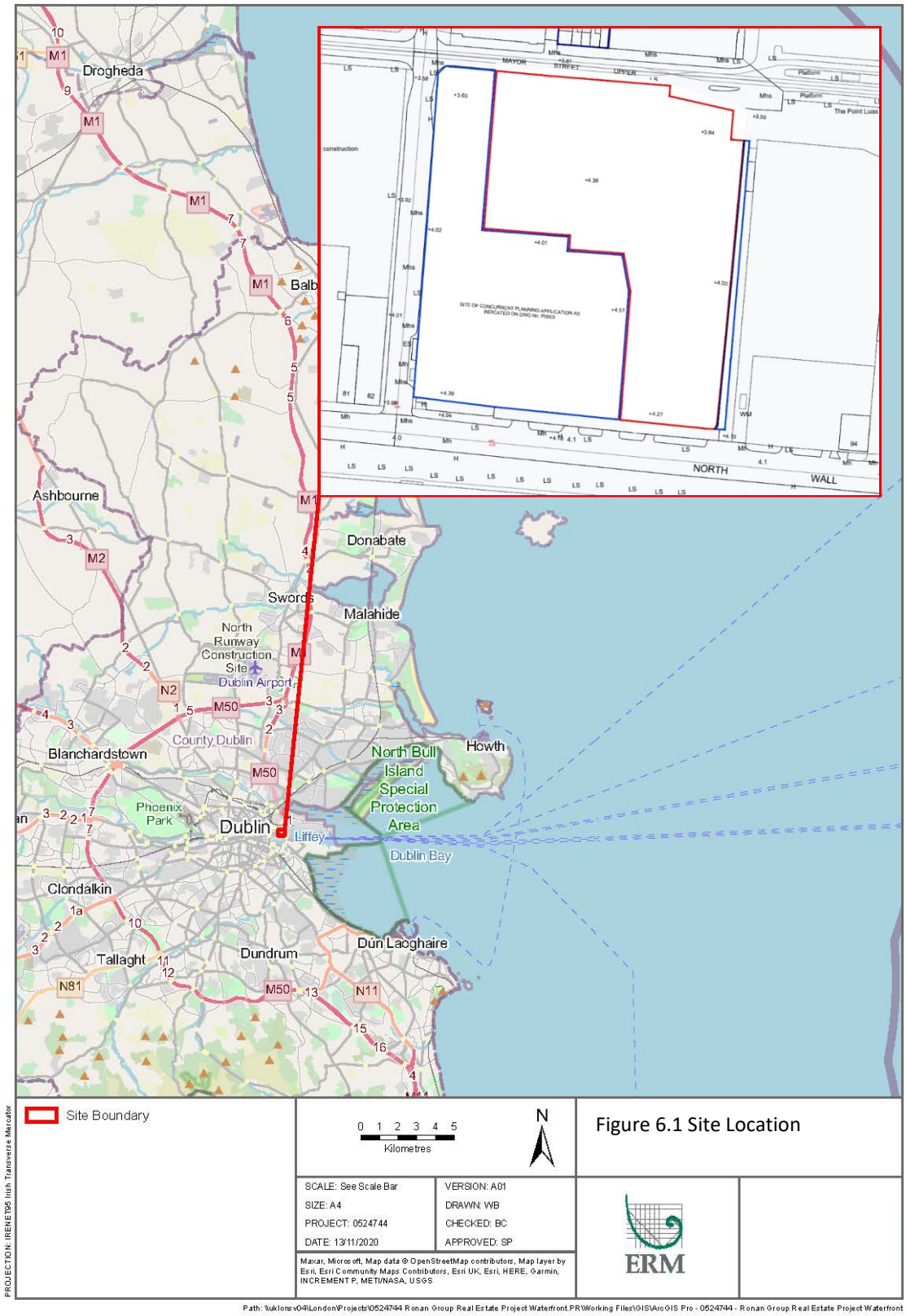


Figure 6.1: Location of the Proposed Development (ERM, November 2020)

6.1.3 Environmental Impact Assessment

Scoping of whether the Proposed Development required an Environmental Impact Assessment (EIA) was undertaken in December 2019 by Tom Phillips + Associates[9]. This report concluded that a mandatory EIA was not required, however due to the number of residential dwellings being proposed an EIA is required for the scheme on this basis. Biodiversity was scoped into the assessment at this stage to determine the likely significant effects on species, namely birds and bats, due to the construction of a 45 storey tower.

The scoping document produced was not subject to a formal scoping opinion from An Bord Pleanála.

6.1.4 Relevant Legislation, Policy and Guidelines

The assessment of the likely significant effects of the Proposed Development on ecological features has considered legislation, policy documents, and guidelines outlined in this EcIA and by a range of published and publically available data including:

- Ordinance Survey of Ireland mapping and aerial photography available from www.osi.ie;
- Online data available on European sites as held by the National Parks and Wildlife Services (NPWS) from www.npws.ie;
- Online data available on what qualifies as a rare or threatened species as held by the National Parks and Wildlife Services (NPWS) from www.npws.ie;
- Online data available on what qualifies as a rare or threatened species and on European sites as held by the National Biodiversity Data Centre from https://maps.biodiversityireland.ie/;
- Information on the status of EU protected habitats and species in Ireland (NPWS, 2013a and 2013b) from www.npws.ie;
- Information on land-use zoning from the online mapping of the Department of the Environment, Community and Local Government www.myplan.ie;
- Department of Housing, Planning and Local Government. River Basin Management Plan for Ireland 2018-2021;
- Information on water quality from the European Protection Agency website https://gis.epa.ie/EPAMaps/;
- Information on local watercourses and the Water Framework Directive (WFD) from www.catchment.ie;
- Information on soils, geology and hydrogeology from Geoscience Survey Ireland (GSI) website www.gsi.ie;

[9] Tom Phillips + Associates (2019) EIA Scoping Report. Tom Phillips + Associates, Dublin.

- Information on birds of conservation concern from Birdwatch Ireland www.birdwatch.ie;
- Screening for Appropriate Assessment for Proposed Residential Development City Block 9. Dublin City Council planning application DSDZ3779/17;
- Dublin City Council planning application DSDZ3042/19 (2019); and
- Altemar Ltd. (2019) Appropriate Assessment Screening & Natura Impact Statement on behalf of Waterside Block 9 Developments Limited.

The following planning and policy documents were relevant with regards to the assessment of other plans and projects with potential for cumulative effects:

- Department of Culture, Heritage and Gaeltacht. 2017-2021. *National Biodiversity Action Plan*;
- National planning applications from www.myplan.ie;
- *Dublin City Biodiversity Action Plan 2015-2020*;
- *Dublin City Development Plan 2016-2022;*
- *Strategic Environmental Assessment Statement for the Dublin City Development Plan 2016-2022*;
- *Appropriate Assessment for Dublin City Development Plan 2016-2022;*
- *Dún Laoghaire-Rathdown County Development Plan 2016-2022*;
- *Fingal Development Plan 2011-2017;*
- Strategic Housing Development Applications http://www.pleanala.ie/shd/applications/index.htm; and
- Dublin City planning applications from http://www.dublincity.ie/swiftlg/apas/run/wchvarylogin.display.

6.2 Methodology

6.2.1 Desk Study

Species data within a 2 km radius from the central Irish Grid Reference O 17840 34493, were obtained from the National Biodiversity Data Centre (NBDC), bat species data within a 1 km radius of the Proposed Development was also obtained from Bat Conservation Ireland (BCI)[10].

[10] https://www.batconservationireland.org/

Statutory and non-statutory designated site data within 15 km and 2 km respectively of the Proposed Development were obtained from National Parks and Wildlife Services (NPWS)[11] and National Biodiversity Data Centre (NBDC)[12]. Information on the habitats and landscape structure in the site surrounds, as well as any designated sites was obtained from aerial images from Google Earth[13], NBDC, NPWS, Environment Protection Agency (EPA)[14] and Dublin City Development Plan 2016-2022[15].

6.2.2 Walkover Survey

A walkover survey was conducted by Altemar[16] in August 2019. This included an inspection of the ground for species and habitats of conservation importance. The survey followed the Heritage Councils Best Practice Guidance for Habitat Surveys and Mapping (2011) and *A guide to habitats in Ireland* (2000)[17]. Habitats were classified according to Best Practice Guidelines to determine the dominant plant species. The nomenclature of vascular plants occurring within the defined survey area follows Stace (2019)[18].

6.2.3 Impact Assessment Criteria

The criteria used to assess the ecological value and significance of features is consistent with Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018)[19].
In accordance with CIEEM's Guidelines, an impact assessment is only undertaken for important ecological features. Important ecological features are considered within the Zone of Influence[20] of the development. To qualify as an important ecological feature, features of at least local importance which are being affected due to the Proposed Development are being considered in the assessment. Features of lower ecological value are not assessed. The levels of impact significance for each features 'value' are shown in Table 6.1.

The Zone of Influence (ZoI) of the Proposed Development is assumed to be restricted to the outline or reach of the tower cranes with potential for localised impacts of noise, light and general disturbance through activity levels during construction within the Proposed Development's footprint. Indirect effects on birds and bats will extend beyond the zone of the footprint.

[11] (NPWS, 2013a and 2013b) www.npws.ie
[12] https://maps.biodiversityireland.ie/
[13] https://earth.google.com/web/@53.34857362,-6.23280453,0.20720862a,4953.77130334d,35y,0h,0t,0r
[14] https://gis.epa.ie/EPAMaps/
[15] http://www.dublincity.ie/main-menu-services-planning-city-development-plan/dublin-city-development-plan-2016-2022
[16] Altemar Ltd. (2019) Appropriate Assessment Screening & Natura Impact Statement on behalf of Waterside Block 9 Developments Limited.
[17] Fossitt, J.A. (2000). *A Guide to Habitats in Ireland.* Heritage Council, Kilkenny
[18] Stace, C. (2019) *New Flora of the British Isles*. 4th edition. C&M Floristics, UK
[19] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester
[20] The Zone of Influence is the term used to define the receiving environment for the activities associated with the project and the biophysical changes that are likely to occur. The Zone of Influence is the 'effect area' over which change is likely to occur. This differs for different species and habitats due to varying sensitivities to potential impacts

Table 6.1: Valuation of Important Ecological Features

Valuation	Description
International	Very high importance and rarity, international scale with very limited potential for substitution. **Habitats** Internationally designated sites or candidate sites (i.e. Special Protection Area (SPA), provisional SPA (pSPA), Special Areas of Conservation (SAC), candidate SAC (cSAC), Ramsar site, Biogenetic/Biosphere Reserve, World Heritage Site or an area which meets the published selection criteria for such designation. A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat essential to maintain the viability of a larger whole. **Species** Regularly occurring populations of an internationally important species, where: • The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • The population forms a critical part of a wider population at this scale; or The species is at a critical phase of its life cycle at this scale.
National	High importance and rarity, national scale, limited potential for substitution. **Habitats** • Nationally designated sites (i.e. Natural Heritage Areas (NHA), Statutory Nature Reserve or National Park). • Habitats which provide refuge for fauna and flora under the Wildlife Acts. • A site containing viable areas of the habitat types listed in Annex I of the Habitats Directive. **Species** Regularly occurring populations of a nationally important species, where: • The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • The population forms a critical part of a wider population at this scale; or The species is at a critical phase of its life cycle at this scale.
County	High or medium importance and rarity, regional scale, limited potential for substitution. **Habitats** • Sites which contain area(s) of habitat type listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation for International or National importance. • Sites which are areas of Special Amenity or subject to Tree Preservation Order (TPO). • Areas of High Amenity or equivalent, designated under the County Development Plan. • Sites containing habitats and species that are rare or declining in quality or extent at a national level. • Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or population of species which are uncommon within the county.

	Species Resident, or regularly occurring populations of species assessed to be at County Level where: • The loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • The population forms a critical part of a wider population at this scale; or • The species is at a critical phase of its life cycle at this scale. This may include regularly occurring, locally significant population of a species listed as being nationally scarce, or in a Regional BAP. A regularly occurring, locally significant population / number of a regionally important species.
Local	Medium importance and rarity, local scale, limited potential for substitution. **Habitats** • Locally important population of priority habitats, species or natural heritage features identified in the Local Biodiversity Action Plan (LBAP). • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species which are uncommon in the locality. • Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological importance **Species** Resident, or regularly occurring populations of species assessed to be at Local Level where: • The loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • The population forms a critical part of a wider population at this scale; or • The species is at a critical phase of its life cycle at this scale. This may include regularly occurring, locally significant population of a species listed as being nationally scarce, or in a Local BAP. A regularly occurring, locally significant population / number of a regionally important species.

6.3 Baseline Description

6.3.1 Statutory Designated Sites

The Proposed Development site does not sit within any designated site.

The nearest European designated sites are the SPAs and SACs of Dublin Bay (2.8 km east). There is no direct hydrological connection to any of these designated sites. The locations of these designated sites in relation to the Proposed Development are illustrated in Figure 6.2 and Figure 6.3. Due to the possible indirect connection to Dublin Bay Natura 2000 sites via the surface water network to the River Liffey and foul networks via Ringsend Wastewater Treatment Plant an Appropriate Assessment was undertaken.

Appropriate Assessment (AA) was undertaken by ERM on all Natura 2000 sites within 15 km of the Proposed Development[21]. This is subject to a separate standalone report, but for context and completeness a summary is provided herein.

During stage 1 (screening) all sites with no hydrological connection or other pathway to the Proposed Development were screened out. Only the Natura 2000 sites with Qualifying Interests (QI) and the Special Conservation Interests (SCIs) that are potentially linked to the Proposed Development were taken forward to stage 2 (Natura Impact Statement). ERM undertook a Natura Impact Statement (NIS) for the following sites due to likely significant effects of potential contamination through hydrology links individually, or in combination with other developments, on these European sites:

- South Dublin Bay SAC;
- North Dublin Bay SAC;
- South Dublin Bay and River Tolka Estuary SPA; and
- North Bull Island SPA.

The report concluded potentially significant risks to the European sites mentioned above (in the absence of mitigation) arise from potential construction-related impacts to QIs and SCI species through changes in water quality resulting from proposed works. However, with the full implementation of the mitigation measures outlined in NIS report these risks will be avoided. Consequently, there will be no risk of adverse effects on QI habitats or species, SCI species, or the attainment of specific conservation objectives, either alone or in combination with other developments, for these European sites. The assessment is provided in the AA Screening and NIS[21].

6.3.2 Non-statutory Designated Sites

The nearest non-statutory designated sites to the Proposed Development are the pNHAs of Royal and Grand Canals (0.5 km east and 0.6 km south respectively). Further afield the pNHA North Dublin Bay and pNHA South Dublin Bay (c. 1.8 km north and 2 km south-east respectively). All of these pNHAs were designated in 1995 and have not been statutory upgraded or proposed to a NHA in the elapsed time. Prior to statutory designation pNHAs are subject to limited protection[22].

The Royal Canal is 0.5 km east of the Proposed Development. This site is a man-made waterway linking the River Liffey at Dublin to the River Shannon near Tamonbarry. The canal pNHA comprises the central channel and the banks on either side of it.

The Grand Canal is 0.6 km south of the Proposed Development. This site is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. Water is fed into the summit level of the canal at Lowtown from Pollardstown Fen, itself a pNHA.

[21] ERM (2020). *Appropriate Assessment Screening & Natura Impact Statement: City Block 9, Dublin Docklands*. Dublin
[22] https://www.npws.ie/protected-sites/nha

Both canals consist of a number of different habitats that are found within their boundaries – hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The ecological value of the canals lies more in the diversity of species they supports along there linear habitats than in the presence of rare species. Each canal crosses through agricultural land and therefore provides refuge for species threatened by modern farming methods.

The North Dublin Bay pNHA and South Dublin Bay pNHA are both proposed designated for their internationally important coastal habitats and bird populations which are designated under their SAC and SPA citations.

6.3.3 Important Wildlife Corridors

The River Liffey is located approximately 30 m to the south of the Proposed Development boundary, North Wall Quay defines the boundary of the Lower Liffey Estuary. This transitional water body connects the River Liffey to the Liffey Estuary and the wider Dublin Bay area; roughly 2-3 km to the east. Across the Liffey Estuary, 360 m to the south-east of the site, the Dodder River enter the Liffey Estuary from the South. The water quality status for the River Liffey between Talbot Bridge and Poolbeg Lighthouse is classified by the EPA as "unpolluted"[23], hydrology is discussed in greater detail in Chapter 8.

Surface water contamination has been recorded on the Proposed Development and there is an indirect connection to the River Liffey via surface water drainage and foul networks via Ringsend Waste Water Treatment Plant during construction. Under the precautionary principle there is potential for impact on features of interest without the use of mitigation measures the River Liffey has been considered as a key ecological receptor.

Given the proximity of European designated sites, and identified potential source-pathway-receptor links, designated sites have been considered as a key ecological receptor. Non-statutory designated sites have been discounted at this stage due to there being no potential source-pathway-receptor links as there are a number of locks at the interface between the River Liffey and the Canals.

[23] https://gis.epa.ie/EPAMaps/ accessed January 2020, reporting period of results 2010-2012

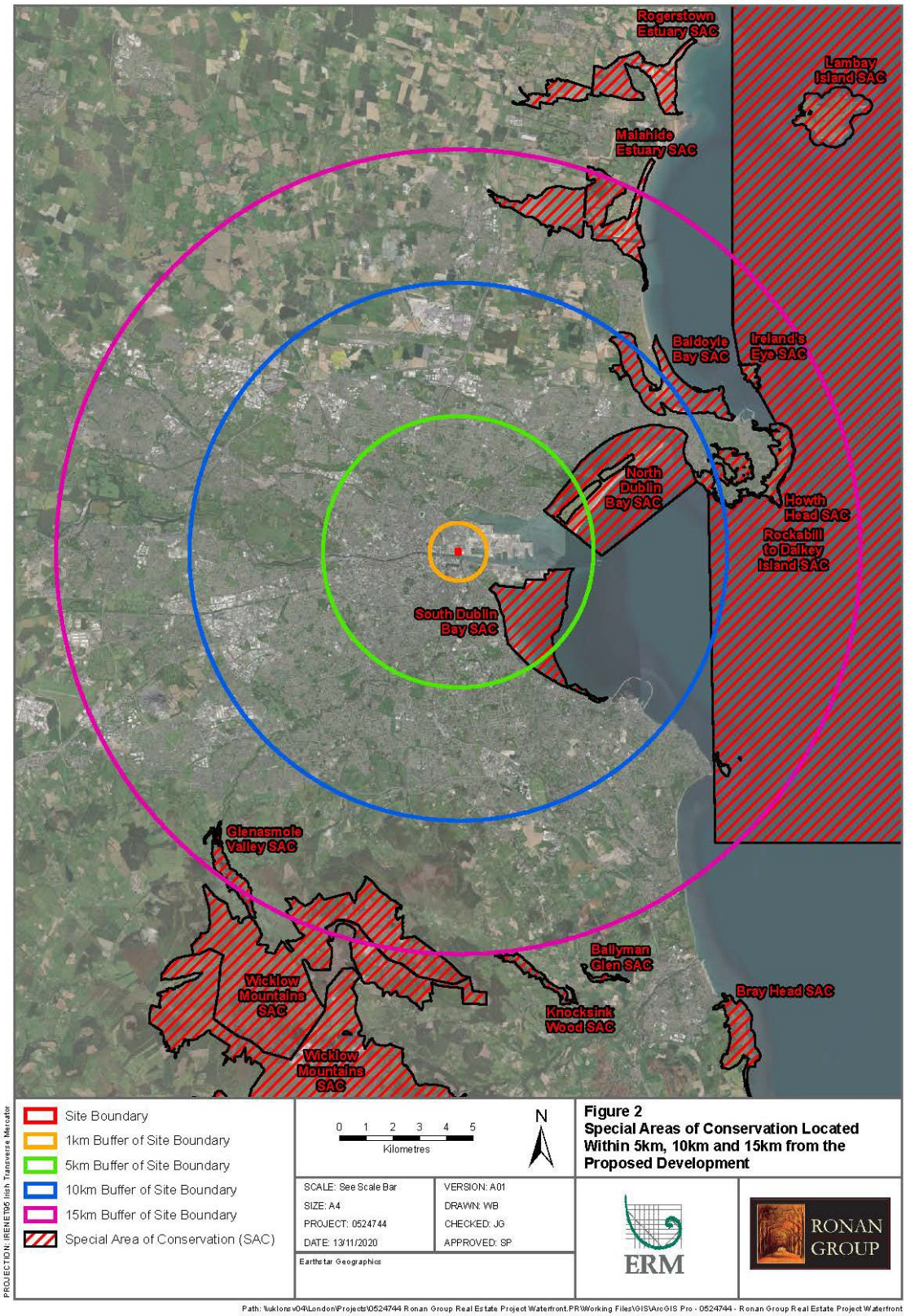


Figure 6.2: Special Areas of Conservation within 15 km of the Proposed Development (ERM, November 2020)

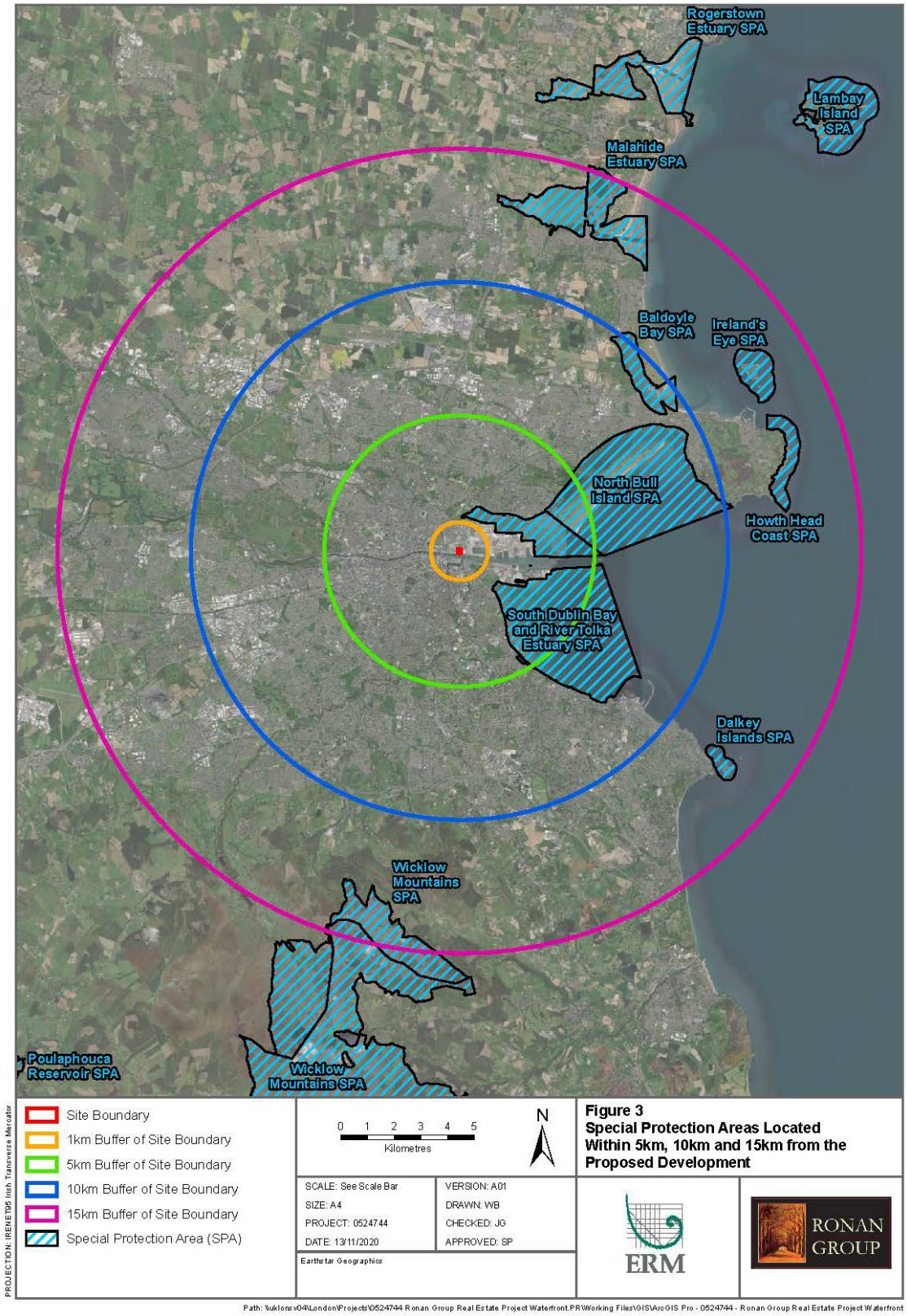


Figure 6.3: Special Protection Areas within 15 km of the Proposed Development (ERM, November 2020)

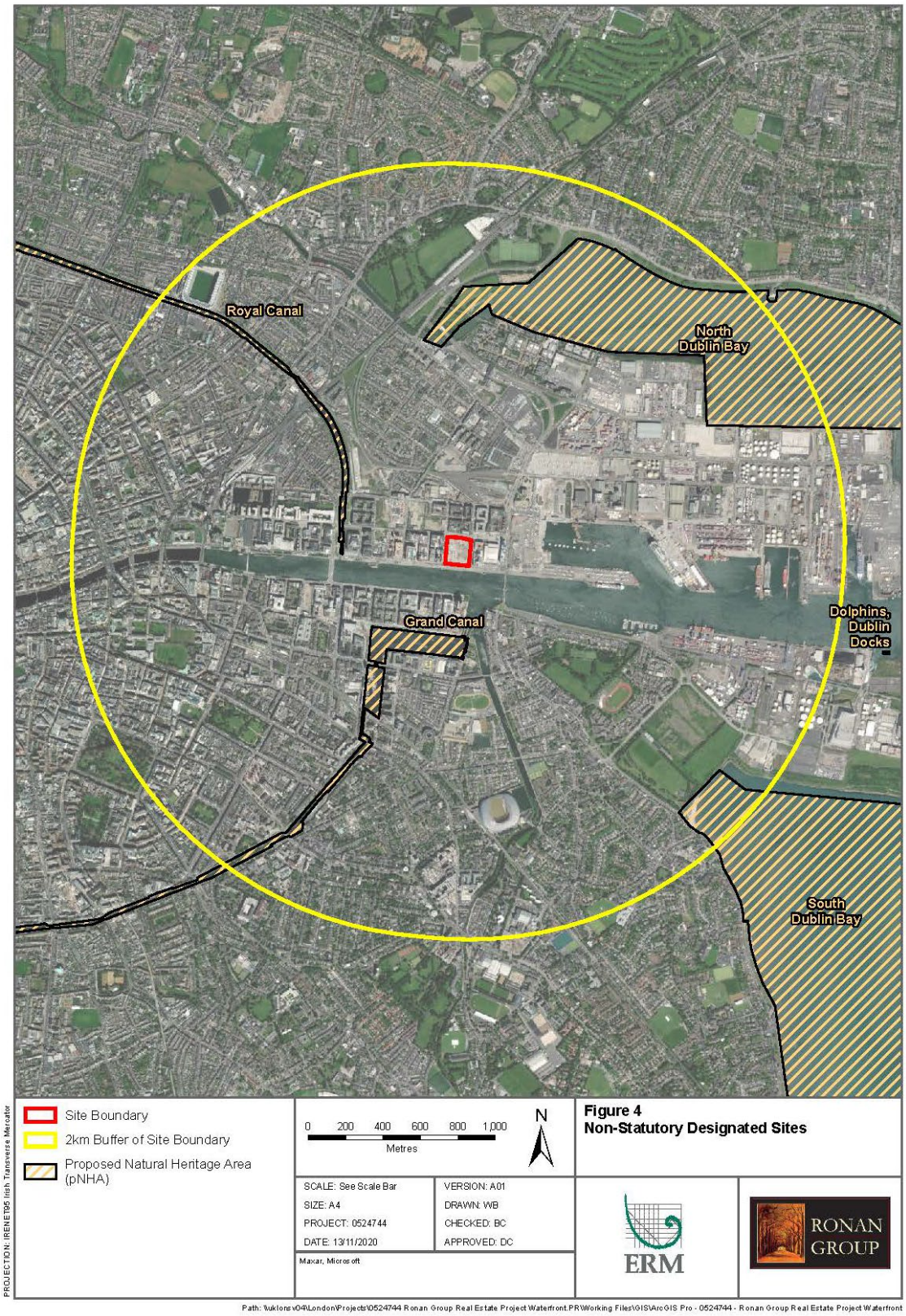


Figure 6.4: Non-statutory designated sites within 2 km of the Proposed Development (ERM, November 2020)

6.3.4 Desk Study Flora Records

Protected Species

Opposite-leaved pondweed (*Groelandia densa*), which is protected under the Flora (Protection) Order 2015[24], was recorded within 2 km of the development site in 1999 on the Grand Canal.

Trees

The *Dublin City Biodiversity Action Plan (BAP) (2015 - 2020*) and the *Dublin City Tree Strategy (2016 - 2020)*[25] identifies treelines as an important part of the extensive wildlife network and habitat connectivity in the locality. Trees play an important role in Sustainable Urban Drainage Systems (SuDS) alongside providing societal benefits in terms of aesthetics, UV protection and health and crime reduction benefits.

Invasive Species

The NBDC database search returned records of the following 13 invasive plant species within 2 km of the Proposed Development, Table 6.2 shows those species listed as high impact invasive species by NBDC.

Table 6.2: Invasive species within 2 km of the Proposed Development

Latin Name	Common Name
Impatiens glandulifera	Himalayan balsam
Fallopia japonica	Japanese knotweed
Elodea nuttallii	Nuttall's waterweed
Heracleum mantegazzianum	Giant hogweed

6.3.5 Desk Study Fauna Records

Desk study records for fauna species within 2 km of the Proposed Development are shown in Table 6.3. Species of birds recorded in the desk study data are shown under Section 6.2.5.2.

Table 6.3: Protected fauna species within 2 km of the Proposed Development

Latin Name	Common Name	Legislative Protection IUCN Status
Mammals		

[24] http://www.irishstatutebook.ie/eli/2015/si/356/made/en/pdf
[25] https://www.dublincity.ie/sites/default/files/content/RecreationandCulture/DublinCityParks/Documents/Dublin%20City%20Tree%20Strategy%202016-2020.pdf

Lutra lutra	Otter	Annex II and IV NT
Meles meles	Eurasian Badger	WA LC
Myotis daubentonii	Daubenton's Bat	WA, Annex IV LC
Nyctalus leisleri	Leisler's Bat	WA, Annex IV LC
Plecotus auritus	Brown Long-eared Bat	WA, Annex IV LC
Pipistrellus nathusii	Nathusius's Pipistrelle	WA, Annex IV LC
Pipistrellus pipistrellus	Common Pipistrelle	WA, Annex IV LC
Pipistrellus pygmaeus	Soprano Pipistrelle	WA, Annex IV LC
Sciurus vulgaris	Eurasian Red Squirrel	WA LC
Sorex minutus	Eurasian Pygmy Shrew	WA NT
Amphibians		
Lissotriton vulgaris	Smooth Newt	WA LC
Rana temporaria	Common Frog	WA, Annex V LC
Invertebrates		
Andrena (Melandrena) nigroaenea	-	- VU
Argynnis aglaja	Dark Green Fritillary	- VU
Bombus (Melanobombus) lapidaries	Large Red-tailed Bumble Bee	- NT
Bombus (Thoracombus) muscorum	Moss Carder-bee	- NT
Cupido minimus	Small Blue	- EN
Ischura pumilio	Scarce Blue-tailed Damselfly	- VU
Lasiommata megera	Wall	- EN

WA = Protected under the Irish Wildlife Act (2000) as amended.

Annex II – Habitats of this species are protected under the European Habitats Directive.
Annex IV – Species are strictly protected under the European Habitats Directive.
Annex V – Species are protected from exploitation and being taken in the wild under the European Habitats Directive.
IUCN Red List Conservation status – NT = Near Threatened, EN = Endangered, VU = Vulnerable, LC = Least Concern

Mammals

The nearest known bat roost, according to BCI, is location c. 1 km to the south of the Proposed Development at Grand Canal Dock, species present are common pipistrelle and Leisler's bat. No other bat roosts have been recorded within a 1 km radius of the Proposed Development.

Otters are known to use the River Liffey as a transitional water body, a holt[26] was recorded 600 m west of the Proposed Development during Dublin City otter survey completed in 2019[27]. The holt was classed as an inactive breeding site (see Figure 6.5). The numerous steps and floating platforms of Grand Canal Harbour and the mouth of the River Dodder opposite the Proposed Development were marked by otter.

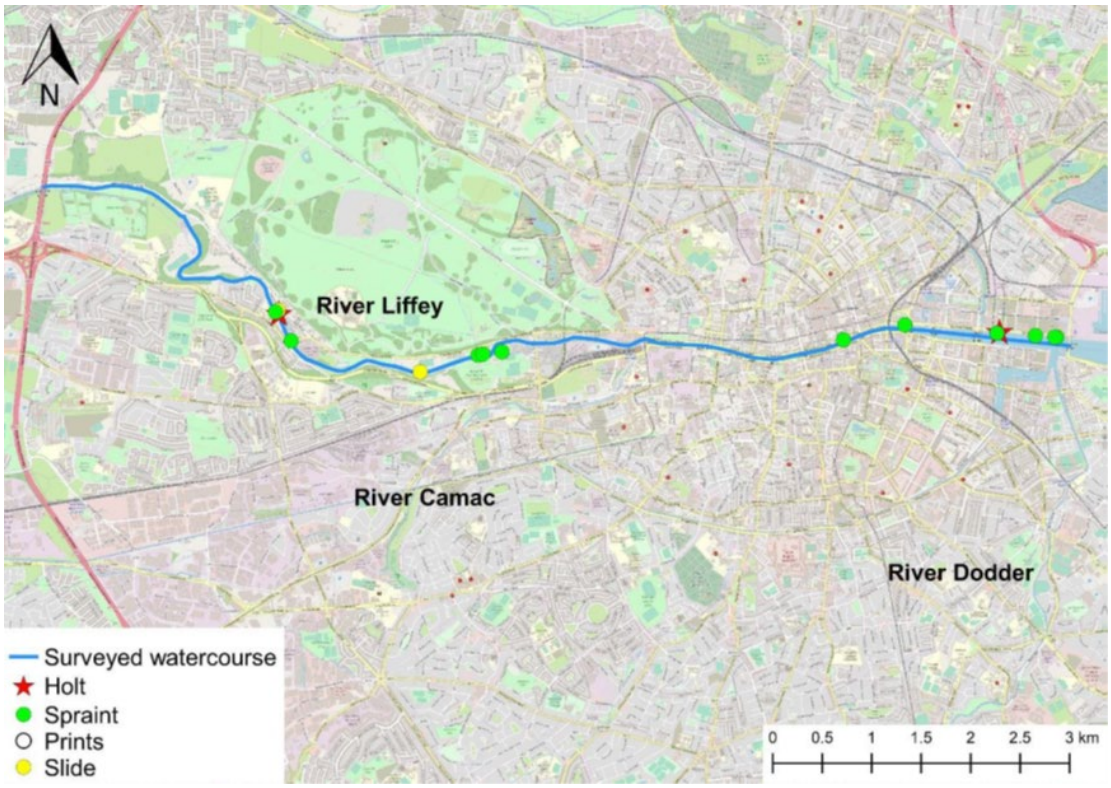


Figure 6.5: Otter sign distribution on the surveys reaches of the River Liffey, Co. Dublin as surveyed April 2018 - April 2019 (Tritus Environmental Ltd, 2020)

[26] a holt is a potential breeding area that has been used by otters
[27] Triturus Environmental Ltd, (2019). Dublin City Otter Plan. An Action of the Dublin City Biodiversity Action Plan 2015-2020. Dublin City Council
https://www.dublincity.ie/sites/default/files/content/RecreationandCulture/DublinCityParks/Documents/Dublin%20City%20Tree%20Strategy%202016-2020.pdf

Birds

The current *Birds of Conservation Concern* in Ireland[28] list was used to record the conservation status of the bird species records from Birdwatch Ireland and NBDC within a 2 km radius of the Proposed Development site. Species are classified into three categories (Colhoun & Cummins, 2013)[29]:

- Red list - birds of high conservation concern;
- Amber List - birds of medium conservation concern; and
- Green List - birds not considered threatened.

Table 6.4 excludes any bird species which have Green status as these are the least critical group and occur regularly. Table 6.4 also excludes those bird species which fall under the European Habitat and Birds Directives, as these are addressed in the accompanying ERM NIS report[30].

Table 6.4: Birds of Conservation Concern in Ireland recorded within 2 km of the Proposed Development

Species	Status	Considered to breed or forage within the site?
Black Guillemot (*Cepphus grylle*)	Amber-listed	No
Black-headed Gull (*Larus ridibundus*)	Red-listed	No
Black-legged Kittiwake (*Rissa tridactyla*)	Amber-listed	No
Brent Goose (*Branta bernicla*)	Amber-listed	No
Common Linnet (*Carduelis cannabina*)	Amber-listed	No
Great Cormorant (*Phalacrocorax carbo*)	Amber-listed	No
Herring Gull *(Larus argentatus*)	Red-listed	No
House Martin (*Delichon urbicum*)	Amber-listed	No
House Sparrow (*Passer domesticus*)	Amber-listed	No
Kestrel (*Falco tinnunculus*)	Amber-listed	No

[28] https://birdwatchireland.ie/birds-of-conservation-concern-in-ireland-2014-2019/
[29] Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014 -2019. Irish Birds 9: 523-544
[30] ERM (2020). *Appropriate Assessment Screening & Natura Impact Statement: City Block 9, Dublin Docklands*. Dublin

Lesser Black-backed Gull (*Larus fuscus*)	Amber-listed	No
Mew Gull (*Larus canus*)	Amber-listed	No
Mute Swan (*Cygnus olor*)	Amber-listed	No
Starling (*Sturnus vulgaris*)	Red-listed	No
Black Guillemot (*Cepphus grylle*)	Amber-listed	No
Black-headed Gull (*Larus ridibundus*)	Red-listed	No

6.3.6 Field Surveys

Habitats and Flora

Recolonised bare ground (ED3)

The site of the Proposed Development is currently brownfield and predominantly occupied by existing extensive areas of hard standing (>80%) with hardcore areas. The area does not appear to be maintained and no rare or otherwise notable plant species of conservation value were recorded during the field assessment undertaken by Altemar. Species on site included dandelion (*Taraxacum* spp.), colt's foot (*Tussilago farfara*), willow-herbs (*Epilobium spp*.) nettle (*Urtica dioica*), and ragworts (*Senecio spp*.), purple-loosestrife (*Lythrum salicaria*), slender St John's-wort (*Hypericum pulchrum*), narrow-leaved ragwort (*Senecio inaequidens*), and thistles (*Cirsium arvense, Circium. vulgare*). Opportunistic flora exists within isolated pockets recolonising bare ground. Vegetation such as the invasive non-native species butterfly-bush (*Buddleja davidii*) has formed around the perimeter of the site.

Treelines (WL2)

There are scattered tree lines along the eastern and western footpath associated with the perimeter of the site at c. 15 m intervals.

Fauna

In accordance with NBCD Ireland's species synopsis on habitats, otters, amphibians and badgers are extremely unlikely to be found on hard-standing surfaces[31]. No evidence or signs of these species were observed along the River Liffey at the time of the field survey. Otters are known to utilise the River Liffey, however directly opposite the Proposed Development, and in the close vicinity, the river edge is a hard engineered quay wall, and so no signs of otters (footprints, droppings, holts) were found during the survey along this stretch of the river.

The Proposed Development contains no buildings or trees that could potentially form a bat roost, there is also no evidence, or signs of bats recorded at the time of the survey.

[31] https://species.biodiversityireland.ie/

No bird species were observed foraging or nesting on the site during the time of the survey. Although there are no suitable nesting / foraging habitats on site, the River Liffey, adjacent, provides potential suitable habitat.

Limitations

A walkover survey was undertaken in 2019, with the following limitations / data gaps:

- There was no habitat mapping completed;
- The survey was undertaken in late summer; species which are found earlier in the season are likely to have been missed;
- No breeding bird data was collected for the site; and
- No bat activity surveys were undertaken in vicinity to the site, so the use of the River Liffey as a commuting corridor is undetermined.

As the Proposed Development site is largely hard standing with negligible semi-natural habitats present, limited to the occurrence of ruderal habitats between hard standing areas and occasional patches of invasive non-native plant species (buddleia), the above data gaps are not considered to present significant limitations to the impact assessment.

6.3.8 Summary of Ecological Evaluation

Table 6.5 below summarises all identified important ecological features. These have been identified as at risk of potentially significant impacts via a source-pathway-receptor link and are valued as local importance (higher value) or above.

Table 6.5: Identified Important Ecological Features

Ecological Feature	Ecological Valuation Level	Justification for Valuation	Important Ecological Feature
South Dublin Bay SAC	International	There is a potential hydrogeological contamination pathway from the Proposed Development and the SAC.	Yes, but not included in the EIAR as part of the standalone AA/NIS
North Dublin Bay SAC	International	There is a potential hydrogeological contamination pathway from the Proposed Development and the SAC.	Yes but not included in the EIAR as part of the standalone AA/NIS
South Dublin Bay and Tolka River SPA	International	There is a potential hydrogeological contamination pathway from the Proposed Development and the SPA.	Yes but not included in the EIAR as part of the standalone AA/NIS

North Bull Island SPA	International	There is a potential hydrogeological contamination pathway from the Proposed Development and the SPA.	Yes but not included in the EIAR as part of the standalone AA/NIS
Royal Canal pNHA	County	There is no direct hydrogeological pathway between the Proposed Development and the pNHA.	No
Grand Canal pNHA	County	There is no direct hydrogeological pathway between the Proposed Development and the pNHA.	No
River Liffey	Local (Higher value)	There is potential that the River Liffey's water quality could be affected by pollutants from the Proposed Development.	Yes
Recolonised Bare-ground (ED3)	Negligible	This is a common habitat type in the vicinity to the Proposed Development.	No
Treelines (WL2)	Local (Moderate value)	The local importance of trees outlines in the Dublin City BAP.	No
Invasive Non-native species	Negligible	Within the Proposed Development site a few stands of butterfly-bush were found, this is a non-native species which isn't invasive.	No
Otters	National	The River Liffey's edge directly adjacent to the site, and in the close vicinity, is built up by a hard engineered quay wall which prevents otters from using the site for holts.	No
Bats	Local (Higher value)	The potential use of the River Liffey as a commuting habitat for bats which could be affected by the lighting of the development.	Yes
Birds	Local (Higher value)	The potential use of the Proposed Development site and the River Liffey for foraging and roosting.	Yes

6.4 Proposed Development

The Proposed Development will consist of three apartment buildings; Block A (8 - 14 floors), Block B (8 – 41 floors) and Block C (11 – 45 floors), the maximum height of the development is 166 m above three levels of basement. There is a cumulative gross floor area above ground of c. 102,889 sq. m. The Proposed Development is to be built in one phase which is anticipated to take four years to complete.

In order to provide an informed assessment of the potential impact pathways, a number of surveys have been undertaken including a Hydrological Impact Assessment, Generic Quantitative Risk Assessment, Engineering Services Report and a Site-Specific Flood Risk Assessment. The results and conclusions of the reports have been used by Ronan Group Real Estate to determine an appropriate Construction Management Plan (CMP)[32] incorporating the latest methodologies and practices for the project.

6.4.1 Construction Methodology

Construction for the Proposed Development is anticipated to commence in Q4 of 2021 and be completed in one phase which is expected to last four years. The construction working hours for the Proposed Development are to be 8am – 6pm.

The Construction Management Plan has inbuilt mitigation to ensure that the effects arising during the construction phase are mitigated for, including the following:

- A suitable dewatering design for the site based on several criteria, namely site hydrogeology, average rainfall, construction details, discharge licence limits, available space on site, groundwater storage volumes, groundwater inflow calculations, etc., will be produced and implemented.

- Any impacted groundwater, encountered during enabling works, will be pumped from the excavations and undergo treatment on-site which would enable pumped groundwater to be disposed to sewer under discharge licence. A discharge license will have to be attained from Dublin City Council to pump to the sewer. Treated water will require continual monitoring to check that water quality standards are in compliance with the requirements of the discharge license.

- Further dewatering wells will be installed on-site as required in order to fully dewater the site for construction works. Pumping from the southern side of site will be monitored during the dewatering stage to determine if the contamination risk has been reduced based on laboratory results from raw water entering the proposed on-site water treatment system.

- Dewatering will be stopped once a structural assessment (provided by the Client) concludes the risk of hydrostatic uplift is no longer present and all joints and wellheads are sealed out; at this stage the dewatering infrastructure will be removed

[32] PJ Hegarty & Sons (2020). *Outline Construction Management Plan for Waterfron South Central Residential Development, North Wall Quay, Dublin 1.* PJ Hegarty & Sons, Dublin.

from the site. All wells will need to be decommissioned appropriately in accordance with best practice guidelines.

- Treatment for other parameters such as ammoniacal nitrogen and metals will be undertaken as required to satisfy the requirement of a discharge licence.

- During construction works where there is excavation and movement of soils, it is recommended that works be undertaken by appropriately trained contractors so that risks associated with the presence of asbestos in the soils on site are managed correctly. An asbestos management plan should be put in place to manage the risks to construction workers from asbestos identified in soils on the site.

- During enabling works, potential risks to construction workers should be mitigated through the implementation of measures by the contractor and their sub-contractor in accordance with construction health and safety legislation.

- Silt fences or other suitable barrier measures will be installed where the working area encroaches within 10 m of a watercourse and / or drain that leads directly to the River Liffey.

- Storage of fuel, oil and chemical must be sited on an impervious base within a bund and secured. The base and bund walls must be impermeable to the material stored and of adequate capacity. Sufficient oil spill cleaning materials should be held on site in a clearly marked area. These should contain sufficient absorbent to clean 150% of the largest potential oil spill. Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment.

- From the detailed site investigation and sampling works, the fill material and subsoils have been classified into different waste categories and will be disposed of accordingly to appropriate waste facilities off-site.
- In order to limit the risk of spreading identified metals and creosote related groundwater contamination across the site, pumping will be limited to the northern side of the site thus keeping any groundwater contamination present localised.

- The on-site water treatment plant will be designed to cater for the known contaminants of concern that are known to be on-site within the shallow groundwater. Although the detection of free phase product was not reported to be present on-site the water treatment system proposed will cater for light non-aqueous phase liquids (LNAPL) and dense non-aqueous phase liquids (DNAPL) if present. Treatment design will cater for all COC which will be verified by further baseline groundwater monitoring on-site prior to dewatering works.

Sub-structure in accordance with the Construction Management Plan

For the purposes of explaining the construction methodology to be employed, the substructure will consist of secant piles to the basement perimeter with continuous flight auger (CFA) piles supporting the foundations pile caps and raft slabs. Stair and lift cores will

be constructed in concrete with a mixture of reinforced concrete and structural steel superstructures built around these cores.

A dewatering system will be installed ahead of the excavation and all water will be pumped through settlement tanks before discharge to a location agreed with Dublin City Council.

Ground investigations carried out in advance of the main works as part of the detailed foundation design will determine if any ground contamination is present. All excavated material will be disposed to licensed landfill sites. Any contaminated materials will be kept separate and removed to specialist facilities in accordance with environmental legislation.

Dust suppression and road sweeping will be undertaken as required to maintain the site, neighbouring properties and adjacent public roads in clean condition. The breaking of concrete has the potential to emit alkaline dust into the receiving environment. A barrier between the dust source and the River Liffey will be erected, where necessary and possible, to limit the possibility of dust contacting the receptor.

Super-Structure in accordance with the Construction Management Plan

As the basement level slabs are completed, stair and lift cores will be constructed. Six tower cranes will be erected as required to service the lifting requirements for the project. Beacon lights will be placed on the cranes for aviation purposes and flood lights will be placed on the crane shafts for site lighting. As the jib radius / placing boom reach will range between 30 m and 60 m, drivers will be instructed to slew loads so that materials remain over the foot print of the site although jibs will oversail properties outside of the site and potentially over the River Liffey.

Foul Waters

A proposed system for that of foul water from the Proposed Development shall be discharged by gravity to the 17000 x 725 mm public combined sewer located on Castleforbes Road which then goes on to Ringsend Waste Water Treatment Plant (WWTP) for treatment prior to discharge into Dublin Bay. The proposed foul water drainage system has been designed in accordance with the 'Irish Water Code of Practice for Wastewaste Infrastructure'[33] and 'Greater Dublin Regional Code of Practice for Drainage Works'[34].

Surface waters

A proposed surface water drainage system has been designed using WinDes Microdrainage software in accordance with the Department of Environment and local Government's guidance document. 'Recommendations for Site Development Works for Housing Areas'[35],

[33] Irish Water. (2017 revision 1) Code of Practice for Wastewaste Infrastructure. Document IW-CDS-5030-03
[34] Greater Dublin Regional Code of Practice for Drainage Works, V6.0
http://www.dublincity.ie/sites/default/files/content//WaterWasteEnvironment/WasteWater/Documents/Greater_Dublin_Regional_Code_of_Practice_V6-0.pdf
[35] Stationary Office (1998) Recommendations for Site Development Works for Housing. Dublin

with guidance taken from the 'Greater Dublin Strategic Drainage Study' (GDSDS)[36] and CIRIA Publications C644 – 'Building Greener'[37].

The drainage system has been designed with the aim of providing a sustainable drainage solution ensuring, in so far as feasible, that the development has a minimal impact on the existing public surface water sewer system. This is achieved with the incorporation of Sustainable Urban Drainage Systems (SuDS) including as green roofs, filter drains, drainage channels, and attenuation systems. Details of the SuDs scheme along with locations of the pocket parks can be found in the landscape chapter of this EIAR.

Sustainable Urban Drainage Systems (SuDS)

The Proposed Development utilises SuDS in order to reduce the impact on the surface water sewage systems. Throughout the development the following attenuation systems are being incorporated:

- 2,400 m^2 of pocket parks;
- 50 m^2 of attenuation ponds;
- 7,432 m^2 of green walls;
- 800 m^2 of allotments;
- 4,831 m^2 of roof terraces; and
- 466 m^2 of green roofs.

Biodiversity Enhancement Measures

The Proposed Development includes areas of habitat for biodiversity, including ponds, green roofs and green walls which are likely to be utilised by a variety of invertebrates, birds and bats. The design pallet for these areas has been considered in order to attract key target species throughout the seasons.

As well as creating biodiverse habitats, the Proposed Development will include bat boxes, insect hotels and bird boxes to create space for species within the development. These would all be placed in the appropriate locations to maximise use by species on site.

6.5 Assessment of Impacts

Based on the baseline ecological context and the extent of the Proposed Development, the following potential impacts have been identified during the construction stage:

[36] Irish Water (2005) Greater Dublin Strategic Drainage Study Final Strategy Report
[37] CIRIA (2007). PUB C644 Building greener: guidance on the use of green roofs, green walls and complementary features on buildings

- loss of approximately 0.2 ha of less than local value semi-natural habitats present on the Proposed Development;
- disturbance / noise / activity level increase arising from cranes, and increase in construction vehicles and construction workers;
- construction is anticipated to last for four years, with construction commencing in winter 2021; and
- working hours on site are 8 am – 6 pm.
- artificial lighting arising during the construction phase:
- all non-essential lighting will be switched off when not in use.
- accidental pollution affecting surface water quality in receiving environment; and
- spread of invasive non-native invasive species.

Based on the baseline ecological context and the extent of the Proposed Development the following potential impacts have been identified during the operational stage:

- disturbance arising from operational artificial lighting;
- wind tunnelling arising from the building of the Proposed Development;
- buildings at height intruding on commuting bird and bat assemblage; and
- operational run-off affecting surface water quality in receiving environment.

As outlined in the Verdè report[38], there are a number of contaminated land areas within the existing site boundary, these include:

- an area in the north-central section of the site showing physical signs of hydrocarbon contamination (odour, sheens etc.) in the top 4 m of made ground;

[38] Verdè Environmental Consultants Ltd. (2019). *Hydrogeological Impact Assessment: City Block 9, North Wall Quay, Dublin.* Verdè Environmental Consultants Ltd, Kilcoole.

- in the west-central section of the site strong hydrocarbon odours were detected at 21 mBGL;
- a buried pit was located to the north of the site which was likely used in the treatment timber by soaking the wood in creosote;
    - leaks from the buried pit and localised areas of contaminated groundwater were found in the deep made ground and the sand and gravel layer beneath the buried pit.
    - creosote impacted groundwater's were not found in the sand and gravel layer beyond 75 m down gradient of the buried pit.
    - it was found that a previously installed monitoring well (BH02) was a pathway for contamination to enter the water bearing sand and gravel layer. The well has been fully decommissioned and the pathway fully removed.

As outlined in the RSK report[39] "The aquifer underlying the site has been classified by the GSI as a locally important aquifer. The vulnerability of the aquifer has been classified as Low." In addition, "the Dublin Boulder clay encountered at depth is considered to be an aquitard and therefore downward migration of contaminants is considered unlikely."

Likely significant effects relating to the Proposed Development have assessed the important ecological features listed in Table 6.5. All impacts are described in the absence of mitigation.

6.5.1 Do Nothing Impact

The existing unmanaged amount of recolonised bare ground within the Proposed Development is expected to maintain habitat conditions close to their current state. Biodiversity is unlikely to become of value or increase due to the existing habitats on site and the surrounding environment.

[39] RSK. (2019). *Generic Quantitative Risk Assessment: Project Waterfront, Dublin 1.* RSK (Ireland) Ltd.

6.5.2 Construction Stage

Non-statutory Designated Sites and River Liffey

Although the water quality status for the River Liffey adjacent to the Proposed Development is classified by the EPA as 'unpolluted', contamination has been recorded within the site boundary.

Due to the identified contamination on site and the indirect pathway via the River Liffey, the river and all designated sites with a source-pathway-receptor link will be subject to the same potential impacts. These include:

- clearance of contaminated materials from within in the surface layers during the construction of the basement levels and from surface water runoff from the site during clearance, that may contain mobilised contamination, pollution or silt;
- the use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals could lead to pollution on site or in adjacent surface water networks and the River Liffey;
- the storage of topsoil or works on onsite, in the vicinity of the River Liffey, could lead to dust, contamination, soil or silt laden runoff entering adjacent watercourse;
- surface water runoff on site during construction or operation may lead to silt or contaminated materials from site entering the River Liffey;
- concrete, silt or pollution could enter watercourses during dewatering of foundations or drainage trenches, if required during construction;
- breaking of concrete (associated with hardstanding demolition) has the potential to emit noise and alkaline dust into the receiving environment;
- if on-site concrete production is required or cement works are carried out in the vicinity of watercourses there is potential for contamination of watercourses; and
- localised activity on site and noise may be generated during works.

  In the absence of mitigation, (under the precautionary principle) construction-related impacts are considered to be significant at the level the site has been valued.

Birds

There are no suitable habitats within the Proposed Development for nesting and / or foraging bird species.

Noise, vibration and increased human presence associated with the construction works of the Proposed Development are likely to result in a temporary disturbance impact to birds. However, the existing local bird population may currently be habituated to high levels of noise and human activity, due to the urban nature of the site and the existing construction projects adjacent to site and in the surrounding location. Pollution can pose a threat to bird

populations as outlined in Article 12 of the EU Birds Directive[40]. However, considering the distance and nature of the Proposed Development to any recorded breeding sites, any small pollution risk would be diluted and dispersed, by the River Liffey and Dublin Bay (Wilson and Jackson, 2011[41] and O'Higgins and Wilson, 2005[42]), resulting in no significant effect to bird species range, timing and intensity of areas.

Construction-related impacts are not considered significant for bird species.

Bats

There are no suitable habitats within the Proposed Development for roosting / foraging bat species.

Lighting during the construction of the Proposed Development could cause a temporary disturbance to bats, should there be any light spill onto the likely commuting / foraging route of the River Liffey. However the Construction Management Plan[43] states that night-time working would be avoided and any unnecessary lighting during construction would be switched off when it is not in use, resulting in no significant effect to commuting / foraging bats along the River Liffey.

6.5.3 Operational Stage

Designated Sites and River Liffey

Surface water arising on site during the operational phase will be collected and stored on site before being discharged through the existing surface water system on Castleforbes Road.

The foul water on site during the operational phase will be collected and discharged to the public combined sewer located on Castleforbes Road.

There are no likely significant effects during the operational phase due to the following reasons:

- Any accidental pollution event is likely to be short in duration (i.e. confined to storm events), limiting the magnitude and extent of effects;
- The significant distance between the outfall of surface water runoff and the nearest European site in Dublin Bay (c. 2.3 km), meaning that it is unlikely that sediments or pollutants from the proposed development are likely to result in any discernible effects on European sites in Dublin Bay;

[40] NPWS Birds Directive Article 12, Ireland's Summary Report for the period 2008 - 2012
[41] Wilson, J.G. and Jackson, A. (2011) Upgrading of Dublin Sewage Treatment Plant: N sources for the macroalga Ectocarpus. Unpublished report to Dublin City Council. Trinity College Dublin.
[42] O'Higgins T.G. and Wilson J.G. (2005) Impact of the River Liffey discharge on nutrient and chlorophyll concentrations in the Liffey Estuary and Dublin Bay (Irish Sea). Estuarine and Coastal, Shelf Science, 64, 323- 334
[43] PJ Hegarty & Sons (2020). *Outline Construction Management Plan for Waterfron South Central Residential Development, North Wall Quay, Dublin 1.* PJ Hegarty & Sons, Dublin.

- There was no proven link between WWTP discharges and nutrient enrichment of sediments in Dublin Bay based on analyses of dissolved and particulate Nitrogen signatures (Wilson and Jackson, 2011);

- Enriched water entering Dublin Bay has been shown to rapidly mix and become diluted such that the plume is often indistinguishable from the rest of bay water (O'Higgins and Wilson, 2005);

- Marine modelling for Ringsend WWTP indicates that discharged effluent is rapidly mixed and dispersed to low levels via tidal mixing within a short distance of the outfall pipe (Dowly & Bedri 2007[44]); and

- Modelling of water quality in Dublin Bay for the Ringsend WWTP Upgrade Project demonstrates that the effects of nutrients from Ringsend WWTP are largely confined to the area between the South Wall and the Tolka Estuary (Irish Water, 2018[45]).

No statutory or non-statutory designated sites, nor the River Liffey are deemed to be at risk of likely significant effects from the operation of the Proposed Development for the reasons stated above.

Birds

The existing local bird population may currently be habituated to high levels of noise and human activity, due to the urban nature of the site and the commercial and residential nature of the surrounding environment.

The operational phase is likely to increase resource for birds due to the creation of biodiverse green walls and roofs, as well as the inclusion of several bird boxes and trees scattered throughout the Proposed Development. Therefore it is considered that operational phase of the Proposed Development would result in perceptible positive impact on local breeding bird populations.

Bats

The existing local bat population may be currently habituated to higher levels of light along the River Liffey due to the urban nature of the site and the surrounding environment. The additional light created through the operation phase of the Proposed Development on the River Liffey would not be above that of which other developments in the vicinity are emitting.

The operational phase is likely to increase foraging resources for bats due to the creation of biodiverse green walls and roofs. There would also be an increase in roosting potential due

[44] Dowly, A. & Bedri, Z. (2007) Modelling of Ringsend Discharge. Report commissioned by EPA in association with IPPC licencing for Ringsend WwTW. [Available online at: http://www.epa.ie/licences/lic_eDMS/090151b280269ef8.pdf
[45] TJ O'Connor and Associates Consulting Engineers, Barry and Partners Consulting Engineers and Royal Haskoning DHV (2018). Ringsend Wastewater Treatment Plant Upgrade Project Environmental Impact Assessment Report. Water Quality. Irish Water. Available online at https://www.ringsendwwtpupgrade.ie/planning-sites/ringsend-planning/docs/environmental-documents/volume-3a/180601_RGD-Planning-App-EIAR-Vol-3-Part-A.pdf

to bat boxes being included within the Proposed Development. Therefore, it is considered unlikely that the operational phase of the Proposed Development would result in a negative impact on local foraging bat populations.

6.5.4 Cumulative Impacts

This area of Dublin City is currently undergoing redevelopment, where derelict brownfield sites with significant hard standing areas are being revitalised. Existing or proposed projects or plans impacting on the same key ecological receptors have the potential to lead to impacts of a higher level of significance when assessed cumulatively. This applies impacts on birds and bats as a consequence of the combined loss of suitable nesting bird habitat in the locality, and the increase in lighting in the vicinity of the River Liffey.
Given that it is unlikely that there would be wide scale removal of suitable habitat in the surrounding locality, significant cumulative impacts on local bird populations are considered unlikely.

The increase in lighting on the River Liffey is unlikely to be at a scale that it would deter bats from using the River Liffey as a commuting / foraging corridor, given that the other developments along the River corridor already emit light onto the River Liffey and bat species still use this corridor. Therefore, cumulative impacts on local bat foraging / commuting populations are considered unlikely.

Potential cumulative impacts on the River Liffey and Dublin Bay due to accumulation of pollutants entering the riverine system and cumulative effects of proposed plans and projects within the Dublin City Development Plan 2016-2022, Dún Laoghaire-Rathdown County Development Plan 2016-2022, Fingal Development Plan 2011-2017, and other county-level land use plans which can influence conditions in Dublin Bay via rivers and other surface water features. Nonetheless, no significant cumulative effects are predicted on the following basis:

- There was no proven link between WWTP discharges and nutrient enrichment of sediments in Dublin Bay based on analyses of dissolved and particulate Nitrogen signatures (Wilson and Jackson, 2011);
- Enriched water entering Dublin Bay has been shown to rapidly mix and become diluted such that the plume is often indistinguishable from the rest of bay water (O'Higgins and Wilson, 2005);
- Marine modelling for Ringsend WWTP indicates that discharged effluent is rapidly mixed and dispersed to low levels via tidal mixing within a short distance of the outfall pipe (Dowly & Bedri 2007);
- Recent modelling of water quality in Dublin Bay for the Ringsend WWTP Upgrade Project demonstrates that the effects of nutrients from Ringsend WWTP are largely confined to the area between the South Wall and the Tolka Estuary (Irish Water, 2018); and
- Despite the fact that Ringsend WWTP is currently operating above capacity and was non-compliant with several parameters as set under the EPA discharge licence, Dublin Bay as a whole is currently of “Unpolluted” water quality status (EPA, 2018).

Do Nothing Impact

Assuming, plans and projects in the area have proposed and implemented appropriate mitigation to minimise impacts arising from them, in a do-nothing scenario no potential adverse cumulative impacts are predicted.

6.6 Mitigation

6.6.1 Construction

Designated Sites and River Liffey

In accordance with good practice, construction methods would minimise environmental effects on site. These standard measures would be implemented to prevent significant impacts from contamination, pollution and suspended sediment entering the River Liffey from surface water networks and dust during the construction phase.

Overall, the removal of contaminated fill material, subsoils and treatment of the contaminated groundwater during the dewatering construction works would improve the environmental quality of the area. There is not anticipated to be a direct adverse environmental impact of the construction works on the soil / geological or groundwater on-site or on surrounding off-site environmental receptors (including designated sites), due to the implementation of the detailed dewatering plan.

Birds

All vegetation clearance would take place outside the bird breeding season, which runs from approximately March to August (inclusive). If any areas of vegetation cannot be cleared outside this period, a breeding bird check would be required no more than 24 hours before the vegetation is due to be removed. If nests are present or signs of nest making activity, then vegetation would remain in place until the young had fledged and verified that this had occurred by a suitably qualified ecologist.

Bats

In order to reduce the amount of light spill from construction lighting, any lighting which is not required during the night will be switched off.

6.6.2 Operation

No operational impacts are predicted and therefore, no mitigation measures are required.

6.7 Residual Impact

There are no anticipated adverse impacts on sites or habitats, including the River Liffey, which would arise from the Proposed Development.

Positive residual impacts are expected during the operational phase for habitat biodiversity, bats, birds and insects due to the increase in biodiverse semi-natural habitats present on site. The created semi-natural habitats, in the form of green walls, green roofs, allotments, ponds, pocket parks and terraces, along with the provision of insect hotels, bat and bird boxes would provide increased foraging and nesting resources for bats, birds and insects on site.

6.8 Interactions

The key interactions with Biodiversity are Water (surface and groundwater), Air, Noise and Landscape topics. This Chapter sets out the required mitigation to address significant Biodiversity impacts, the Water Chapter sets out specific measures to address significant impacts pertaining to the quality and quantity of surface and ground waters and in so doing also address the potential impacts on aquatic biodiversity.

Construction-related impacts associated with a change in air and noise are addressed in Section 6.5 above. The Landscape Chapter details the proposed green walls, green roofs and landscaped areas within the proposed Development. Together with the proposed ponds and pocket parks, the bat and bird boxes form an integrated landscape and ecology masterplan.

6.9 Monitoring

6.9.1 Construction Stage

Ecological monitoring would be carried out during the construction stage to ensure mitigation measures regarding water quality of the River Liffey are implemented properly.

Surface water samples would be recovered from the Liffey upstream, adjacent to, and downstream of the site at regular intervals during the development works to monitor conditions for the potential of impacted groundwater discharging from the site to impact the quality of the River Liffey.

Installation of monitoring well(s) outside the pile wall would provide information on any potential groundwater mounding / lowering.

Treated water during enabling works and construction would require continual monitoring to check that water quality standards are in compliance with the requirements of the discharge license.

Regular monitoring of the on-site treatment plant would be undertaken to ensure the discharge water is being adequately treated prior to discharge.

7.0 LAND AND SOILS

7.1 Introduction

This section of the EIAR has been prepared by Environmental Resources Management Ltd (ERM) and describes the existing *Land & Soil* 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.

This chapter was prepared by Peter Rodgers of ERM. Peter is an Environmental Scientist who has been practising as an environmental consultant for fifteen years. Peter holds an undergraduate degree in Environmental Science, along with a Diploma in Industrial Studies and a Master's degree in research.

7.2 Methodology

ERM have written this impact assessment in accordance with the following guidelines:

- *Guidelines on the information to be contained in Environmental Impact Statements* (EPA 2002 and 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); and
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*, (Dept Housing 2018).

ERM have undertaken a review of all available geological and soils data for the site including the following existing reports for the site:

- *Generic Quantitative Risk Assessment* completed by RSK Ireland Limited, December 2020;
- *Hydrogeological Impact Assessment* completed by Verdé Environmental Consultants Ltd., January 2021; and
- All available information concerning the development including development plans.

7.3 Receiving Environment

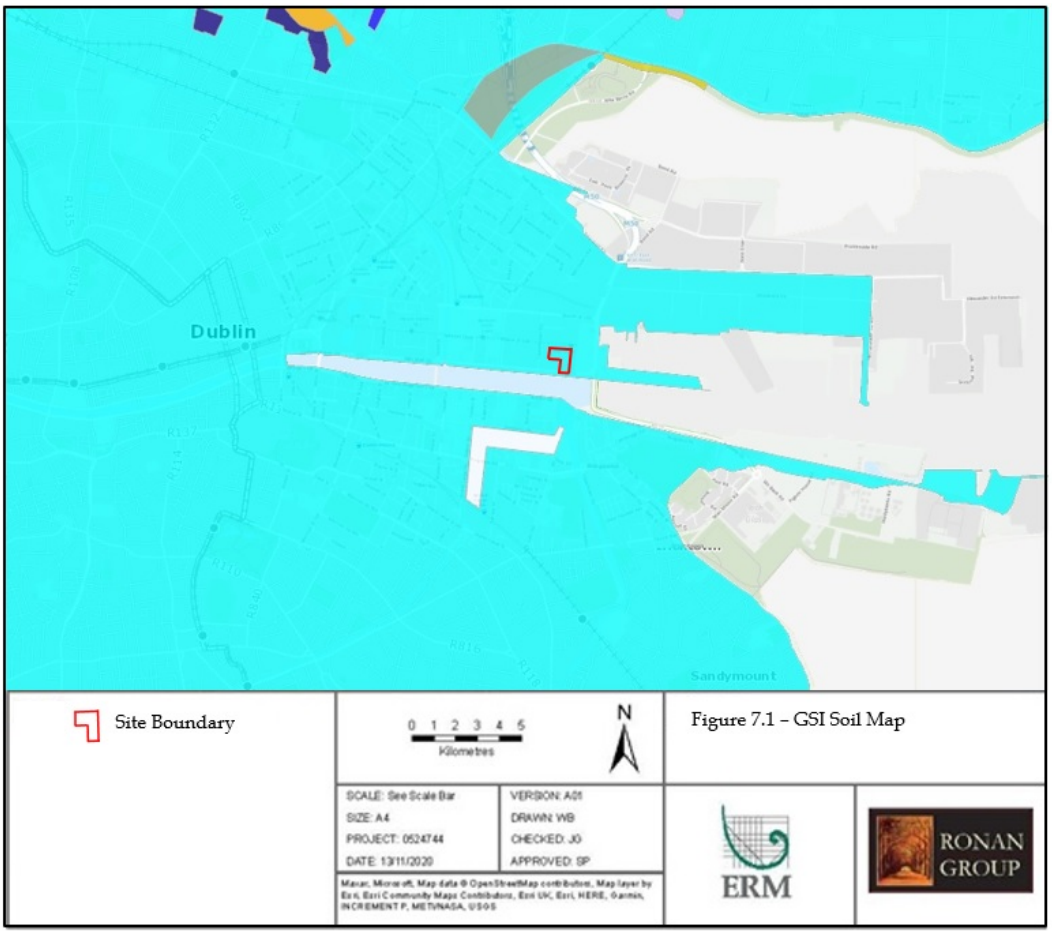
The site is situated at North Wall Quay at the junction of North Wall Quay and Castleforbes Road, Dublin 1. The site covers an area of approximately 1.1 hectares. The site is currently vacant, existing above ground infrastructures have been demolished and removed from site.

Land use surrounding the site is predominately mixed-use commercial and residential. To the north is Mayor Street Upper with office blocks and residential properties. To the south is the North Wall Quay with the River Liffey beyond. To the west is Castleforbes Road and a construction site. There is also a construction site to the east, beyond North Wall Avenue. Avenue are for commercial and residential mixed use.

A site investigation comprising the installation of boreholes using a rotary drilling rig to a depth of 17 m below ground level (bgl) was undertaken by RSK Ireland Limited (RSK) as part of an environmental assessment of the site completed in July 2019. The borehole logs and results of laboratory analytical testing have been reviewed as part of this impact assessment.

7.3.1 Soils

According to the Geological Survey of Ireland (GSI) the soil underlying the site has been mapped as Made Ground. Figure 7.1 below presents the GSI soils mapping at the site.

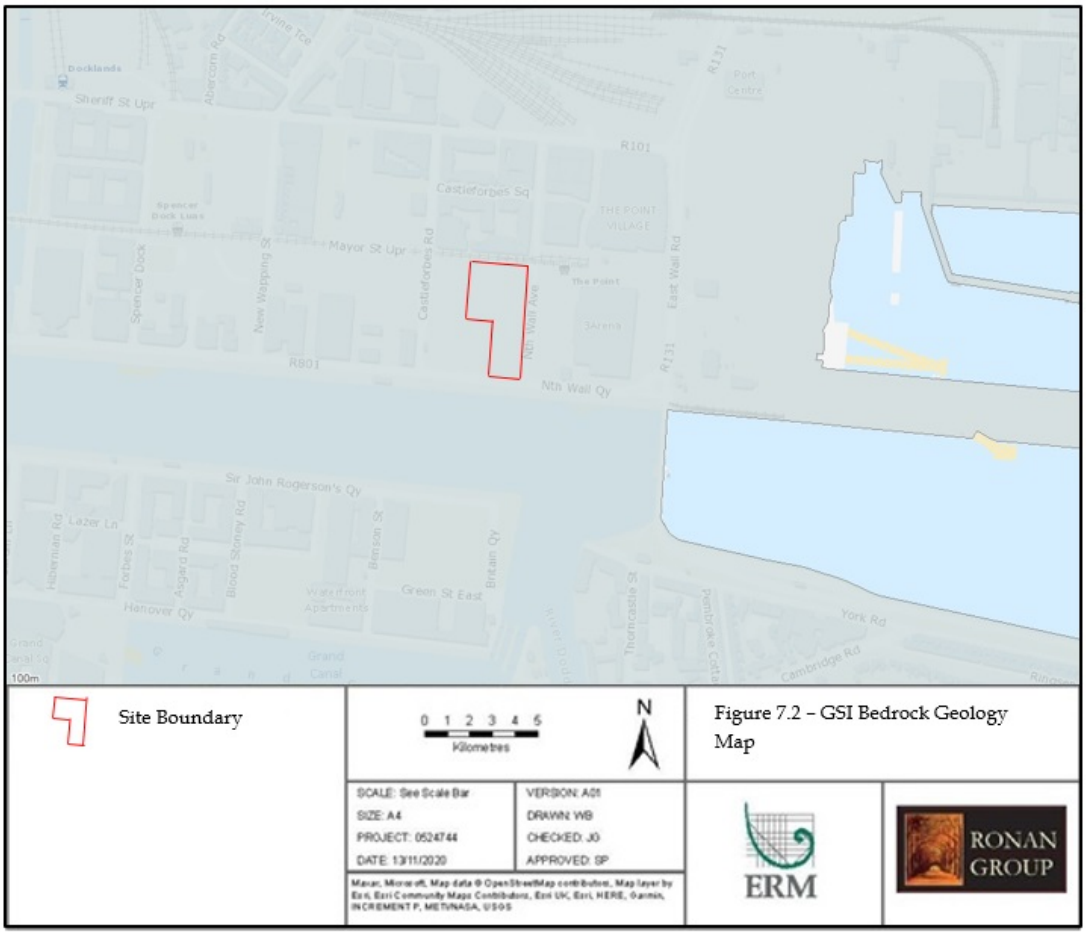


The borehole logs contained within the RSK report confirm that the site is underlain by a horizon of made ground which has a maximum thickness of 9m. The made ground was reported to be quite variable but generally comprised a concrete slab on top of sandy gravel fill, overlying sandy gravelly clay or silt; which in turn overlay reworked silt layers.

As part of the RSK environmental assessment, soil samples were collected and submitted for laboratory analysis to assess the presence of potentially contaminating compounds. The results of analytical testing reported the presence of localised hotspots of heavy metal, hydrocarbon, and asbestos contamination within the made ground across the site.

7.3.2 Geology

According to the Geological Survey of Ireland (GSI) the geology underlying the site comprises alluvial deposits and glacial Limestone Till underlain by the Calp, Marine Shelf Facies Formation of Carboniferous age, which is described as limestone and calcareous shale of the Tobercolleen and Lucan formations. Figure 7.2 below presents the GSI geological mapping at the site.



A review of the borehole drilling logs contained within the RSK Report confirm that presence of alluvial deposits consisting of natural silts overlying sands and gravels to a maximum depth of 14 m bgl. The sands and gravels were underlain by boulder clay, bedrock was not encountered during the site investigation.

As part of the RSK environmental assessment, samples were collected from the alluvial deposits and boulder clay and submitted for laboratory analysis to assess the presence of potentially contaminating compounds. The results of analytical testing did not report the presence of contamination within the alluvial deposits or boulder clay across the site.

7.3.3 Hydrogeology

According to the GSI, aquifers in the Republic of Ireland are classified as follows:

- Regionally Important – An aquifer which is sufficiently productive to be able to yield enough water to boreholes or springs to supply major regional water schemes. These are divided into: extensive sand/gravel aquifers; karst aquifers; and fissured aquifers;

- Locally Important – An aquifer which is moderately productive, i.e. capable of yielding enough water to boreholes or springs to supply villages, small towns or factories. These are divided into: Sand/gravel aquifers; Bedrock aquifers which are generally moderately productive; and Bedrock aquifers which are moderately productive only in local zones; and

- Poor – An aquifer which is normally capable of yielding only sufficient water from wells or springs to supply single houses, small farms or small group water schemes. These can be sub divided into: Bedrock aquifers which are generally unproductive except for local zones and Bedrock aquifers which are generally unproductive.

The GSI have categorised the bedrock aquifer underling the site as a locally important aquifer, bedrock is moderately productive only in local zones. Figure 7.3 below presents the GSI bedrock aquifer mapping at the site.

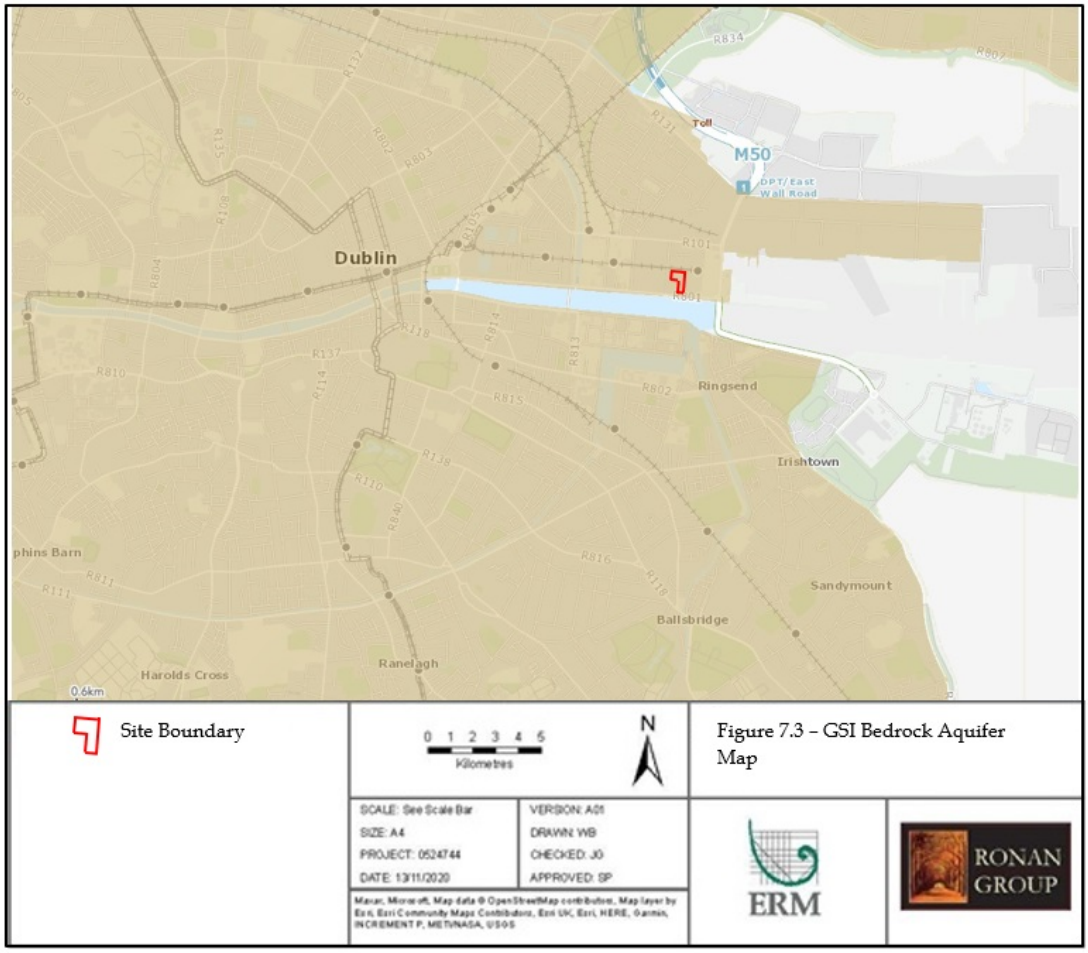


Figure 7.3 – GSI Bedrock Aquifer Map

Aquifer or groundwater vulnerability is a relative measure of the ease with which the groundwater could be contaminated by human activity and depends on the aquifer's intrinsic geological and hydrogeological characteristics. The vulnerability is determined by the permeability of any overlying deposits. For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden.

Groundwater vulnerability categories are defined by the GSI as – Extreme rock at or near surface or karst (X), Extreme (E), High (H), Moderate (M) and Low (L) for mapping purposes and in the assessment of risk to ground waters. The classifications are based on the thickness and permeability of the sub-soils overlying the aquifer. The GSI has classified the aquifer vulnerability underlying the site as LowThe aquifer underlying the site has been classified by the GSI as a locally important aquifer. The vulnerability of the aquifer has been classified as Low. Figure 7.4 below presents the GSI groundwater vulnerability mapping at the site.

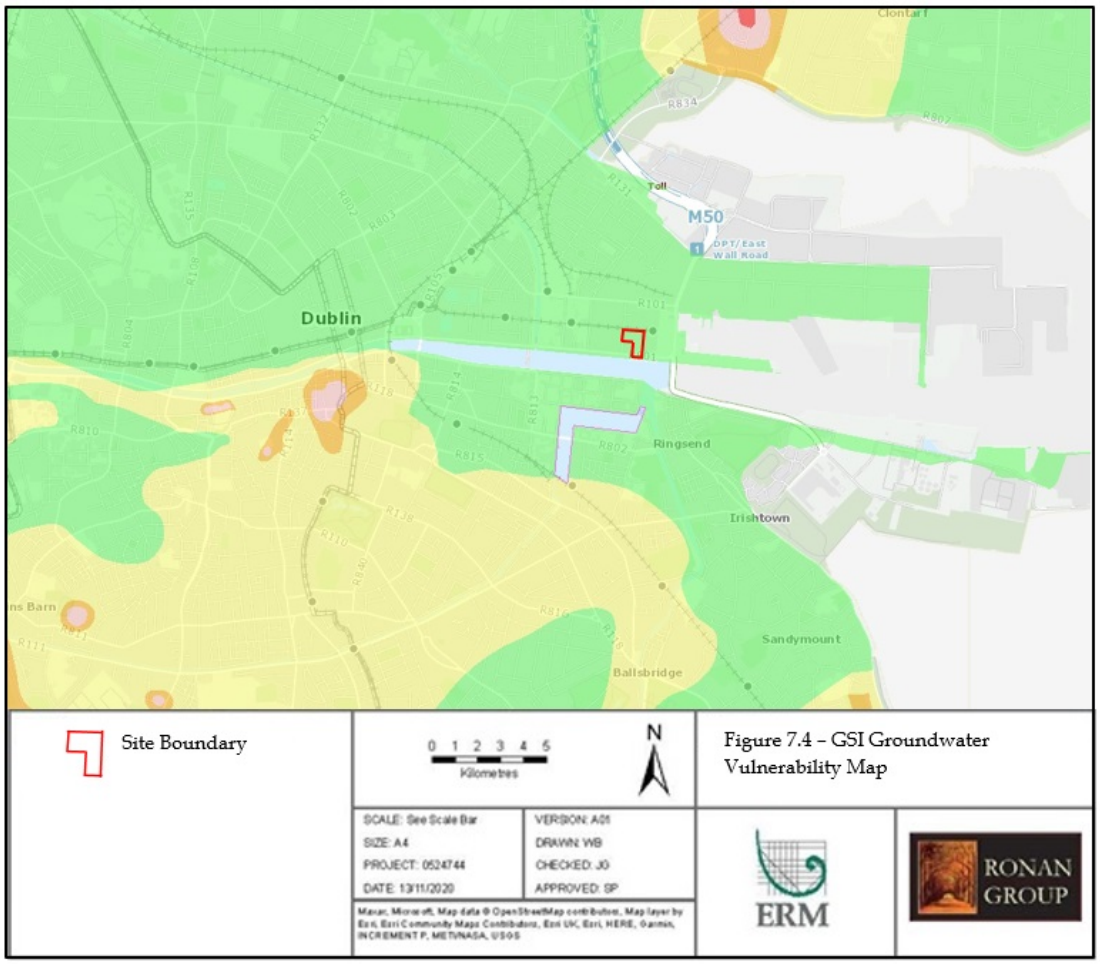


Figure 7.4 – GSI Groundwater Vulnerability Map

As part of the RSK site assessment, groundwater monitoring wells were installed at the site. One round of groundwater monitoring was undertaken by RSK during February 2019 which involved the collection of samples from the newly installed and existing monitoring wells. Each monitoring well was sampled using USEPA approved 'Low-Flow' Purging and Sampling Methodology. Groundwater levels were gauged during the February 2019 monitoring round and during a subsequent groundwater gauging event in June 2019.

The results of groundwater gauging indicated that it was unlikely a there is a continuous 'shallow' groundwater table within the overburden soils encountered beneath the site. Of the thirteen shallow wells, installed within the made ground, only five had groundwater present.

Groundwater levels within the monitoring wells installed within the alluvial deposits indicated the presence of a continuous groundwater body. The depth to groundwater in the alluvial deposits ranged between -0.081 mAOD (metres above ordinance datum) and -0.195 mAOD (BH229). The estimated groundwater flow was in a south to south-easterly direction. Given the site's proximity to the estuary of the River Liffey it is likely that the groundwater contained within the alluvial deposits is in hydraulic connectivity with the River Liffey and likely subject to a tidal influence.

The results of laboratory analysis of groundwater samples reported hotspots of localised hydrocarbon impact in the shallow perched groundwater within the made ground. No contamination impacts were reported for samples collected from the groundwater contained within the alluvial deposits.

7.4 Characteristics of the Proposed Development

The scheme, totalling 125,388 sq m, provides 22,499 sq m at basement levels, with 102,889 sq m from ground upwards. The development will consist of the:

1. Construction of 1,005 No. residential units (with balconies and winter gardens on all elevations) arranged in 3 No. blocks ranging in height from 8 No. storeys to 45 No. storeys over a triple-level basement (including mezzanine plant level), the former comprising: Block A (8-14 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 116 No. 1-bed; and 92 No. 2-bed; with landscaped terraces at Level 1 (south east elevation), Level 8 (south west elevation), Level 11 (south west elevation) and Level 14 (roof level)); Block B (8-41 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 172 No. 1-bed; and 247 No. 2-bed; with landscaped terraces at Level 5 (south west elevation), Level 8 (north west elevation and south west elevation), Level 11 (north elevation), Level 12 (west elevation), Level 13 (east elevation), Level 14 (east elevation), and at Level 41 (roof level)); and Block C (11-45 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 207 No. 1-bed; 168 No. 2-bed; and 3 No. 3-bed units; with landscaped terraces at Level 11 (north elevation), Level 24 (south, west and east elevation), Level 32 (south, west and east elevation), and Level 45 (roof level), incorporating a public viewing deck at Levels 44 and 45).

2. Provision of ancillary residential amenities and support facilities including: a residential study area (321 sq m), a gym/spa reception (52 sq m), a residents' games room (91 sq m), a residents' common room (110 sq m), a residents-only social space (193 sq m), a management office (96 sq m), a security office (50 sq m), concierge spaces (GFA of 369 sq m) all located at ground floor level; a residents' games room (122 sq m) located at Level 1 of Block B; a residents' common room (86 sq m) located at Level 14 of Block B; a residents' wellness club and common room (408 sq m) located at Level 24 of Block C;

3. Construction of a triple level basement, comprising two levels of basement and a mezzanine plant level (total basement area 22,499 sq m), accommodating: waste storage areas (659 sq m), plant rooms (4,228 sq m), maintenance / management offices (GFA of 92 sq m), residents' courier / parcel rooms (GFA of 210 sq m), residents' laundry rooms (GFA of 138 sq m), ancillary residential storage (GFA of 291 sq m), residents' WCs (65 sq m), a residents' gym / spa (1,529 sq m) and ancillary gym storage room (100 sq m), residents' screening rooms (240 sq m), a residents' indoor plant cultivation room (356 sq m), 176 No. car parking spaces, 10 No. motorcycle parking spaces and 1,693 No. bicycle parking spaces, with vehicular access provided by ramp from North Wall Avenue.

4. Provision of 4,307 sq m of "other uses" as defined by the *Planning and Development (Housing) and Residential Tenancies Act 2016,* comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmers' Market/foodhall (299 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Levels 41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C.

5. Provision of 84 No. surface-level bicycle parking spaces, a pocket park, an external market area, a winter garden/seating area, and new pedestrian lanes from North Wall Quay, North Wall Avenue and Mayor Street Upper to the centre of the site.

6. All enabling and site development works, landscaping (including living walls), lighting, services and connections, waste management, interim site hoarding, and all other ancillary works above and below ground including the use of existing secant piling permitted under Reg. Ref. DSDZ3779/17 and DSDZ3780/17 (as amended by DSDZ3042/19).

7.5 Potential Impact of the Proposed Development

7.5.1 Construction Phase

The proposed development will be constructed over a 2 level basement which will require excavation of existing soils and subsoils. It is considered that the basement excavation works represent the greatest potential impact associated with the construction phase of the development.

7.5.1.1 Stripping of Topsoil

The majority of made ground deposits underlying the site will be removed during the excavation of the basement. Hotspots of elevated contaminant concentrations were reported in the made ground at the site. The excavation of made ground deposits will remove this impacted material which will likely have a positive, permanent impact on the land and soils at the site. The excavation of the made ground will also likely have a positive, permanent impact on the shallow groundwater aquifer at the site as this will remove any potential source of groundwater contamination.

7.5.1.2 Excavation of Subsoil Layers

A significant volume of alluvial deposits and boulder clay will be excavated and removed from site during the construction of the basement. It is anticipated that the likely impact to the subsoils during construction will likely be short term and low to moderate.

7.5.1.3 Imported Fill

Where possible reusable excavated subsoil will be retained for backfill purposes limiting the requirement to import fill material to the site.

7.5.1.4 Construction Traffic

During the excavation works, subsoil will be exposed to construction plant traffic which could lead to a negative, short term impact on the land and soils. The regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity

of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes.

7.5.1.5 Accidental Spills and Leaks

There is the potential for accidental leaks and spills of fuels, hydrocarbons, solvents and paints during the construction phase of the proposed development. Given the potential exposed nature of the subsoils during the excavation of the basement the risk posed by spill and leaks is considered temporary and moderate .

7.5.1.6 Geological Environment

The proposed development will not impact on the underlying bedrock geology as the basement will be excavated into the overlying alluvial deposits and boulder clay.

7.5.2 Operational Phase

The operational phase of the proposed development is unlikely to have any impact to the land, soil or groundwater underlying the site. The proposed drainage plan for the development will reduce any potential impact from impacted site run-off impacting the soils or groundwater at the site.

7.5.3 'Do Nothing' Scenario

If the proposed development at the site did not proceed, a potential source of contamination (impacted made ground) would remain in-situ. This source of contamination could migrate laterally and vertically, potentially impacting off-site receptors and the water environment.

7.6 Ameliorative, Remedial or Reductive Measures

7.6.1 Construction Phase

Prior to the start of redevelopment works the Contractor should produce a Construction Environmental Management Plan (CEMP) 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.

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

7.6.1.1 Excavation of Subsoil Layers

Subsoils should be excavated, stored and transported in accordance with the Contractor's CEMP. The CEMP should include details of the National Waste Collection Permit of haulage contractors along with the waste soil classification report. Waste Transfer Certificates issued from receiving waste facilities should also be logged and stored.

7.6.1.2 Imported Fill

If imported material is required, the source, quality and contamination status of the material should be confirmed by the Contractor and approved by a suitably qualified Environmental Consultant prior to importation and placement.

7.6.1.3 Construction Traffic

The Contractor should provide wheel wash facilities close to the site entrance to reduce the deposition of mud, soils and other substances on the surrounding road network.

7.6.1.4 Accidental Spills and Leaks

All refuelling and plant servicing should be undertaken in designated hard standing areas away from any water courses or site drains. Any fuel or chemicals should be stored in appropriate double skinned tanks/containers within bunded areas. The Contractor shall also provide spill kits to clean up any accidental spills and leaks.

7.6.2 Operational Phase

Based on the proposed activities of the development and the installation of a drainage system no mitigation measures have been identified.

7.7 Predicted Impact of the Proposed Development

7.7.1 Construction Phase

The proposed development will alter the current land use to a primarily residential development with some elements of commercial use. The implementation of the mitigation measures outlined in section 7.6 should reduce the potential risk to the land, soil and groundwater underlying the site. The risk of impact to the land, soil and groundwater environment is considered to be low and temporary in nature.

After implementation of the mitigation measures for the construction phase, the proposed development will not give rise to any significant long-term adverse impact. Moderate negative impacts during the construction phase will be short term only in duration.

7.7.2 Operational Phase

There are not considered to be any long term impacts to land, soil or groundwater underlying the site during the operational phase of the development.

7.7.3 '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, soil and groundwater site.

Under the "Do Nothing Impact" the site would represent a risk to the land, soil and groundwater environment due to the presence of contaminated made ground across the site which has the potential to migrate and impact off-site receptors including the River Liffey.

7.8 Monitoring

The Contractor should include monitoring and auditing of the implementation of the CEMP to ensure appropriate mitigation measures are being applied during the construction stage of the development.

7.9 Reinstatement

Where possible, excavated material generated at the site will be used to back fil service trenches and along the sides of the basement. Following completion of the development works at the site there will be no requirements for reinstatement works for land and soils.

7.10 Interactions and Potential Cumulative Impacts

7.10.1 Interactions

The design team has worked collaboratively to produce a design which aims to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development. There is an interaction between soil and waste management which may require the removal of soil off site to a suitable licensed facility. There is an interaction between geology for the site and hydrogeology and biodiversity, as discussed in the Hydrology and Biodiversity chapters of this EIAR. Furthermore, there is an interaction with air and climate regarding the possibility of dust arising from construction works.

8.0 HYDROLOGY (Water, Wastewater & Groundwater)

8.1 Introduction

This section of the EIAR has been prepared by Cronin and Sutton Consulting and describes the existing *Water & Wastewater* aspects on the proposed development site. Potential impacts to the local surface water environment have been addressed by ERM. 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 twenty years. Robert holds an undergraduate degree in Civil & Environmental Engineering, a postgraduate Diploma in Environmental Engineering and has a master's degree in Industrial Engineering.

8.2 Methodology

8.2.1 Source of Information

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);
- *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)* (EPA 2015); and
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*, (Dept Housing 2018).

The draft guidelines have also been reviewed and have formed the basis for the development of this chapter.

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; and
- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA).

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; and
- All available information concerning the development including development plans.

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, and maintaining "high status" where the status already exists; and
  - 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:

- *European Communities (Quality of Salmonid Waters) Regulations 1988* (S.I. No. 293 of 1988);
- *Local Government (Water Pollution) Acts 1977 – 1990*; and
- *Water Quality Standards for Phosphorus Regulations 1998* (S.I. No. 258 of 1998).

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 new regulations supersede previous water quality regulations (both EU and national). This project must still be 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 management plan will be cognisant of 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.

- *European Communities (Quality of Salmonid Waters) Regulations 1988* (S.I. No. 293 of 1988).

The Salmonid Regulations set water quality standards for salmonid waters, with identification of salmonid waters, water quality standards, and frequencies of sampling and methods of analysis and inspection.

- *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.

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.

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. The potential sources of flooding considered were:

- Tidal/Coastal flooding;
- Fluvial flooding (from adjacent surface water bodies);
- Pluvial (direct rainfall);
- Groundwater flooding; and
- Potential for offsite flooding due to infrastructure failure.

8.3 Receiving Environment (Baseline Situation)

This sub 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.

8.3.1 River Liffey

The main freshwater receiving environment within the vicinity of the proposed development is the River Liffey which is located approximately 35m to the south of the site. The River Liffey flows in an easterly direction and discharges into the Irish Sea approximately 2 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 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 (2010-2012) indicate that they are 'Unpolluted'. Under the 2015 'Trophic Status Assessment Scheme' classification of the EPA, 'Unpolluted' means there have been no breaches of the EPA's threshold values for nutrient enrichment, accelerated plant growth, or disturbance of the level of dissolved oxygen normally present. Annual precipitation for this area is approximately 687mm (2018 figures from Met Eireann website).

sub 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.

8.3.2 Potable Water Infrastructure

Record drawings reviewed from Irish Water indicate the following services in the area:

- To the north an existing 225mm (2008) HPPE main;
- The east a 300mm (2017) Ductile Iron main;
- To the south a 6"(1900) maim / 300mm (2010) DI main / 600mm (2010) DI main; and
- To the west a 315mm (2018) PE main.

All the noted existing water infrastructure is in the public control of Irish Water. As required a *Pre-Connection Enquiry* was lodged with Irish Water to allow an assessment of the local & regional infrastructure to accommodate the proposed development. Irish Water have indicated their requirements and noted that a formal connection agreement will be required to be entered into the services to be made available, refer to the *Engineering Services Report* for a copy of same. As required a *Pre-Connection Enquiry* was lodged with Irish Water indicating their requirements before a for connection agreement, refer to the Engineering Services Report for a copy of same.

8.3.3 Surface Water Drainage Infrastructure

Dublin City Council's drainage records indicate:

- A 225mm diameter stormwater sewer and a 225-375mm diameter concrete stormwater sewer to the south, flowing east to west on North Wall Quay connecting with a 1090mmx920mm brick stormwater sewer, flowing north to south on Castleforbes Road, which flows into River Liffey;
- A 225mm diameter concrete stormwater sewer to the north, flowing east to west on Mayor Street Upper into the 1090mmx920mm brick stormwater sewer; and

- A 450mm diameter vitrified clay combined sewer to the south, flowing east to west on North Wall Quay, into a pumping station on Castleforbes Road, which a 150mm diameter cast iron is place on Castleforbes Road towards a 225mm diameter vitrified clay foul sewer on Mayor Street Upper.

Previous granted planning application (DSDZ3780/17) also indicates 2No. 225mm diameter storm water sewer flowing south to north on North Wall Avenue and a small section of 225mm diameter storm water sewer flowing north to south at the junction between North Wall Avenue.

8.3.4 Foul Water Drainage Infrastructure

Dublin City Council's drainage records indicate:

- A 450mm diameter vitrified clay combined sewer to the south, flowing east to west on North Wall Quay, into a pumping station on Castleforbes Road, which a 150mm diameter cast iron is place on Castleforbes Road towards a 225mm diameter vitrified clay foul sewer on Mayor Street Upper;

- Discussions with Irish Water & Dublin city Council indicates that the pumping station on Castleforbes Road is not current in operation; and

- A 375mm diameter concrete foul sewer to the north, flowing east to west on Mayor Street Upper, connects into a 1420mm concrete on Castleforbes Road, which is also direct to the pump station on Castleforbes Road.

Previous granted planning application (DSDZ3780/17) also indicates a 300mm diameter foul sewer flowing south to north on North Wall Avenue.

As required a *Pre-Connection Enquiry* was lodged with Irish Water to allow an assessment of the local & regional infrastructure to accommodate the proposed development. Irish Water have indicated their requirements and noted that a formal connection agreement will be required to be entered into the services to be made available, refer to the *Engineering Services Report* for a copy of same. As required a *Pre-Connection Enquiry* was lodged with Irish Water indicating their requirements before a for connection agreement, refer to the Engineering Services Report for a copy of same.

8.3.5 Flood Risk

The site of the proposed development is in **Flood Zone C,** based on Dublin City Councils Strategic Flood Risk Assessment from the current Development Plan. The primary risk of flooding to the site is by Pluvial flooding.

8.4 Characteristics of the Proposed Development

Refer to the Planning Consultants submission as part of this EIAR for a detailed breakdown of the proposed development.

8.5 Potential Impacts of the Proposed Development

8.5.1 Construction Phase

This sub 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. The principal risks associated with the **Construction Phase** are:

Water Supply

The Contractor will require a separate water supply connection for the works.

Surface Water

Surface water run-off will occur from hardstanding and roof structures during the construction period. Surface water run-off from construction activities has the potential to be contaminated.

- Suspended solids arising from ground disturbance and excavation;
- Hydrocarbons from accidental spillage from construction plant and storage;
- Concrete/cementitious products: arising from construction materials;
- Water removed from surface excavations as a result of rainfall or groundwater seepage;
- Vehicle wheel wash water;
- Runoff from exposed work areas and excavated material storage areas;
- Leakage of temporary foul water services; and
- Solid (municipal) wastes being disposed or blown into watercourses or drainage systems.

During excavation works, groundwater within the shallow perched aquifer and the sand and gravel aquifer will be dewatered to facilitate the construction of the basement. It is likely this dewatering will remove any localised areas of contaminants reported by RSK in the shallow aquifer underlying the site. The removal of impacted groundwater will likely have a permanent positive effect on receiving surface waters.

Foul Water

The Contractor's operations will result in the generation of effluent and sanitary waste from facilities provided for the construction staff on site.

Flood Risk

Surface water run-off has the potential to flood basement levels & excavations during the construction period. Ground water encountered during excavations has the potential to flood basement construction. Construction works, excavations etc. have the potential to contaminate surface and ground waters.

8.5.2 Operational Phase

The principal risks associated with the Operation Phase are:

Water Supply

The potable water network will not be vested to Irish Water. As such all maintenance works that be required will be undertaken by a suitably qualified contractor. The potential issues would be the accidental damaging of the water infrastructure leading to leak and potentially a loss of supply.

The proposed development is to consist commercial & retail space of 4307sq m gross floor area in addition to 1005 No. apartments.

Based on Irish Water guidelines, the water demand will be shall be:

- For the commercial space:

  ⇒ 4307sq m ÷ 7.5 sq m/person = 574 persons

  ⇒ 574 persons x 100l/person/day = 57,400 l/day = 57.40 m^3/day

  ⇒ 0.664 l/s Average water demand;

  ⇒ 1.993 l/s Peak water demand (5 times average water demand for a population between 1,001 and 5,000).

- For the apartments:

  ⇒ 1005 X 405 l/day/unit = 407,025 l/day: 407.03 m^3/day

  ⇒ 4.71 l/s Average water demand;

  ⇒ 14.13 l/s Peak water demand (3 times average water demand for a population between 1,001 and 5,000).

Overall potable demand:

⇒ Average water demand: 5.374 l/sec (4.71 + 0.664)

⇒ Peak water demand: 16.123 l/sec (14.13 + 1.993)

A Pre-Connection Enquiry has been submitted to Irish Water based on the water demand for an initial proposed number of 1005 No. apartment units and 55,538 sq m retail unit (To clarify, the proposed development is to consist commercial & retail space of 4307 sq m gross floor area in addition to 1005 No. apartments. Any additional commercial & retail space remaining forms part of the concurrent SDZ commercial Application on the west portion of City Block 9) and we have received a response. See the Engineering Services Report which accompanies this submission for details of same.

Surface Water

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.

Due to the proposed stormwater system which will be implemented at the site there is considered to be minimal risk of the site impacting the water quality of the River Liffey during the operational stage.

Proposed Attenuation Arrangements

In accordance with the requirements of the *North Lotts and Grand Canal Dock SDZ Planning Scheme, 2014* all new developments in the SDZ are to limit their storm water discharge to 2l/s/Ha. The site's area of 1.1 ha and it has been considered as that the entire site area shall be hardstanding.

The attenuation volume to be retained on site for a 1–in–100-year extreme storm event, increased by 20% for the predicated effects of climate change indicates that a volume of 1024m3 will be required to be provided.

Therefore, all storm water events will restrict flow from the development to 2.2l/s by way of using a flow control device. The attenuation volume will be provided in an attenuation tank sized to retain storm volumes predicated.

See CS Consulting Drawing **R064-251 and R064-252** for drainage details, & the *Engineering Services Report* which contains the attenuation calculation, the SAAR Value & the Attenuation calculations for the 1-in-100 storm events.

Proposed Sustainable Urban Drainage System, SuDS

A further requirement of the local authority is to adopt, where achievable elements into the design which conform to the general principles of Sustainable Urban Drainage systems. The aim is to increase the overall quality of storm water before it leaves the site and enters the public network. To achieve this a number of SuDS proposals are being implemented:

i) The use of green roofs on applicable roof space for the apartment blocks is proposed. Please refer to Landscape Layout for proposed details;

ii) The use of low water usage sanitary appliances to reduce the reliance on potable water supplies;

iii) Where feasible local footpaths, hardstanding areas will be directed into tree pits or landscaped areas to allow for local infiltration; and

iv) Road gully's will be trapped to allow for the removal of grit and other potentially harmful material entering the storm network.

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.

Foul Water

The Completed foul system will not no offered to be vested to Irish Water. As such the ongoing maintenance will be carried out by the maintenance company operating for the management firm. Potential issues could be blockages of the drain and sewers due to unsuitable material being placed in same.

The proposed development is to consist commercial & retail space of 4307sq m gross floor area in addition to 1005 No. apartments.

- For the commercial space:

  ⇒ 4307sq m ÷ 7.5 sq m/person = 574 persons

  ⇒ 574 persons x 100l/person/day = 57,440 l/day = 57.44m^3/day

  ⇒ 0.665 l/s Average effluent generation;

  ⇒ 1.994 l/s Peak effluent generation (5 times average for a population between 1,001 and 5,000).

- For the apartments:

  ⇒ 1005 X 446 l/day/unit = 44,8230 l/day: 448.23 m^3/day

  ⇒ 5.18 l/s Average effluent generation;

  ⇒ 15.56 l/s Peak effluent generation (3 times average for a population between 1,001 and 5,000).

  Overall effluent generation:

  ⇒ Average: 5.845 l/sec (5.18 + 0.665)

  ⇒ Peak: 17.554 l/sec (15.56 + 1.994)

Therefore, the proposed development will generate wastewater in order of 505.67 m^3/day, which equates to:

⇒ 6.51 l/sec Average flow; and

⇒ 19.548 l/sec Peak Flow.

A Pre-Connection Enquiry has been submitted to Irish Water based on the water demand for an initial proposed number of 1005 No. apartment units and 55,538 sq m retail unit ((The proposed development is to consist commercial & retail space of 4307 sq m gross floor area in addition to 1005 No. apartments)) and we have received a response. See the Engineering Services Report which accompanies this submission for details of same.

Flood Risk

The proposed development will not adversely affect the subject sites Flood Zone designation or alter same for the local environs. The scheme has been reviewed in accordance with the requirements of the of both the Local Authorities Site specific flood risk assessment requirements and the requirements of the Department of the Environment & Planning. The proposed scheme will not increase the potential for localized or off-site flooding. For a detailed breakdown of the flood risk assessment for the scheme refer to the *Site Specific Flood Risk Assessment* prepared by CS Consulting for this scheme and submitted with this application.

8.6 Mitigation Measures

8.6.1 Construction Phase

The main potential impacts are associated with the Construction Phase of the proposed development. Mitigation measures relating to impacts outlined in the previous section are outlined below:

Construction Phase

- 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.

- All batching and mixing activities will be located in areas away from watercourses and drains.

- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards and manufacturer's guidance.

- 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.

- Spills of concrete, cement, grout or similar materials will not be hosed into drains.

- Rainwater that accumulates on site will be discharged to the DCC sewer system.

- The Contractor will comply with the following guidance documents:

    - CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001); and

    - CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004).

- 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.

The Contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water and or Dublin City Council, in addition temporary pumping of ground water to facilitate the proposed basement construction will be licensed by Dublin City Council and the water levels monitored as outline sin the basement impact assessment.

8.6.2 Operational Phase

- Incidental surface run-off from underground basement car parks, compactor units and waste / service yard areas will be discharged into the foul drainage system. Grit / petrol / oil separators will be provided in all of the above areas to improve the quality of water discharging.

- 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 2 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.

- SuDS proposals will improve the quality and reduce the quantity of surface water discharging into the receiving system.

- Removal of the surface water from the existing combined sewers will reduce the hydraulic loading on the existing sewerage network and Waste Water Treatment Plant (WWTP) at Ringsend.

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

8.7 Predicted Impact of the Proposed Development

8.7.1 Construction Phase

The implementation of the mitigation measures outlined in section 8.6 should reduce the potential for impact on the River Liffey 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.

- 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.

- All batching and mixing activities will be located in areas away from watercourses and drains.

- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards and manufacturer's guidance.

- 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.
- Spills of concrete, cement, grout or similar materials will not be hosed into drains.
- Rainwater that accumulates on site will be discharged to the DCC sewer system.
- The Contractor will comply with the following guidance documents:
    - CIRIA – *Guideline Document C532 Control of Water Pollution from Construction Sites* (CIRIA, 2001); and
    - CIRIA – *Guideline Document C624 Development and Flood Risk - guidance for the construction industry* (CIRIA, 2004).
- 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.

The Contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water and or Dublin City Council, in addition temporary pumping of ground water to facilitate the proposed basement construction will be licensed by Dublin City Council and the water levels monitored as outline sin the basement impact assessment.

8.7.2 Operational Phase

Surface Water

The provision of petrol/ oil interceptors and grease trays where required will ensure improved quality of surface water run-off from the development to the existing system. The provision of flow control with storm attenuation will ensure a reduced quantity of surface water discharging to the existing surface water sewerage 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.

Foul Water

No significant impact is expected to occur to the sewerage systems as a result of the proposed development. Any increase in discharge will be compensated by a reduction in the expected surface water runoff into the combined sewers from the redevelopment. The proposed layout and loading were vetted by Irish Water who deemed the local network, subject to up-grades could accept the increased volumes. Any required up-grades off site

will be undertaken by Irish Water and their designated contractors. As noted in Irish Waters *Pre-Connection Enquiry* response contributions towards up-grades deemed required by Irish Water will form part of the connection agreement should planning permission be secured.

Water Supply

The development will result in additional demands on the public water network however the installation of low flow devices will minimise the impact of the development on the existing water supply network. The proposed layout and loading were vetted by Irish Water who deemed the local network, subject to up-grades could provide the increased volumes. As with all new development of the nature proposed, water saving devices and water metres to Irish Water requirements are proposed to be installed in the development.

8.7.3 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 and therefore the hydrology environment and the drainage systems and water supply would remain as is. However, as the proposed development will provide separate foul & storm water systems and the storm water system will have a fixed discharge rate for all storm water events. This will allow a reduced flow from the site during extreme storm events, thereby increasing the hydraulic capacity in the public drainage network.

8.8 Monitoring Measures

Ongoing monitoring of the water quality during construction is proposed. It is not foreseen that any monitoring will be required on completion of the proposed development.

8.9 Interactions

Land, Soils, Geology and Hydrogeology

There is an inter-relationship between hydrology and land, soils, geology and hydrogeology. Surface water run-off may have the potential to enter soil and groundwater. Implementation of appropriate mitigation measures as outlined in chapter 7 (Land, Soils, Geology and Hydrogeology) and other associated chapter will eliminate the potential for the influx of surface contaminants into the underlying geology and hydrogeology.

The interaction between the material assets and hydrology has been continually highlighted throughout the text of this chapter. Refer to chapter 13 for more information on the material assets.

Surface Water

The design team has been in regular contact with each other throughout the design process to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development.

Foul Water Drainage

The design team has been in regular contact with each other throughout the design process to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development.

Water Supply

The design team has been in regular contact with each other throughout the design process to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development.

8.10 References

In addition to the sources noted in *Section 8.2.1* the documents listed below were also consulted.

- *Dublin City Development Plan 2016–2022*;
- *Dublin City Strategic Flood Risk Assessment, 2016 – 2022*;
- R*egional Code of Practice For development work*s, Version 6;
- *Irish Waters Code of Practice for Water Infrastructure*;
- Ir*ish Waters Code of Practice for Wastewater Infrastructure*;
- *Greater Dublin Strategic Drainage Study*;
- *North Lotts and Grand Canal Dock Strategic Development Zone Planning Scheme*;
- Office of Public Works Flood Maps;
- *Department of the Environment Flooding Guidelines*;
- Geological Survey of Ireland Maps; and
- Local Authority/Irish Water Drainage Records.

9.0 AIR & CLIMATE

9.1 Introduction

This section of the EIAR has been prepared by Environmental Resources Management Ltd (ERM) and describes the existing *Air & Climate* 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.

This chapter was prepared by Chris Hazell-Marshall Chris is a Technical Director who has been practicing as an environmental consultant for 20 years. Chris holds an undergraduate degree in Environmental Risk Management and a Ph.D Air Pollution and Cardiovascular Health. Chris is a member of both the Institute of Environmental Sciences and the Institute of Air Quality Management.

A separate Green House Gas climate assessment has been completed as part of the assessment and included within the planning application.

The proposed development will result in impacts on air quality. This Air Quality Impact Assessment (AQIA) assesses these impacts and identifies mitigation measures where required. The Residential and Commercial elements of the project are being constructed and operated together. As such impacts at receptors will be cumulative and it is therefore appropriate to consider impacts to air quality together.

A joint AQIA encompassing both projects has been undertaken and is set out in Appendix 9A. This chapter summarises the key points relating to baseline, method, results and mitigation. However, the Appendix should be referenced for the detailed approach.

The key activities that are considered in the AQIA are below, along with the pollutants of interest for each activity:

- Construction;
    - Construction activities will result in the emission to air of dust and particulate matter, primarily as PM10;
    - The construction activities will generate traffic on nearby roads, leading to emissions of nitrogen dioxide (NO2), and particulate matter (as PM10 and PM2.5); and
- Operation;
    - The operation of the development will generate traffic on nearby roads, leading to emissions of nitrogen dioxide (NO2), and particulate matter (as PM10 and PM2.5).

The AQIA considers these activities, emissions and impacts in the context of the existing baseline, and on this basis identifies the potential for significant impacts. The project is located to the east of Dublin city centre, the air quality is not expected to be close to, or in excess of air quality standards. This is supported by air quality monitoring.

9.1.1 Background Information

Relevant Legislation and Policy

The air quality standards relevant to this assessment are set out in Table 9.1.

Pollutant	Averaging Period	Statistic	Value (µg/m3)
NO_2	Annual mean		40
NO_2	1 hour mean	Not to be exceeded more than 18 times per year	200
PM_{10}	Annual mean		30
PM_{10}	24 hour mean	Not to be exceeded more than 35 times per year	50
$PM_{2.5}$	Annual mean		25

Table 9.1: Air Quality Standards

There are no statutory standards for dust nuisance, and the dust assessment methodology is not a quantitative method requiring an air quality standard.

9.1.2 Determining Significance

The dust impact assessment uses a risk-based method to identify the risk of significant impacts and directs towards the necessary mitigation to render impacts negligible, or at worst minor. As such the methodology does not directly quantify the magnitude and significance of impacts.

For road traffic emissions the significance of impacts is determined by:

Sensitivity of Receptors x Magnitude of Impacts.

The magnitude is determined by comparing the predicted concentration of pollutants arising from road traffic to the relevant air quality standard, in the context of the baseline. This is described in more detail in Appendix 9A.4.

9.2 Methodology

9.2.1 Construction Phase Impact

Construction Dust

To assess the potential impacts associated with dust and PM10 releases during the construction phase and to determine the necessary mitigation measures, an assessment based on the latest guidance from the Institute of Air Quality Management[1] (IAQM) has been undertaken.

1 Guidance on the assessment of dust from demolition and construction, IAQM, February 2014

This approach divides construction activities into the following dust emission sources:

- demolition;
- earthworks;
- construction; and
- trackout.

The risk of dust effects (low, medium or high) is determined by the scale (magnitude) and nature of the works and the proximity of sensitive human and ecological receptors.

The detailed methodology is set out in Appendix 9A.4.

Construction and Operational Traffic

The traffic assessments for construction and operational phases have been undertaken as a two-step process. Step 1 is a simple screening process based upon IAQM guidance. Step 2 is a detailed assessment utilising detailed roads modelling. As noted, Stage 1 and Stage 2 has been undertaken on the basis of the sum total of traffic from both elements of the project. This has been done to avoid underestimating impacts.

The construction and operation of the development will generate traffic on the nearby road network. The assessment methodology will follow two pieces of UK guidance used routinely in Ireland:

- IAQM (2017) *Guidance on land-use planning and development control: Planning for air quality v1.2*; and
- Defra (2018) *Local Air Quality Management Guidance TG(16).*

<u>Step 1: Screening</u>

The IAQM set out screening thresholds for the determination of whether significant impacts may arise. In terms of the Annual Average Daily Traffic (AADT) these thresholds are:

- In areas with baseline air quality greater than air quality standards;
    - Heavy Goods Vehicles (HGVs): 25 AADT;
    - Light Duty Vehicles (LDVs): 100 AADT
- In areas with baseline air quality below air quality standards;
    - Heavy Goods Vehicles (HGVs): 100 AADT; and
    - Light Duty Vehicles (LDVs): 500 AADT

Where the construction or operational traffic numbers are in excess of these thresholds, detailed impact assessment has been undertaken using dispersion modelling.

Ten road links have been considered in the traffic assessment. These are:

Link 1: North Wall Avenue - between subject development access and North Wall Quay;

Link 2: North Wall Avenue - between subject development access and Mayor Street Upper;

Link 3: North Wall Avenue - to north of Mayor Street Upper;

Link 4: North Wall Quay - to west of Castleforbes Road;

Link 5: North Wall Quay - between Castleforbes Road and North Wall Avenue;

Link 6: North Wall Quay - to east of North Wall Avenue;

Link 7: Castleforbes Road - between planned development access and North Wall Quay;

Link 8: Castleforbes Road - between planned development access and Mayor Street Upper;

Link 9: Castleforbes Road - to north of Mayor Street Upper; and

Link 10: Mayor Street Upper - between Castleforbes Road and North Wall Avenue.

Step 2: Detailed Road Traffic Assessment

Detailed modelling of traffic emissions has been undertaken utilising detailed dispersion modelling. In this case the ADMS-Roads model has been utilised. ADMS uses information on the traffic flows, traffic speeds, road characteristics, surrounding area and local meteorology. This information is used to model the impacts of road traffic emissions on air quality. Three scenarios are considered:

- Base year: this is a year for which air quality monitoring has been captured (2018);
- Do Nothing: this is the opening year of the development, without any development traffic (year); and
- Do Something: this is the opening year of the development, with development traffic (year).

The base year model is 'verified' using monitoring data as far as possible based upon the baseline data available. The Do Nothing and Do Something scenarios are used to determine the net change in air quality due to the development. The difference in these two cases is then used to determine the overall impact and the significance. Based on the significance of the impact, the need for mitigation is identified. The significance of impacts is based upon IAQM guidelines as set out in Table A.3.

As noted, earlier step 1 Screening and Step 2 Detailed Modelling consider the total traffic generated by the Residential and Commercial projects. The findings of the assessment are therefore based upon the net cumulative impacts of the two projects together.

Road Model Methodology

The key elements of the methodology used for carrying out the air dispersion modelling are set out in Appendix 9A.4, and key parameters are summarised in Table 9.2.

Parameter	Approach	Notes
Dispersion model	CERC ADMS-Roads v4.1	
Roads Modelled	North Wall Avenue	North Wall Avenue is the only road that screened through Stage 1.
Years modelled	2022, 2037	Construction phase screened out, operational phase only needs consideration EFT emissions only available until 2030, so 2037 modelled as 2030 emissions
Traffic profile	Diurnal profile	Diurnal profiles for weekdays, Saturdays and Sundays has been utilised
Model domain	North Wall Avenue	Within 200m of North Wall Avenue
Receptor grid	North Wall Avenue	A receptor grid has also been defined around North Wall Avenue to allow contour plots to be generated.
Specified receptors		Discrete receptors along North Wall Avenue have been identified. These include ground level receptors, and elevated receptors. As adjacent buildings have not yet been constructed, receptors are assumed to occur at up to 44 storeys.
Meteorological data	Dublin Airport 2018	Hour-sequential data.
Street Canyons	132m	The development will create a street canyon. Details of the development indicate that buildings will be between 8 and 44 storeys. At 3m for each storey, the building height will be 132m. There are no details available of the building to the east of North Wall Avenue. As a worst case, this is assumed to be similar 132m height.
Road width	Actual: 6.6m With Street	Road modelled at actual width to avoid excessive impacts predicted at roadside receptors
Emissions data	EFT 8.0 (2VC)	Assumed traffic profile is the same as 'England' Urban, as closest proxy for Traffic in Dublin.

Table 9.2: Road Traffic Modelling Inputs

9.2.2 Baseline Information and Data Sources

The project is located to the east of Central Dublin, close to the docks and on the northern bank of the River Liffey. There are four air quality monitoring stations close to the site summarised in Table 9.3.

Site Name	Distance and Direction	Type	Pollutants monitored	Available data
St. Anne's park	4.1km northeast	Suburban	NO2 PM10	2015 2015
Marino	2.3km north	Suburban	PM2.5	2017
Winetavern Street	2.5km west	Urban	NO2 PM10	2017 2017
Ringsend (1.2km)	1.2km southeast	Suburban	NO2 PM10	2017 2012

Table 9.3: Air Quality Monitoring Sites Details

The monitoring results for these sites is summarised in Appendix 9A.5. Based upon this monitoring data, the following baseline has been used:

NO_2: 20.1µg/m^3

PM_{10}: 16.1µg/m^3

$PM_{2.5}$: 6.9µg/m^3

9.3 Predicted Impacts

9.3.1 Construction Phase

Construction Dust

Following the methodology set out in Section 9.2.1, the construction dust assessment has been undertaken as set out in Table 9.4 below.

Define Sensitivity	Category	Notes
Sensitivity of Area	High	Nearby residential and commercial premises
Define Emissions Category		
Demolition	Negligible	No demolition, site already cleared
Earthworks	Negligible	No earthworks, basement will already been constructed
Construction	Large	Category 1: total building volume >100,000m3
Trackout	Medium	10 – 50 HGV movements in any one day
Define Area Sensitivity		

Define Sensitivity	Category	Notes
Dust Nuisance		
Construction	High	>10 receptors within 20m
Trackout	High	>10 receptors within 20m
PM_{10}		
Construction	High	>10 receptors within 20m
Trackout	High	>10 receptors within 20m
Risk of Dust Impacts		
Construction	High Risk	
Trackout	Medium Risk	

Table 9.4: Dust Assessment

The dust assessment concluded that there is a high risk of dust and PM_{10} impacts for construction, equating to Major Impacts if unmitigated; and medium risk of dust and PM_{10} impacts equating to Moderate Impacts if unmitigated for trackout.

Based on these findings, mitigation is recommended to control dust and PM_{10} emissions during the construction phase.

Emissions from Construction Traffic

Stage 1 screening has been undertaken for ten roads for construction phase as set out in Section 9.2.1 In all cases traffic flows screened out as not significant. No further assessment has therefore been undertaken and no mitigation is required for construction traffic.

9.3.2 Operation Phase

Stage 1 Screening

Stage 1 screening has been undertaken for ten roads for the operations phase (as set out in Section 9.2.1). Of these, the impacts of emissions from traffic on North Wall Avenue screen in as potentially having significant impacts. These have therefore been considered with a more detailed Stage 2 assessment.

Stage 2 Detailed Assessment

The Stage 2 assessment utilising detailed modelling identified that the emissions from traffic generated on North Wall Avenue will be negligible for all pollutants. On this basis no mitigation is required.

9.4 Mitigation Measures

9.4.1 Construction Phase

Dust

The dust impact assessment concluded that there is the risk of Major (High) Impacts due to construction activities, and Moderate (Medium) impacts due to trackout. The mitigation measures, derived from IAQM guidance, required to render impacts as Negligible, or at worst Minor are set out in Table 9.5.

Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager
Display the head or regional office contact information
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, realtime PM_{10} continuous monitoring and/or visual inspections
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken
Make the complaints log available to the local authority when asked
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.

Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
Avoid site runoff of water or mud Keep site fencing, barriers and scaffolding clean using wet methods
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below
Cover, seed or fence stockpiles to prevent wind whipping
Ensure all vehicles switch off engines when stationary - no idling vehicles
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
Use enclosed chutes and conveyors and covered skips
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Avoid bonfires and burning of waste materials.
Avoid scabbling (roughening of concrete surfaces) if possible
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
Avoid dry sweeping of large areas.
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
Record all inspections of haul routes and any subsequent action in a site log book.
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
Access gates to be located at least 10 m from receptors where possible

Table 9.5: Dust Mitigation Measures

9.4.2 Operation Phase

No mitigation measures are required for the operational phase of the development.

9.5 Residual Impact

9.5.1 Construction Phase

The assessment illustrates that there are potentially significant impacts associated with construction dust. Mitigation measures are therefore recommended. The uptake and correct implementation of these mitigation measures are designed to result in impacts being reduced to negligible.

The construction of the project will generate traffic on nearby roads. The assessment illustrates that the impact to air quality as a result of emissions from this traffic are negligible. On this basis no mitigation is required.

9.5.2 Operational Phase

The operation of the project will generate traffic on nearby roads. Stage 1 screening identified that there was the potential for significant impacts on North Wall Avenue. Stage 2 detailed modelling was therefore undertaken. The assessment illustrates that the impact to air quality as a result of emissions from this traffic are negligible. On this basis no mitigation is required.

9.6 Interactions

Air quality does not have significant interactions with other aspects. In terms of potential impacts on human health, dust from the construction of the project and exhaust emissions from road traffic generated by the project are both of interest. However, the air quality impact assessment undertaken for the project determined that the potential impacts to health are not significant. For dust, this is contingent on the application of appropriate mitigation during construction. For road traffic, modelling has been undertaken to determine the potential impact of emissions, and again these have been determined to be not significant.

APPENDIX 9A: DETAILED AIR QUALITY IMPACT ASSESSMENT

9A.1 Introduction

The proposed development will result in impacts on air quality. This Air Quality Impact Assessment (AQIA) assesses these impacts and identifies mitigation measures where required. The key activities that are considered in the AQIA are set out below, along with the pollutants of interest for each activity:

- Construction
    - Construction activities will result in the emission to air of dust and particulate matter, primarily as PM_{10}; and
    - The construction activities will generate traffic on nearby roads, leading to emissions of nitrogen dioxide (NO_2), and particulate matter (as PM_{10} and $PM_{2.5}$);
- Operation
    - The operation of the development will generate traffic on nearby roads, leading to emissions of nitrogen dioxide (NO_2), and particulate matter (as PM_{10} and $PM_{2.5}$).

The AQIA considers these activities, emissions and impacts in the context of the existing baseline, and on this basis identifies the potential for significant impacts. The project is located to the east of Dublin city centre, the air quality is not expected to be close to, or in excess of air quality standards. This is supported by air quality monitoring.

9A.2 Air Quality Standards

The air quality standards relevant to this assessment are set out in Table 9A.1.

Pollutant	Averaging Period	Statistic	Value (µg/m^3)
NO_2	Annual mean		40
NO_2	1 hour mean	Not to be exceeded more than 18 times per year	200
PM_{10}	Annual mean		30
PM_{10}	24 hour mean	Not to be exceeded more than 35 times per year	50
$PM_{2.5}$	Annual mean		25

Table 9A.1: Air Quality Standards

There are no statutory standards for dust nuisance, and the dust assessment methodology is not a quantitative method requiring an air quality standard.

9A.3 Determining Significance

Introduction
In terms of air quality, the significance of impacts is determined by:

Sensitivity of Receptors x Magnitude of Impacts

The determination of the magnitude differs for dust impacts and traffic impacts. For dust impacts and road traffic the methodology for determining Magnitude is set out in Section 1.4.

Receptor Sensitivity

Factors defining the sensitivity of a receptor are presented in Table 9A.2.

Sensitivity	Human (Health)	Human (Dust soiling)	Ecological
High	■ Locations where members of the public are exposed over a time period relevant to the air quality objectives (a) ■ Examples include residential dwellings, hospitals, schools and residential care homes	■ Regular exposure ■ High level of amenity expected ■ Appearance, aesthetics or value of the property would be affected by dust soiling ■ Examples include residential dwellings, museums, medium and long-term car parks and car showrooms	■ Nationally or Internationally designated site with dust sensitive features (b) ■ Locations with vascular plant species (c)
Medium	■ Locations where workers are exposed over a time period relevant to the air quality objectives (a) ■ Examples include office and shop workers (d)	■ Short term exposure ■ Moderate level of amenity expected ■ Possible diminished appearance or aesthetics of property due to dust soiling ■ Examples include parks and places of work	■ Nationally designated site with dust sensitive features (b) ■ Nationally designed sites with a particularly important plant species where dust sensitivity is unknown
Low	■ Transient human exposure ■ Examples include public footpaths, playing fields,	■ Transient exposure ■ Enjoyment of amenity not expected	■ Locally designated site with dust sensitive features (b)

Sensitivity	Human (Health)	Human (Dust soiling)	Ecological
	parks and shopping streets	■ Appearance and aesthetics of property unaffected ■ Examples include playing fields, farmland [(e)], footpaths, short-term car parks and roads	

[(a)] In the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day.
[(b)] Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete).
[(c)] Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.
[(d)] Does not include workers exposure to PM_{10} as protection is covered by Health and Safety at Work legislation.
[(e)] Except commercially sensitive horticulture which is Medium sensitivity

Table 9A.2: Factors Defining the Sensitivity of a Receptor

Determination of Magnitude

Construction Dust

The methodology for determining the magnitude of construction dust impacts is set out in Section 9A.4.

Construction and Operational Traffic

Where the traffic assessment requires Stage 2 detailed assessment using dispersion modelling the criteria in Table A.3 are used to determine the magnitude of impacts.

	Change in concentration relative to air quality standard (%)			
Long term average Concentration at receptor in assessment year	**1**	**2-5**	**6-10**	**>10**
<75% AQS	Negligible	Negligible	Small	Medium
76-94% of AQS	Negligible	Small	Medium	Medium
95-102% of AQS	Small	Medium	Medium	Large
103 – 109% of AQS	Medium	Medium	Large	Large

	Change in concentration relative to air quality standard (%)			
>110%	Medium	Large	Large	Large
Short Term	<10%	10-20%	20-50%	>50%
Any baseline	Negligible	Small	Medium	Large

Table 9A.3: Road Traffic Assessment – Stage 2 Magnitude Criteria

9A.4 Assessment Methodology

Construction Dust

Introduction

To assess the potential impacts associated with dust and PM_{10} releases during the construction phase and to determine the necessary mitigation measures, an assessment based on the latest guidance from the Institute of Air Quality Management[2] (IAQM) has been undertaken.

This approach divides construction activities into the following dust emission sources:

- demolition;
- earthworks;
- construction; and
- trackout.

The risk of dust effects (low, medium or high) is determined by the scale (magnitude) and nature of the works and the proximity of sensitive human and ecological receptors.
The IAQM guidance recommends that an assessment be undertaken where there are sensitive human receptors:

- within 350 m of the Site boundary; or
- within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance(s).

An assessment should also be carried out where there are dust-sensitive ecological receptors:

- within 50 m of the Site boundary;
- or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance(s).

The significance of the dust effects is based on screening criteria, taking into account the sensitivity of receptors and existing air quality.

2 Guidance on the assessment of dust from demolition and construction, IAQM, February 2014

Dust Emission Magnitude

The magnitude of the dust impacts for each source is classified as Small, Medium or Large depending on the scale of the proposed works. Table A.4 summarises the IAQM criteria to determine the magnitude of the dust emission. These criteria are used in combination with site-specific information and professional judgement.

Source	Large	Medium	Small
Demolition	■ Total building volume >50,000m^3 ■ Potentially dusty Material (e.g. concrete) ■ Onsite crushing and Screening ■ Demolition activities >20m above ground level.	■ Total building volume 20,000-50,000m^3 ■ Potentially dusty material ■ Demolition activities 10-20m above ground level.	■ Total building volume <20,000m^3 ■ Construction material with low potential for dust release ■ Demolition activities <10m above ground level ■ Demolition during wetter months
Earthworks	■ Total site area >10,000m^2 ■ Potentially dusty soil type (e.g. clay) ■ >10 heavy earth moving vehicles active at any one time ■ Formation of bunds >8m in height ■ Total material moved >100,000 tonnes	■ Total site area 2,500-10,000m^2 ■ Moderately dusty soil type (e.g. silt) ■ 5 – 10 heavy earth moving vehicles active at any one time ■ Formation of bunds 4-8m in height ■ Total material moved 20,000-100,000 tonnes	■ Total site area <2,500m^2 ■ Soil type with large grain size (e.g. sand) ■ <5 heavy earth moving vehicles active at any one time ■ Formation of bunds <4m in height ■ Total matieral moved <20,000 tonnes ■ Earthworks during wetter months
Construction	■ Total building volume >100,000m^3 ■ On site concrete batching ■ Sandblasting	■ Total building volume 25,000 – 100,000m^3 ■ Potentially dusty construction material (e.g. concrete) ■ On site concrete batching	■ Total building volume <25,000m^3 ■ Material with low potential for dust release (e.g. metal cladding or timber)
Trackout	■ >50 HGV movements in any one day [(a)] ■ Potenitally dusty surface material (e.g. high clay content) ■ Unpaved road length >100m	■ 10 – 50 HGV movements in any one day [(a)] ■ Moderately dusty surface material (e.g. silt) ■ Unpved road length 50 – 100m	■ < 10 HGV movements in any one day [(a)] ■ Surface material with low potential for dust release ■ Unpaved road length <50m

Source	Large	Medium	Small
[a] HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes			

Table 9A.4: Dust Emission Magnitude Criteria

Area Sensitivity

The sensitivity of the area to dust soiling and health impacts is dependent on the number of receptors within each sensitivity class and their distance from the source. In addition, human health impacts are dependent on the existing PM_{10} concentrations in the area. Table 9A.5, Table 9A.6 and Table 9A.7 summarise the criteria for determining the overall sensitivity of the area to dust soiling, health impacts and ecological impacts respectively. Note that 'Receptor Sensitivity' is as defined in Section 9A.3.

Receptor Sensitivity	Number of Receptors	Distance from the source [a]			
		<20m	<50m	<100m	<350m
High	**>100**	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	**>1**	Medium	Low	Low	Low
Low	**>1**	Low	Low	Low	Low
[a] For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.					

Table 9A.5: Sensitivity of the Area to Dust Soiling

Receptor Sensitivity	Annual Mean PM_{10} (ug/m^3)	Number of Receptors	Distance from the source [a]				
			<20m	<50m	<100m	<200m	<350m
High	>22 [b]	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	18-22[b]	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	14-18[b]	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<14[b]	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low
[a] For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible. (b) IAQM method is based upon UK AQS for PM_{10} of 40µg/m^3. These criteria have been adapted for the Irish PM_{10} AQS of 30µg/m^3, by subtracting 10µg/m^3 from the threshold in the IAQM guidance.							

Table 9A.6: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Distance from the Source	
	<20m	<50m
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table 9A.7: Sensitivity of Area to Ecological Impact

For each dust emission source (demolition, construction, earthworks and trackout), the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts.

Risk of Dust Impacts

The risk of dust impacts prior to mitigation for each emission source is presented in Table 9A.8 and Table 9A.9**.**

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 9A.8: Risk of Dust Impacts – Demolition, Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Medium Risk	Low Risk	Negligible

Table 9A.9: Risk of Dust Impacts – Trackout

Mitigation and Significance

The IAQM guidance provides a range of mitigation measures which are dependent on the level of dust risk attributed to the Site. Site specific mitigation measures are also included where appropriate. With appropriate mitigation, dust and PM_{10} impacts can be reduced to Negligible even for large sites close to receptors.

Construction and Operational Traffic

Introduction

The traffic assessments for construction and operational phases have been undertaken as a two-step process. Step 1 is a simple screening process based upon IAQM guidance. Step 2 is a detailed assessment utilising detailed roads modelling.

The construction and operation of the development will generate traffic on the nearby road network. The assessment methodology will follow two pieces of UK guidance used routinely in Ireland:

- IAQM (2017) Guidance on land-use planning and development control: Planning for air quality v1.2

- Defra (2018) Local Air Quality Management Guidance TG(16)

Step 1: Screening

The IAQM set out screening thresholds for the determination of whether significant impacts may arise. In terms of the Annual Average Daily Traffic (AADT) these thresholds are:

- In areas with baseline air quality greater than air quality standards:
    - Heavy Goods Vehicles (HGVs): 25 AADT
    - Light Duty Vehicles (LDVs): 100 AADT
- In areas with baseline air quality below air quality standards:
    - Heavy Goods Vehicles (HGVs): 100 AADT
    - Light Duty Vehicles (LDVs): 500 AADT

Where the construction or operational traffic numbers are in excess of these thresholds, detailed impact assessment has been undertaken using dispersion modelling.

Ten road links have been considered in the traffic assessment. These are:

Link 1: North Wall Avenue - between subject development access and North Wall Quay
Link 2: North Wall Avenue - between subject development access and Mayor Street Upper
Link 3: North Wall Avenue - to north of Mayor Street Upper
Link 4: North Wall Quay - to west of Castleforbes Road
Link 5: North Wall Quay - between Castleforbes Road and North Wall Avenue
Link 6: North Wall Quay - to east of North Wall Avenue
Link 7: Castleforbes Road - between planned development access and North Wall Quay
Link 8: Castleforbes Road - between planned development access and Mayor Street Upper
Link 9: Castleforbes Road - to north of Mayor Street Upper
Link 10: Mayor Street Upper - between Castleforbes Road and North Wall Avenue

Step 2: Detailed Road Traffic Assessment

Detailed modelling of traffic emissions has been undertaken utilising detailed dispersion modelling. In this case the ADMS-Roads model has been utilised. ADMS uses information on the traffic flows, traffic speeds, road characteristics, surrounding area and local meteorology. This information is used to model the impacts of road traffic emissions on air quality. Three scenarios are considered:

- Base year: this is a year for which air quality monitoring has been captured (2018);

- Do Nothing: this is the opening year of the development, without any development traffic (year);

- Do Something: this is the opening year of the development, with development traffic (year).

The base year model is 'verified' using monitoring data as far as possible based upon the baseline data available. The Do Nothing and Do Something scenarios are used to determine the net change in air quality due to the development. The difference in these two cases is then used to determine the overall impact and the significance. On the basis of the significance of the impact, the need for mitigation is identified. The significance of impacts is based upon IAQM guidelines as set out inTable A.3.

Road Model Methodology

The key elements of the methodology used for carrying out the air dispersion modelling are set out in Table 9A.10, Table 9A.11 and Table 9A.12.

Parameter	Approach	Notes
Dispersion model	CERC ADMS-Roads v4.1	
Roads Modelled	North Wall Avenue	North Wall Avenue is the only road that screened through Stage 1.
Years modelled	2022, 2037	Construction phase screened out, operational phase only needs consideration EFT emissions only available until 2030, so 2037 modelled as 2030 emissions
Model domain	North Wall Avenue	Within 200m of North Wall Avenue
Receptor grid	North Wall Avenue	A receptor grid has also been defined around North Wall Avenue to allow contour plots to be generated.
Specified receptors		Discrete receptors along North Wall Avenue have been identified. These include ground level receptors, and elevated receptors. As adjacent buildings have not yet been constructed, receptors are assumed to occur at up to 44 storeys.
Surface characteristics	Development site: Surface Roughness: 1.5 Albedo: 0.23 Monin-Obhukov Length: 100 Priestly –Tailor Parameter: 0.45 Meteorological site: Surface Roughness: 0.2 Albedo: 0.23 Monin-Obhukov Length: 10 Priestly –Tailor Parameter: 0.45	Surface parameters derived for the site specific conditions, and for the meteorological site at Dublin Airport. Values derived from mapping and professional judgement based upon the description of the future site and surrounds.

Parameter	Approach	Notes
Meteorological data	Dublin Airport 2018	Hour-sequential data. Wind roses are presented in Appendix A.
Street Canyons	132m	The development will create a street canyon. Details of the development indicate that buildings will be between 8 and 44 storeys. At 3m for each storey, the building height will be 132m. There are no details available of the building to the east of North Wall Avenue. As a worst case, this is assumed to be similar 132m height.
Road width	Actual: 6.6m With Street	Road modelled at actual width to avoid excessive impacts predicted at roadside receptors
Emissions data	EFT 8.0 (2VC)	Assumed traffic profile is the same as 'England' Urban, as closest proxy for Traffic in Dublin.

Table 9A.10: Road Traffic Modelling Inputs

Parameter	AADT	%HGV	Speed (kph)
North Wall Avenue (North of access)			
2019 Base	693	8.7%	25
2022 DN	2471	2.4%	25
2022 DS	3079	2.0%	25
2022 DN	2492	2.5%	25
2022 DS	3100	2.0%	25
North Wall Avenue (South of access)			
2019 Base	705	10%	25
2022 DN	2728	2.5%	25
2022 DS	3326	2.1%	25
2022 DN	2749	2.6%	25
2022 DS	3347	2.1%	25

Table 9A.11: Road Traffic Data – North Wall Avenue)

Notes:

Source: email from Gordon Finn CS Consulting to Chris Hazell-Marshall ERM 19 Nov 2019 @ 12.12 'RE: Waterfront South Central – queries'

Traffic surveys undertaken on weekday. Saturday profile = weekdays x 0.790; Sunday profile = weekdays x 0.716

Speed assumed to be 5kph less than speed limit

Start Hour	Weekday	Weekday	Saturday	Sunday
	Vehicles per hour	Proportion	Proportion	Proportion
00:00	4	0.033	0.026	0.023
01:00	2	0.016	0.013	0.012
02:00	2	0.012	0.010	0.009
03:00	2	0.016	0.013	0.012
04:00	4	0.029	0.023	0.021
05:00	10	0.081	0.064	0.058
06:00	170	1.3	1.0	0.9
07:00	213	1.7	1.3	1.2
08:00	299	2.3	1.8	1.7
09:00	237	1.8	1.5	1.3
10:00	180	1.4	1.1	1.0
11:00	169	1.3	1.0	0.9
12:00	180	1.4	1.1	1.0
13:00	187	1.5	1.2	1.0
14:00	156	1.2	1.0	0.9
15:00	214	1.7	1.3	1.2
16:00	260	2.0	1.6	1.4
17:00	305	2.4	1.9	1.7
18:00	194	1.5	1.2	1.1
19:00	103	0.80	0.63	0.57
20:00	85	0.66	0.52	0.47
21:00	64	0.50	0.39	0.36
22:00	31	0.24	0.19	0.17
23:00	9	0.071	0.056	0.051
	3079	24	19	17

Table 9A.12: Diurnal Traffic Profile – North Wall Avenue

North Wall Avenue at its immediate environs are illustrated in Figure 9A.1

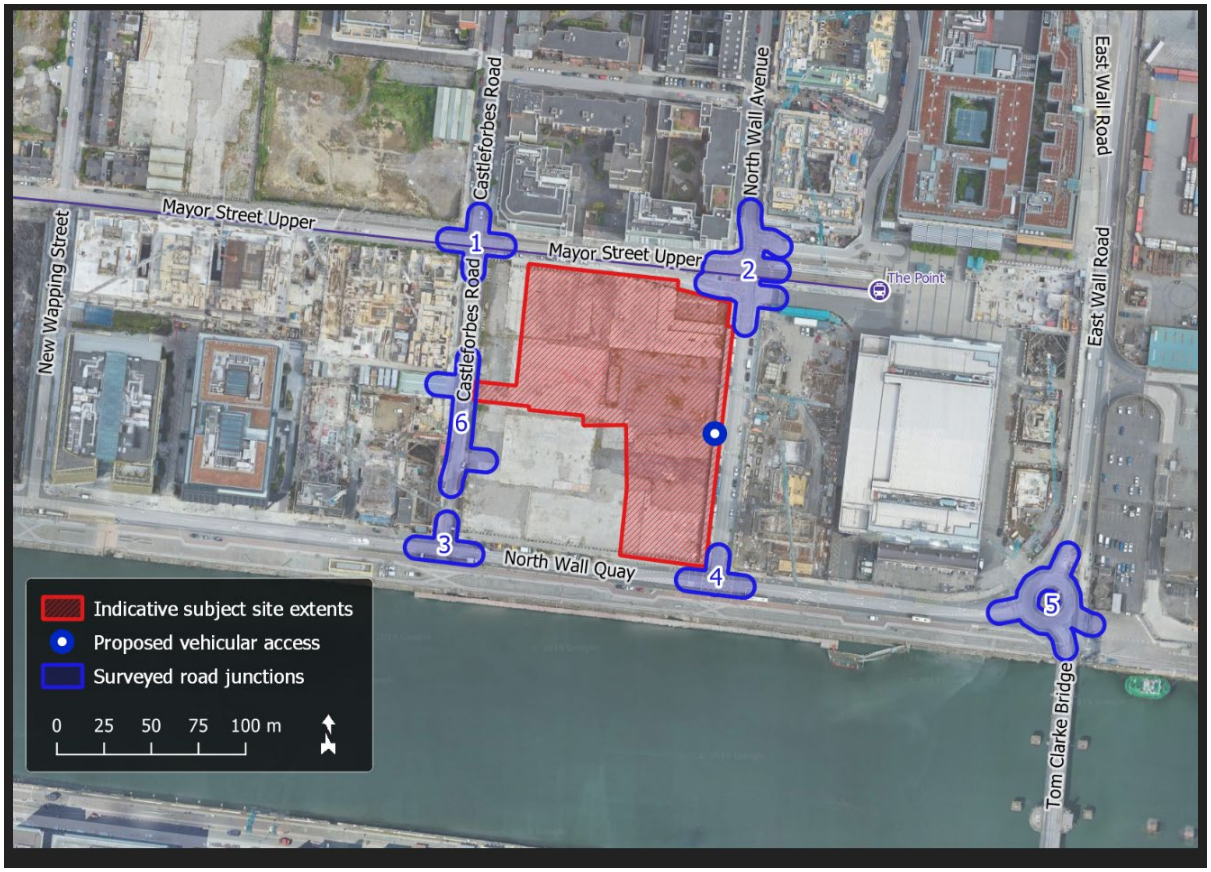


Figure 9A.1: North Wall Avenue and Environs

9A.5 Baseline

The project is located to the east of Central Dublin, close to the docks and on the northern bank of the River Liffey. There are four air quality monitoring stations close to the site, with recent monitoring data as illustrated in Figure A.2, and summarised in Table A.13.

Site Name	Distance and direction	Type	Pollutants monitored	Available data
St. Annes park	4.1km northeast	Suburban	NO_2 PM_{10}	2015 2015
Marino	2.3km north	Suburban	$PM_{2.5}$	2017
Winetavern Street	2.5km west	Urban	NO_2 PM_{10}	2017 2017
Ringsend (1.2km)	1.2km southeast	Suburban	NO_2 PM_{10}	2017 2012

Table 9A.13: Air Quality Monitoring Site Details

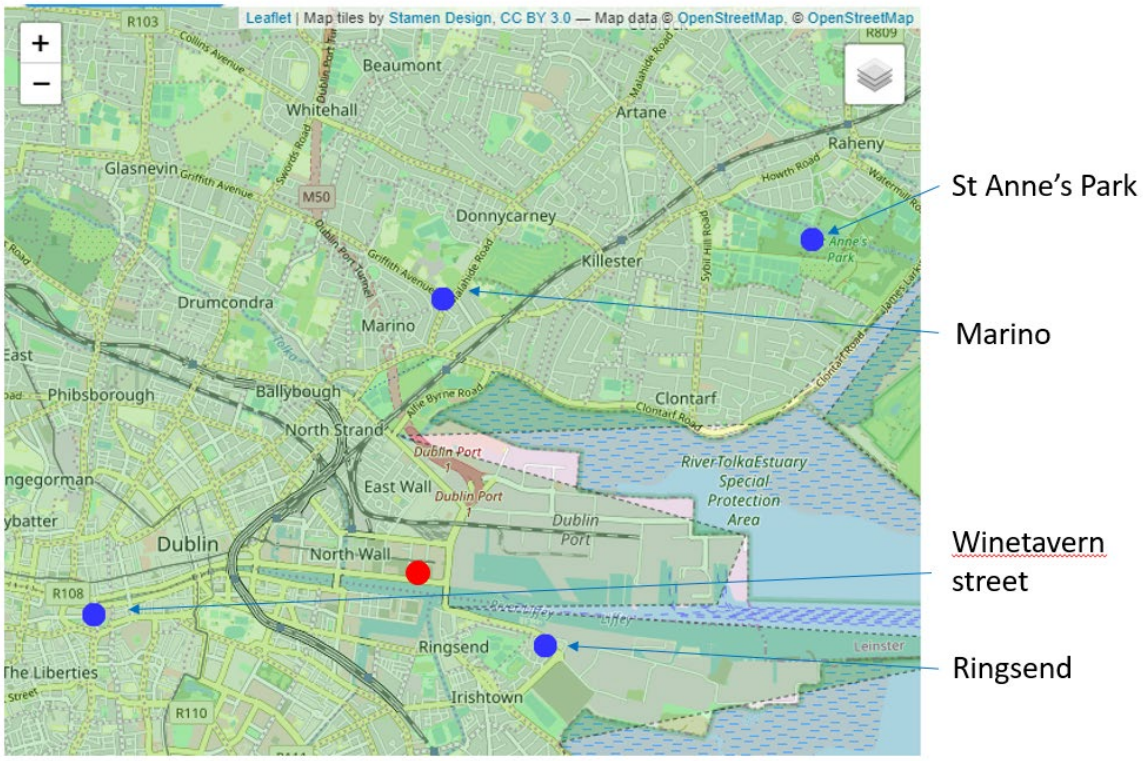


Figure 9A.2: Air Quality Monitoring Stations

The monitoring data used to inform the baseline is summarised in Table A.14.

Pollutant	Site	Annual Average (µg/m^3)
NO_2	*AQS (annual mean)*	*40*
	St. Annes Park	13.5
	Ringsend	21.9
	Winetavern Street	27.2
	Used in assessment	**20.1**
PM_{10}	*AQS (annual mean)*	*30*
	St. Annes Park	15.2
	Ringsend	20.3
	Winetavern Street	12.9
	Used in assessment	**16.1**
$PM_{2.5}$	*AQS (annual mean)*	*25*
	Marino	6.90
	Used in assessment	**6.9**

Table 9A.14: Baseline Air Quality

A.6 Sensitive receptors

There are numerous sensitive receptors in the vicinity of the proposed project. Receptors in the immediate vicinity of the site include residential properties, commercial premises and locations where people will be present along:

- North Wall Quay to the south
- Upper Mayor street to the north
- North Wall Avenue to the east
- Castleforbes road to the west

The site and immediate environs are illustrated Figure 9A.3. Of note is that current construction projects will introduce additional sensitive receptors that are likely to be present when this project goes ahead.

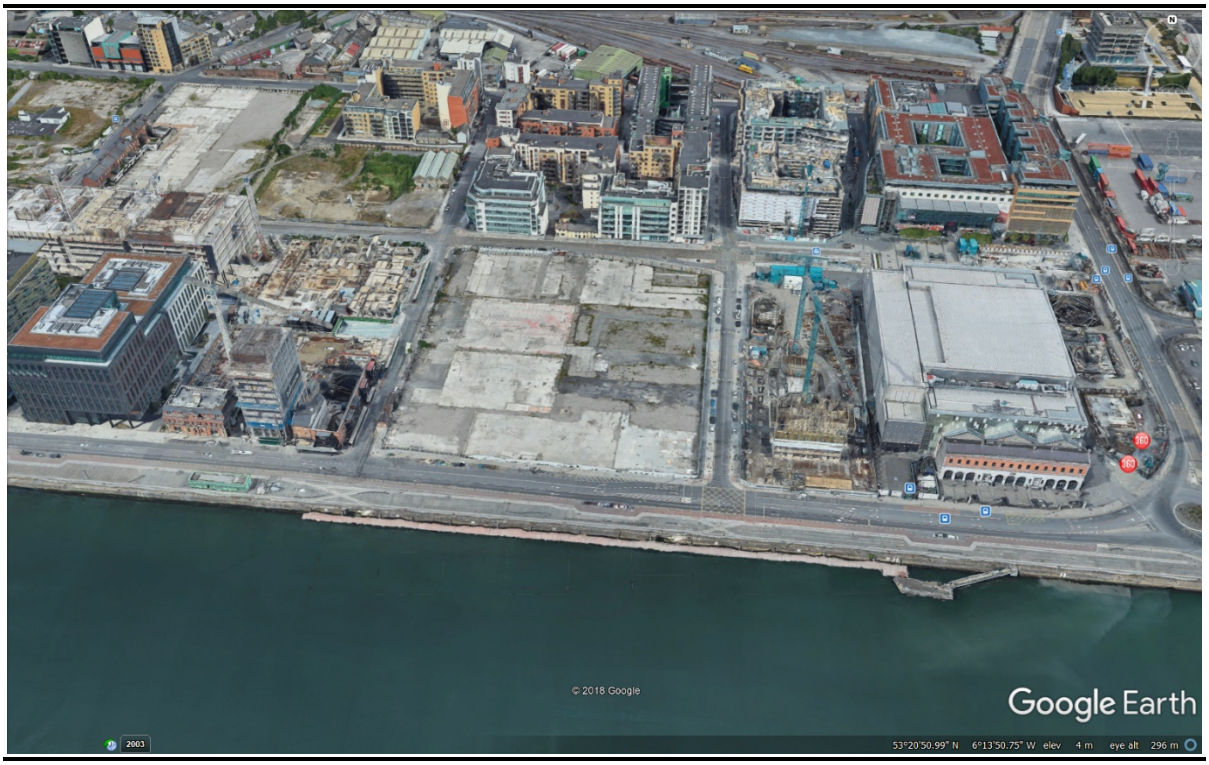


Figure 9A.3: Sensitive Receptors in Vicinity of the Project

These receptors will be those most at risk of significant impacts from dust emissions. In terms of traffic, receptors on North Wall Avenue are potentially impacted, based upon Stage 1 screening.

9A.7 Impact Assessment

Construction Dust

Following the methodology set out in Section 9A.4, the construction dust assessment has been undertaken as set out in Table 9A.15.

Define Sensitivity	Category	Notes
Sensitivity of Area	High	Nearby residential and commercial premises
Define Emissions Category		
Demolition	Negligible	No demolition, site already cleared
Earthworks	Negligible	No earthworks, basement will already been constructed
Construction	Large	Category 1: total building volume >100,000m3
Trackout	Medium	10 – 50 HGV movements in any one day
Define Area Sensitivity		
Dust Nuisance		
Construction	High	>10 receptors within 20m
Trackout	High	>10 receptors within 20m
PM_{10}		
Construction	High	>10 receptors within 20m
Trackout	High	>10 receptors within 20m
Risk of Dust Impacts		
Construction	High Risk	
Trackout	Medium Risk	

Table 9A.15: Dust Assessment

The dust assessment concluded that there is a high risk of dust and PM_{10} impacts for construction, equating to Major Impacts if unmitigated; and medium risk of dust and PM_{10} impacts equating to Moderate Impacts if unmitigated for trackout.

On the basis of these findings, mitigation is recommended to control dust and PM_{10} emissions during the construction phase.

Construction Traffic

Stage 1 screening

Stage 1 screening has been undertaken for ten roads for construction phase (as set out in Section 9A.4). The results are summarised in Table 9A.16.

Road	LDV 2019 back-ground	LDV 2019 construct-ion	Change	Screen	HGV 2019 Background	HGV 2019 Construction	Change	Screen
Link 1	633	633	0	Out	60	148	88	Out
Link 2	636	636	0	Out	69	69	0	Out
Link 3	703	703	0	Out	88	88	0	Out
Link 4	6966	6966	0	Out	2455	2455	0	Out
Link 5	6988	6988	0	Out	2415	2415	0	Out
Link 6	6907	6907	0	Out	2429	2517	88	Out
Link 7	890	890	0	Out	106	106	0	Out
Link 8	844	844	0	Out	94	94	0	Out
Link 9	1034	1034	0	Out	95	95	0	Out
Link 10	142	142	0	Out	11	11	0	Out

Table 9A.16: Construction Phase Traffic Screening

The Stage 1 screening illustrates that the increases in traffic are not significant on any road, and therefore no further Stage 2 assessment is required, and no construction phase mitigation is required.

Operational Traffic

Stage 1 Screening

Stage 1 screening has been undertaken for ten roads for the operational phase (as set out in Section 9A.4). The results are summarised in Table 9A.17.

Road	LDV 2022 DN	LDV 2022 DS	Change	Screen	HGV 2022 DN	HGV 2022 DS	Change	Screen
Link 1	2411	3019	608	In	60	60	0	Out
Link 2	2659	3257	598	In	69	69	0	Out
Link 3	2380	2863	483	Out	88	88	0	Out
Link 4	9232	9546	314	Out	2469	2469	0	Out
Link 5	9095	9430	335	Out	2415	2415	0	Out
Link 6	8884	9157	273	Out	2444	2444	0	Out
Link 7	3398	3419	21	Out	106	106	0	Out
Link 8	3629	3650	21	Out	94	94	0	Out
Link 9	3890	3959	69	Out	96	96	0	Out
Link 10	337	387	50	Out	11	11	0	Out

Table 9A.17: Operational Phase Traffic Screening

The Stage 1 screening illustrates that the increases in traffic are significant for Link 1 and Link 2 (North Wall Avenue), and therefore further Stage 2 assessment is required for this road. No further assessment is required on any other roads.

Stage 2 Assessment

Detailed modelling has been undertaken on North Wall Avenue. The details of the modelling are set out in Section 9A.4.

The results of the assessment are set out in Table 9A.18. The modelling considers the Do Nothing scenario and the Do Something scenario. This modelling is for road traffic contribution only. The

difference is the Change in Concentration, which is expressed as a percentage of the AQS. The underlying baseline is then added to the DN and DS impacts to calculate the overall concentration in the context of the AQS. These two values are assessed using Table 9A.3 to determine magnitude. The impacts are set out in Table 9A.18 and Table 9A.19.

Pollutant	Averaging Period	AQS	Baseline	DN + Baseline	DS + Baseline	Change	Change/AQS	Baseline + DS/AQS	Magnitude	Significance
NO_2	Annual mean	40	20.1	25.6	26.7	1.10	2.7%	67%	Negligible	Negligible
NO_2	1 hour mean	200	40.2	82.4	89.0	6.63	3.3%	45%	Negligible	Negligible
PM_{10}	Annual mean	40	12.9	14.9	15.3	0.379	0.9%	38%	Negligible	Negligible
PM_{10}	24 Hour mean	50	25.8	29.4	30.0	0.613	1.2%	60%	Negligible	Negligible
$PM_{2.5}$	Annual mean	25	6.90	8.05	8.26	0.213	0.85%	33%	Negligible	Negligible

Table 9A.18: Detailed Traffic Assessment: 2022

Pollutant	Averaging Period	AQS	Baseline	DN + Baseline	DS + Baseline	Change	Change/AQS	Baseline + DS/AQS	Magnitude	Significance
NO_2	Annual mean	40	20.1	22.6	23.1	0.572	1.4%	58%	Negligible	Negligible
NO_2	1 hour mean	200	40.2	59.2	62.7	3.48	1.7%	31%	Negligible	Negligible
PM_{10}	Annual mean	40	12.9	14.9	15.3	0.414	1.0%	38%	Negligible	Negligible
PM_{10}	24 Hour mean	50	25.8	29.3	29.9	0.671	1.3%	60%	Negligible	Negligible
$PM_{2.5}$	Annual mean	25	6.90	7.97	8.20	0.228	0.91%	33%	Negligible	Negligible

Table 9A.19: Detailed Traffic Assessment: 2037

The detailed traffic assessment illustrates that there are predicted to be Negligible impacts on North wall Avenue for NO_2 annual mean; and Negligible impacts for all other pollutants.

A.8 Mitigation

Dust

The dust impact assessment concluded that there is the risk of Major (High) Impacts due to construction activities, and Moderate (Medium) impacts due to trackout. The mitigation measures, derived from IAQM guidance, required to render impacts as Negligible, or at worst Minor are set out in Table A.20.

Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager
Display the head or regional office contact information
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, realtime PM_{10} continuous monitoring and/or visual inspections
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken
Make the complaints log available to the local authority when asked
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction

Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
Avoid site runoff of water or mud Keep site fencing, barriers and scaffolding clean using wet methods
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below
Cover, seed or fence stockpiles to prevent wind whipping
Ensure all vehicles switch off engines when stationary - no idling vehicles
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
Use enclosed chutes and conveyors and covered skips
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Avoid bonfires and burning of waste materials.
Avoid scabbling (roughening of concrete surfaces) if possible
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
Avoid dry sweeping of large areas.
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport

Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
Record all inspections of haul routes and any subsequent action in a site log book.
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
Access gates to be located at least 10 m from receptors where possible

Table 9A.20: Mitigation Measures

Construction Traffic

No significant impacts have been identified associated with construction traffic. Therefore, no mitigation is required.

Operational Traffic

Negligible Impacts have been identified on North wall Avenue for annual mean NO_2; all other impacts are negligible. On this basis no mitigation is required.

A.9 Conclusions

The assessment illustrates that there are potentially significant impacts associated with construction dust. Mitigation measures are therefore recommended. The uptake and correct implementation of these mitigation measures are designed to result in impacts being reduced to negligible.

The construction of the project will generate traffic on nearby roads. The assessment illustrates that the impact to air quality as a result of emissions from this traffic are negligible. On this basis no mitigation is required.

The operation of the project will generate traffic on nearby roads. Stage 1 screening identified that there was the potential for significant impacts on North Wall Avenue. Stage 2 detailed modelling was therefore undertaken. The assessment illustrates that the impact to air quality as a result of emissions from this traffic are negligible. On this basis no mitigation is required.

10.0 NOISE AND VIBRATION

10.1 Introduction

This section presents the assessment of noise and vibration from the City Block 9 Project.

The following sections describe the:

- Baseline environment;
- Assessment methodology; and
- Assessment of likely significant noise and vibration effects from construction and operation of the Project.

Where significant effects are predicted, mitigation measures are considered and the residual predicted effects including the mitigation measures are presented.

10.2 Methodology

This section sets out the approach used to assess potential noise and vibration effects as a result of the construction and operation of the proposed development.

10.2.1 Construction

Noise from On-Site Construction Works

Noise from construction has been assessed at the nearest NSRs. BS 5228[1] sets out guidance on construction plant noise levels and on the threshold of significant noise effects on NSRs.

Thresholds for assessing potential noise impacts are based on the levels in Annex E of BS 5228, considered conservative for this urban setting and are set out below in Table 10.1. Before construction begins, noise monitoring may be carried out to confirm appropriate levels using the 'ABC' method. This would require a baseline survey to be carried out under typical conditions (which are unlikely to be present currently due to COVID-19 restrictions). The use of the 'ABC' method would be expected to result in lower impacts and could be used to inform detailed mitigation.

[1] BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites', BSI, 2014

	Criteria (façade), $L_{Aeq,T}$ dB		
Period	**Residential**	**Offices / Commercial**	**Schools / Hospitals**
Day (07:00 – 19:00) (1)	70	70	60
Evening (19:00 – 22:00) (2)	60	n/a	60
Night (22:00 – 07:00)	45	n/a	45
1) Applies weekday daytimes and also Saturday core hours 08:00 – 14:00 2) Applies to weekday evenings, Saturday 14:00 – 23:00 and Sunday 07:00 – 23:00			

Table 10.1: Construction Noise Thresholds

Criteria used to assess the magnitude and significance of construction noise effects are set out below in Table 10.2.

Exceedance of criteria, dB	**Magnitude of predicted impact**		**Significance of effect**
None	Negligible	Factors which may influence significance of effects, e.g. duration of construction activity	Negligible
Up to 5	Small		Minor
>5, up to 10	Medium		Moderate
> 10	Large		Major

Table 10.2: Magnitude and Significance of Construction Noise Effects

Construction plant items have not been specified in detail at this stage. Construction noise has been predicted based on information from the project team and an understanding from other similar projects of the types and numbers of construction plant that will be used.

A separate application has been submitted for ground and basement works at this site. The assessment included in this application therefore does not include these works, however cumulative effects have been considered qualitatively.

The assessment considers the noisiest phase of works during the day, expected to be concreting works required to construct the superstructures for the three blocks. In some cases, it may be necessary to work into the night:

- to carry out power floating following concrete pours of the larger floors, which will take the majority of the day to complete; and
- should the reinforced concrete (RC) cores be constructed using a technique called slip form in which each core is constructed in a continuous concrete pour lasting several weeks.

The construction plant items have been drawn from the guidance in BS 5228 and are presented in Tables 10.3 to 10.5.

Initial modelling showed the potential for significant construction noise impacts at the nearest NSRs and therefore mitigation measures have been considered. Mitigation measures are available which will reduce impacts, including, where necessary, the generic measures listed below:

- Use of stationary equipment, e.g. compressors, generators and pumps fitted with properly lined and sealed acoustic covers or enclosures, which will be kept closed whenever the machines are in use;
- Fitting of mufflers or silencers of the type recommended by manufacturers;
- Shutting down of machines in intermittent periods between work, or throttling down to a minimum;
- Maintenance of plant in good working condition to minimise noise; and
- Siting noisy plant and equipment as far away as possible from NSRs, and use of barriers (eg site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever possible.

It is assumed that the majority of plant can be mitigated to some degree, either by choosing quieter models or through enclosure or partial enclosure. A reduction of 5 dB has been assumed to be achievable for most plant items, with a reduction of 10 dB assumed for generators. No reductions have been assumed for concrete trucks or hand-held welders.

Installation of site hoardings, security measures and signage etc along with later stages, such as landscaping and internal fit-out, are not considered to have the potential to cause significant noise impacts.

Enabling works such as diverting existing services and the installation of new services do not generally require large quantities of plant, are limited to the daytime, and progress at a reasonably rapid rate. Therefore they are not considered to have potential to cause significant noise impacts and have been scoped out of further assessment. In the unlikely event the need for night working for enabling works arise during detailed design, an assessment of the magnitude and duration of works will be carried out to determine whether mitigation measures are appropriate.

The modelling assumes that all three blocks will be constructed simultaneously. The construction noise predictions have been made based on preliminary site layout drawings showing the locations of fixed plant items such as tower cranes, concrete placing booms and the placing boom pump unit. Handheld and mobile plant such as poker vibrators and circular saws have been distributed towards the edges of all of the three blocks to provide a reasonable worst-case estimate of noise levels for all receptors simultaneously, for the daytime concreting

phase. No screening from buildings, site hoardings or other objects has been included, which is conservative.

Slip form and power floating works may be required at night. Slip form works have been modelled assuming that a single RC core is constructed at a time. Power floating will be carried out following a floor pour. It is expected to begin before the night-time period and normally be complete by 1am at the latest, although, by exception, may need to continue later as a result of cold, inclement weather. For the purpose of assessment, it is assumed that power floating continues until 1am. For each activity, several scenarios have been modelled to represent construction works taking place within the three blocks and a range of predicted noise levels presented.

Typically, construction work will be carried out between 8am and 6pm Mon-Fri and between 8am and 2pm on Saturday. It is anticipated, however, that there will be times, as described above and due to exceptional circumstances, that construction work will be necessary outside these standard hours.

Table 10.3: Assumed Construction Plant for Concreting Works During the Daytime

Plant Item	BS 5228 reference number	Lw per equipment item (unmitigated)	Number of plant items	% on-time	Assumed mitigation, dB	Lw per equipment item (mitigated)	Example of potential mitigation method
Concrete placing boom	C4.37	93	6	50	5	88	quieter model or partial enclosure
Concrete pump and concrete mixer truck (pumping to 5th floor)	C4.25	110	1	100	5	105	quieter model or partial enclosure
Concrete Truck	C4.29	103	2	100		103	
Poker Vibrator	C4.33	106	6	20	5	101	quieter model
Tower crane	C4.49	105	6	50	5	100	quieter model or partial enclosure
Hand Held Welder	C3.31	101	6	25		101	
Hand Held Circular Saw	C4.73	112	6	20	5	107	quieter model
Generator	C4.85	94	2	100	10	84	quieter model or enclosure

Table 10.4: Assumed Night-time Construction Plant - Slip Form

Plant Item	BS 5228 reference number	Lw per equipment item (unmitigated)	Number of plant items	% on-time	Assumed mitigation, dB	Lw per equipment item (mitigated)	Example of potential mitigation method
Concrete placing boom	C4.37	93	1	100	5	88	quieter model or partial enclosure
Concrete pump and concrete mixer truck (pumping to 5th floor)	C4.25	110	1	100	5	105	quieter model or partial enclosure
Concrete Truck	C4.29	103	2	100		103	
Poker Vibrator	C4.33	106	1	50	5	101	quieter model

Table 10.5: Assumed Night Time Construction Plant - Power Floating

Plant Item	Reference	Lw per equipment item (unmitigated)	Number of plant items	% on-time	Assumed mitigation, dB	Lw per equipment item (mitigated)	Example of potential mitigation method
5 HP Power Float	- (1)	95	3 or 4 (2)	33 (3)	5	90	quieter model

1) Guidelines on Noise Control for Construction Sites. States of Jersey Health and Social Services. Health Protection 2004.
2) 3 power floats assumed to operate simultaneously for blocks A3 and C1, whilst 4 have been assumed for block A1/A2.
3) Assumes power floating is completed by 1am.

Construction Traffic

Changes in road traffic noise levels resulting from the construction of the Project are calculated using the Calculation of Road Traffic Noise (CRTN) (1) methodology. Noise changes of greater than 3 dB(A) are identified as a significant effect. This corresponds to the smallest change in environmental noise that is noticeable under normal conditions.

The significance of effects will also depend on the duration over which the change will take place.

Construction Vibration

Construction work included in this application comprises mainly concreting works followed by fit out. Construction plant generating high levels of vibration which may be significant at the

(1) Calculation of Road Traffic Noise. Department or Transport Welsh Office. HMSO 1998.

nearest NSRs are not expected to be required during these phases of construction. Therefore, vibration has been scoped out of further assessment.

10.2.2 Operation

During detailed design, residential units will be designed to reduce external noise levels, to ensure adequate internal noise levels are achieved. Therefore, an assessment of noise effects on proposed residential units has not been included.

As for construction, changes in road traffic noise from the operation of the Project are assessed using CRTN, with noise changes of greater than 3 dB(A) identified as a significant effect.

Noise from building services has been assessed using the standards set out in the NG4 (1). This guidance sets out different noise standards depending on the local noise environment. Following the screening guidance for Quiet Areas, it was determined that the site is not located in a Quiet Area as it fails the criteria for being more than 7.5 km from a motorway. As a result of the urban nature of the site setting, it is considered unlikely that the nearest NSRs fall within areas of 'Low Background Noise'. Therefore, the standards set out in Table 10.6 have been adopted.

Table 10.6: Noise Standards from NG4 for Fixed Plant

Period	Limit Values for Noise (free-field)
Daytime (07:00 – 19:00)	55 dB, $L_{Ar,T}$
Evening (19:00 – 23:00)	50 dB, $L_{Ar,T}$
Night-time (23:00 – 07:00)	45 dB, $L_{eq,T}$

NG4 states that during the daytime and evening, rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all sensitive locations, with a penalty of 5 dB applied if audible tones or impulsive noise is present. During the night-time period, no tonal or impulsive noise should be clearly audible or measurable at any noise sensitive location.

10.3 Current baseline conditions

(1) EPA's "Guidance Note for Noise: Licence Applications, Survey and Assessments in Relation to Scheduled Activities (NG4)". 2016

The proposed development site is located in an urban area of east Dublin, close to the Point Square shopping mall and the North Docks. It is bounded by roads on all sides with a tram line to the north:

- the R801 (North Wall Quay) to the south;
- Mayor Street Upper to the north, which carries road traffic in one direction only as well as the Luas 'red' tram line;
- North Wall Avenue to the east; and
- Castleforbes Road to the west.

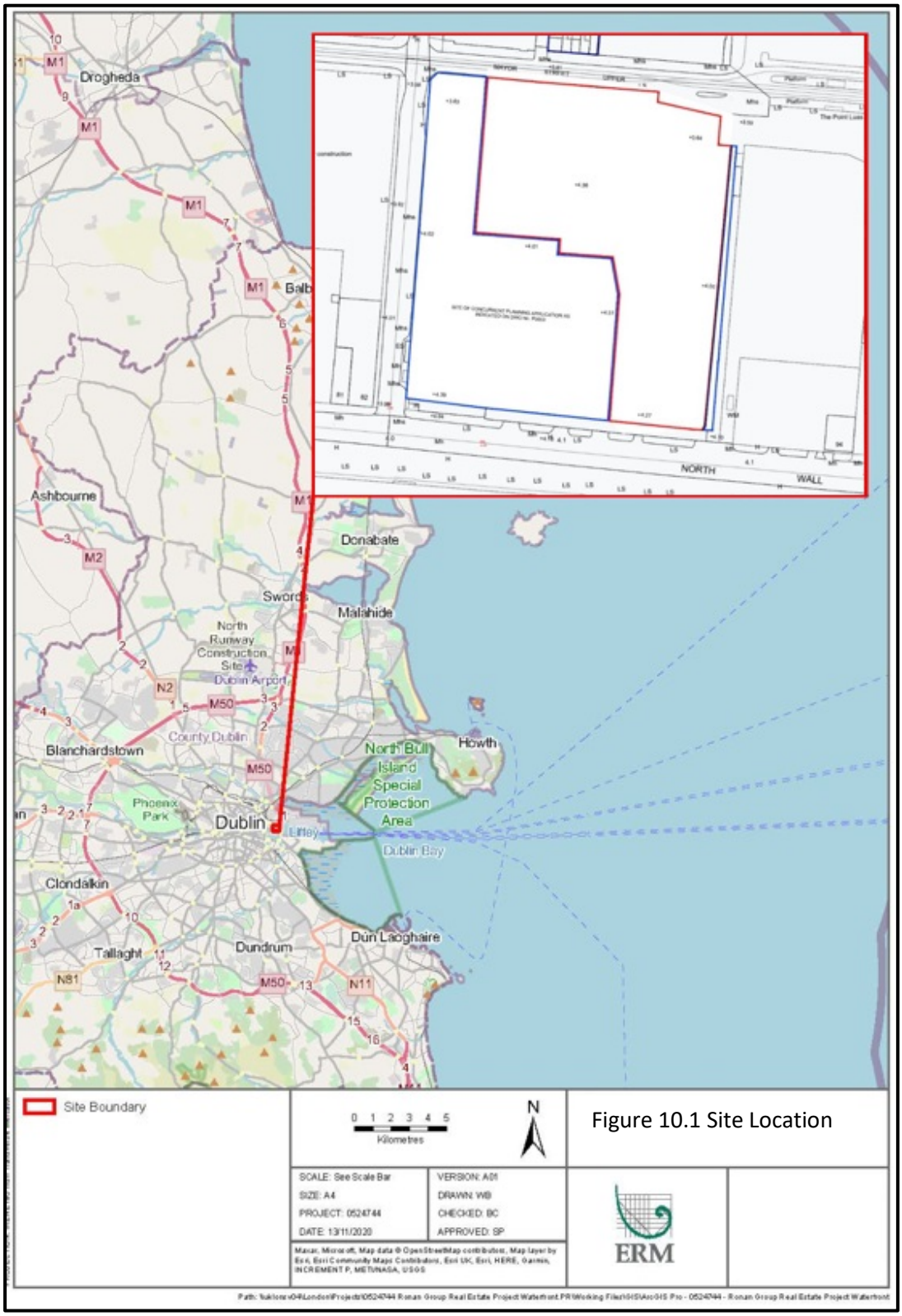


Figure 10.1: Site Location

Mixed use commercial and residential high-rise developments are situated to the north, on the opposite side of Mayor Street Upper. Several two storey residential properties are also

located on this road, with two residential high rise developments located further back. Mixed use developments immediately to the east and west are currently under construction but are expected to be occupied before construction of the proposed development begins and have therefore been included in this assessment as noise sensitive receptors (NSRs). To the south, beyond the R801 lies the River Liffey. A mix of commercial and residential developments are situated on the south bank of the river on Sir John Rogerson's Quay, at a distance of approximately 180 m.

NSR locations have been chosen to represent properties likely to be worst affected by the construction and operation of the Project. These are shown in Figure 10.2.

Figure 10.2: Nearest Noise Sensitive Receptors

The site layout is shown below in Figure 10.3.

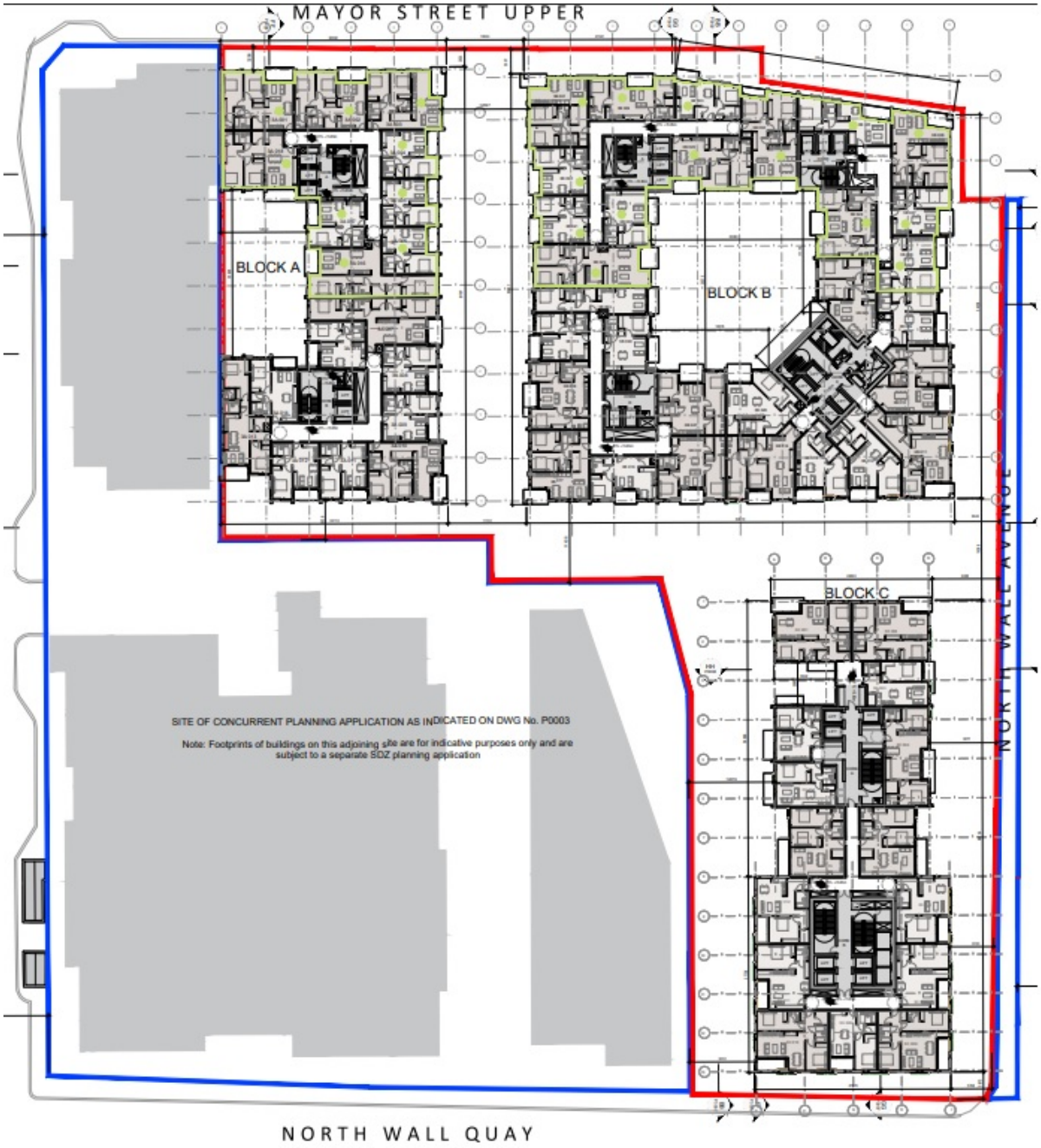


Figure 10.3: Third Floor Plan Drawing Showing the Site Layout

10.4 Identification of Impacts

10.4.1 Construction Noise Impacts

On-site Construction Works

Mitigated noise levels have been predicted using the methodology and assumed plant teams detailed in Section 10.2 at the nearest NSRs to the site, shown in Figure 10.2. The results are presented in Table 10.7.

Table 10.7: Predicted Mitigated Construction Noise

Receptor		Predicted Noise Level (façade), dB(A)		
		Day	Night	
		Concreting	Slip form	Power Floating
1	Commercial units on Mayor Street Upper	69	n/a	n/a
2	Residential properties on Mayor Street Upper	71	63 - 65	42 - 51
3	Commercial units on Mayor Street Upper	72	n/a	n/a
4	Residential properties on Mayor Street Upper	70	63 - 65	43 - 52
5	Residential units set behind Mayor Street Upper	68	61 - 63	41 - 48
6	Residential units set behind Mayor Street Upper	66	60 - 61	39 - 45
7	Newly constructed mixed use development on Castleforbes Road (north end)	68	62 - 63	41 - 50
8	Newly constructed mixed use development on Castleforbes Road (middle)	69	62 - 64	43 - 47
9	Newly constructed mixed use development on Castleforbes Road (south end)	67	62 - 62	43 - 44
10	Newly constructed mixed use development on North Wall Avenue (north end)	72	67 - 68	44 - 52
11	Newly constructed office space on North Wall Avenue (south end)	72	n/a	n/a
12	Mixed use developments on Sir John Rogerson's Quay	59	55 - 56	35 - 38

Mitigated construction noise levels during the daytime are predicted to exceed the criterion by up to 2 dB, resulting in impacts of Minor or below at all NSRs.

At night, if slip form is used to construct the RC cores, it is assumed one core will be constructed at a time. Impacts are predicted to vary depending on which of the 3 blocks works are taking place on. Table 10.7 presents the range of predicted noise levels as a result of works carried out on each block. Impacts of up to Major are predicted at all residential NSRs when works are at their closest. As slip form working to construct each RC core is expected to be carried out continuously for several weeks, if this construction method is adopted, further mitigation will be considered, such as the use of local screening placed around the slip form rig. Mitigation to eliminate significant impacts as far as practicable will be agreed with the local authority.

Noise from power floating is predicted to vary at individual receptors depending on which of the three blocks works are taking place on. When power floating is carried out within blocks further from NSRs, predicted levels are close to the night-time criteria, resulting in exceedances which are either small or negligible in magnitude. When power floating is carried out at the closest blocks to NSRs (blocks facing onto Mayor Street Upper and North Wall Avenue), medium magnitude exceedances are predicted at the closest residential NSRs on these roads. No exceedances are predicted at NSRs to the south of the River Liffey, on Sir John Rogerson's Quay (NSR 12).

Medium magnitude exceedances are predicted for the worst-case situation where the receptor is situated at the same height as the power floating. On Mayor Street Upper, residential receptor blocks are up to 9 storeys high whilst on North Wall Avenue, they are up to approximately 15 storeys high. Once the floor level of each project block exceeds that of the surrounding receptors, noise from power floating will be reduced by screening from the floors themselves, which has not been accounted for in the predictions. Just cutting line of sight between receptor and the power float noise source is expected to provide a reduction of approximately 5 dB, with reductions of up to approximately 15 dB expected where there are height difference of several storeys.

As the highest adjacent residential block on (on North Wall Avenue) is approximately 15 storeys high, predicted night-time noise effects at this level are therefore possible for up to 15 nights. In addition, power floating would not occur more than 4 nights in any 7. Therefore, the significance of this impact is considered Minor.

Traffic

Changes in traffic noise on the wider road network as a result of the construction of the Project have been predicted based on traffic data from the traffic and transport team. The results are presented in Table 10.8 below.

Table 10.8: Predicted Changes in Traffic Noise Levels During Construction

Road Link	Predicted Change in Traffic Noise, dB	
	Day	Night
North Wall Avenue - between development access and North Wall Quay	1.8	1.5
North Wall Avenue - between development access and Mayor Street Upper	-	-
North Wall Quay - to west of Castleforbes Road	-	-
North Wall Quay - between Castleforbes Road and North Wall Avenue	-	-
North Wall Quay - to east of North Wall Avenue	0.1	0.1
Castleforbes Road	-	-
Mayor Street Upper	-	-
Note: '-' means the predicted change in noise is equal to 0.0 dB or no Project traffic uses the road link.		

Changes are predicted to be less than 3 dB during the day and night-time and therefore not significant.

Cumulative effects

A number of projects are currently under construction in the area around the Project site, potentially affecting some of the same receptors considered in this assessment. It is expected that the majority of construction work associated with the adjacent developments on Castleforbes Road and North Wall Avenue will have finished by the time this Project would begin construction.

Should construction of the Project be carried out at the same time as the construction of other nearby developments, it could contribute to an increase in cumulative construction noise levels. Where Project construction noise is well above construction noise from other Projects, they will have little effect on cumulative levels. Similarly, where Project construction noise is well below construction noise from other Projects, the Project will have little effect on cumulative levels. However, where construction noise levels from the Project and other projects are similar, cumulative levels may increase by up to 3 dB at nearby NSRS. This is not considered a significant increase.

In addition, basement construction of the City Block 9 development (assessed as part of a separate application) and construction of neighbouring blocks may extend the duration of construction effects at receptors nearby.

10.4.2 Operation

Noise Effects on Existing Receptors

Changes in road traffic noise

Changes in traffic noise on the wider road network as a result of the operation of the Project have been predicted based on traffic data from the traffic and transport team for the 'do min' and 'do something' situations in the year of opening and for a future year of 2037. The results are presented in Table 10.9 below.

Table 10.9: Predicted Changes in Traffic Noise Levels During Operation

Road Link	**Predicted Change in Traffic Noise, dB**			
	2022		**2037**	
	Day	**Night**	**Day**	**Night**
North Wall Avenue - between development access and North Wall Quay	0.4	-	0.3	-
North Wall Avenue - between development access and Mayor Street Upper	0.3	-	0.3	-
North Wall Avenue - to north of Mayor Street Upper	0.3	-	0.2	-
North Wall Quay	-	-	-	-
Castleforbes Road - adjacent to development	-	-	-	-
Castleforbes Road - to north of Mayor Street Upper	-	-	-	-
Mayor Street Upper	0.4	-	0.4	-
Note: '-' means the predicted change in noise is equal to 0.0 dB				

Changes in noise from traffic increases as a result of the Project are predicted to be less than 1 dB on all roads and therefore below the 3 dB criterion and are therefore not considered significant.

Building Services Noise

The various plant areas within the proposed development have the potential to be significant noise sources. Building services noise can cause disturbance principally at noise sensitive receptors located directly adjacent to them, particularly if they operate during the night. Heating, ventilation, air conditioning and other plant associated with the proposed development that is to operate during night-time periods will be attenuated accordingly in the design of the proposed development. To avoid significant noise impacts at adjacent existing receptors, building services plant will be designed to meet the noise standards from NG4 (set out in Table 1.6) at the nearest NSRs.

Cumulative Effects

Cumulative changes in traffic noise on the wider road network have been assessed by considering the change in traffic flow between the baseline year (2020) and the year of opening (2023). The change in the total flow (ie including the proposed Project, committed developments and natural growth in traffic) as well as the change in flow as a result of the Project in isolation have been considered. The results are presented in Table 10.10 below.

Table 10.10: Predicted Changes in Traffic Noise Levels Between the Baseline Year (2020) and the Year of Opening (2023)

Road Link	**Predicted Change in Traffic Noise, dB**			
	Overall increase in traffic between 2019 and 2022 (from all projects)		**Increase in traffic between 2019 and 2022 as a result of the Project**	
	Day	**Night**	**Day**	**Night**
North Wall Avenue - between development access and North Wall Quay	2.7	2.9	1.1	-
North Wall Avenue - between development access and Mayor Street Upper	2.8	3.1	1.1	-
North Wall Avenue - to north of Mayor Street Upper	2.2	2.5	0.8	-
North Wall Quay	0.1	0.2	-	-
Castleforbes Road - adjacent to development	1.9	0.5	-	-
Castleforbes Road - to north of Mayor Street Upper	1.9	0.5	0.1	-
Mayor Street Upper	2.9	2.1	0.9	-
Note: '-' means the predicted change in noise is equal to 0.0 dB				

The overall change in traffic noise, including committed developments and natural growth in traffic, between 2019 and the expected year of opening in 2022, is predicted not to exceed 3 dB on all surrounding roads, except along North Wall Avenue adjacent to the site, where a small (0.1 dB) exceedance is predicted. However, the contribution to these noise increases from the project is predicted to be small; approximately 1 dB or less during the day, with negligible increases expected at night.

10.4.2 Interactions

Noise from the proposed Project has the potential to cause annoyance or disturbance to human populations nearby during construction and operation. There is therefore an interaction with the Population and Human Health chapter. The potential for significant effects on humans as a result of the proposed Project has been assessed in this chapter.

Changes in traffic flow during the construction and operation of the proposed Project may result in significant noise changes at sensitive receptors nearby. There is therefore an interaction with the Traffic and Transport chapter. The potential for significant effects from changes in traffic flow as a result of the proposed Project has been assessed in this chapter.

11.0 MATERIAL ASSETS – WASTE

11.1 Introduction

CS Consulting has prepared this chapter of the EIAR. This chapter of the EIAR comprises an assessment of the likely impact of the proposed development on the waste generated from the development as well as identifying proposed mitigation measures to minimise any impacts.

A site-specific *Outline Construction Management Plan (OCMP)* has been prepared by PJ Hegarty & Sons to deal with waste generation during the construction and demolition phases of the project Appendix 11.A.1. The *OCMP* was prepared in accordance with the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006. The parts of this chapter which relate to construction and demolition waste has been prepared by Michael Dowling. Michael is a Chartered Engineer with over ten years working in the industry.

A separate *Operational Waste Management Plan (OWMP)* has also been prepared for the operational phase of the development and is included as Appendix 11.A.2 of this chapter. This has been prepared by Pete Roger the Country Manager for ERM. These documents will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

11.2 Methodology

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in the *OCMP* and in the *OWMP* provided as in Section 11.11, Appendix 11.A.1 and Appendix 11.A.2.

This Chapter is based on the proposed development, as described in Chapter 3.0 and considers the following aspects:

- Legislative context;
- Demolition phase;
- Construction phase (including site preparation, excavation and levelling); and
- Operational phase.

A desk study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;

- Description of the typical waste materials that will be generated during the demolition, construction and operational phases; and

- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the demolition, construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research, other available research sources and waste collection data from the existing neighbouring development.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 11.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 8 Land, Soils, Geology and Hydrogeology. Chapter 8 of the EIAR also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the proposed development.

11.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

In addition, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document *A Resource Opportunity – Waste Management Policy in Ireland* was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006. The guidance document *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* was also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports including the *EMR Waste Management Plan 2015 – 2021*, BS 5906:2005 *Waste Management in Buildings*, the EPA

National Waste Database Reports 1998 – 2012 and the EPA *National Waste Statistics Web Resource*.

11.3 Receiving Environment (Baseline Situation)

The subject site is located on lands known as "City Block 9" part of North Lotts & Grand Canal Dock SDZ, North Wall Quay, Dublin 1.

In terms of waste management, the receiving environment is largely defined by Dublin City Council (DCC) as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021.

The waste management plan sets the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Plan sets out the strategic targets for waste management in the region and sets specific target for C&D waste of "70% preparing for reuse, recycling and other recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in December 2017 identifies that Ireland's current progress against this C&D waste target is at 68% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive.

In terms of physical waste infrastructure, are a number of waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources.

These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

- Description of the typical waste materials that will be generated during the demolition, construction and operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the demolition, construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research, other available research sources and waste collection data from the existing neighbouring development.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 11.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 8 Land, Soils, Geology and Hydrogeology. Chapter 8 of the EIAR also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the proposed development.

11.4 Characteristics of the Proposed Development

A Full description of the development can be found in Chapter 3. The characteristics of the development that are relevant in terms of waste management are summarised below.

11.4.1 Demolition Phase

The existing site is a brown field site. The site previously contained several large warehouse facilities. These warehouses have been removed. Therefore there will limited demolition required prior to the commencement of the development. Any demolition wastes which are created will typically include concrete and metals.

11.4.2 Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In order to establish the appropriate reuse, recovery and/or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous. Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in

Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed ecyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific CMP.

It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the C&D waste that will be generated from the construction of the proposed development as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

11.4.3 Operational Phase

During the operation phase of the development the majority of waste generated will comprise household waste from the residential units. In addition, there will be food and packaging waste from the restaurants and a very small amount of non-hazardous dry waste from the leisure facilities and commercial units. An Operational Waste Management Plan (OWMP) has been produced for the development and is included within Appendix 11.A.2

In summary, the main types of waste expected from the operation of the building are listed in the table below.

Waste Type	Example Sources
Paper and cardboard	Scrap paper, packaging, newspapers and magazines from residential units and offices
Plastic	Packaging, drinks bottles
Metal (ferrous and non-ferrous)	Drinks cans, food tins
Glass	Drinks bottles
Composite packaging	Food and drinks packaging
Organics	Food waste – from the residential units and restaurants
Cooking oil	From the residential units and restaurants
Textiles	Discarded clothes from the households
Batteries (hazardous and non-hazardous)	Household and office equipment
Waste Electrical and Electronic Equipment (WEEE)	Computers and other electrical equipment from households and commercials

Chemicals	Pest control, detergents used by building maintenance company

Table 11.1: Waste Types**.**

11.5 Potential Impacts of the Proposed Development

This section details the potential waste effects associated with the proposed development.

11.5.1 Construction Phase

The proposed development will generate a range of non-hazardous and hazardous waste materials during demolition, excavation and construction. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will be identified across the site. These areas will need to be easily accessible to waste collection vehicles.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

Wastes arising will need to be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials and acceptance of waste from the proposed development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. Where possible, waste will be segregated into reusable, recyclable and recoverable materials. The majority of demolition and construction materials are either recyclable or recoverable.

Recovery and recycling of C&D waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

There is a quantity of soil and stone which will need to be excavated to facilitate the proposed development. It is anticipated that there will be limited or no opportunities for reuse of the excavated material on site and so it will require removal from site for offsite reuse, recovery and/or disposal. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

The potential effect of construction waste generated from the proposed development is considered to be short-term, not significant and neutral.

11.5.2 Operational Phase

During the operational phase it has been estimated that the following volumes of waste will be generated at the development.

Waste Type	**Waste Generation**		
	Per Person	For SHD Development	
Units	kg/year (1)	tonnes/year	m3/year (2)
Mixed Residual Waste (MRW)	143	362	1646
Mixed Dry Recyclables (MDR)	53	135	748
Organic Waste (OW)	24	60	299

Table 11.2: Residential Waste Volume Estimates

Notes

1) Assuming averages rates of waste generation for Irish households based on EPA waste statistics - http://www.epa.ie/nationalwastestatistics/municipal/
2) Based on un-compacted densities – WRAP: *UK conversion factors for waste.*

Waste Type	**Waste Generation**		
	Per Person	For SHD Development	
Units	kg/year (1)	tonnes/year	m3/year (2)
Mixed Residual Waste (MRW)	0.75	110	521
Mixed Dry Recyclables (MDR)	0.25	37	174
Organic Waste (OW)	0.28	41	204

Table 11.3: Restaurant Waste Volume Estimates

Notes

1) Taken from WRAP data for restaurant waste - http://www.wrap.org.uk/sites/files/wrap/Restaurants.pdf
2) Assuming 25% of non-food waste can be recycled (similar proportion as for household waste)
3) Based on un-compacted densities – SEPA: *UK Conversion factors for waste*

The potential effect of operational waste generated from the proposed development is considered to be long-term, not significant and neutral.

11.6 Mitigation Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

11.6.1 Construction Phase

As previously stated, a project specific CMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG and is included as Appendix 11.A.1. Adherence to the high-level strategy presented in this CMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement of demolition, the contractor(s) will be required to refine/update the CMP or submit an addendum to CMP to DCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

CS Consulting have estimated that c. 600,000 tonnes of soils and stones will be generated from the excavations required to facilitate basement completion and construction of new foundations, the installation of underground services and attenuation tank. It is anticipated that none will be reused on site and the majority of this material will require removal from site for offsite reuse, recovery, recycling and/or disposal. The contractor(s) will endeavour to ensure that material is reused or recovered off-site insofar as is reasonably practicable or disposed of at authorized facility.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to ‘design out waste’; and

- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:

  o Concrete rubble (including ceramics, tiles and bricks);

  o Plasterboard;

  o Metals;

  o Glass; and

  o Timber.

- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;

- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;

- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);

- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;

- All construction staff will be provided with training regarding the waste management procedures;

- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;

- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and

- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that article 27 will be used.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the EMR Waste Management Plan (2015 - 2021). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

11.6.2 Operational Phase

Waste will be managed in accordance with all legal requirements, and in accordance with the waste hierarchy (see figure 11.1 below). By ensuring that different wastes are appropriately segregated, the aim will be to maximise the potential for reuse and recycling of materials and hence to minimise the amount of waste that needs to be disposed and, specifically, the amount that needs to be landfilled.

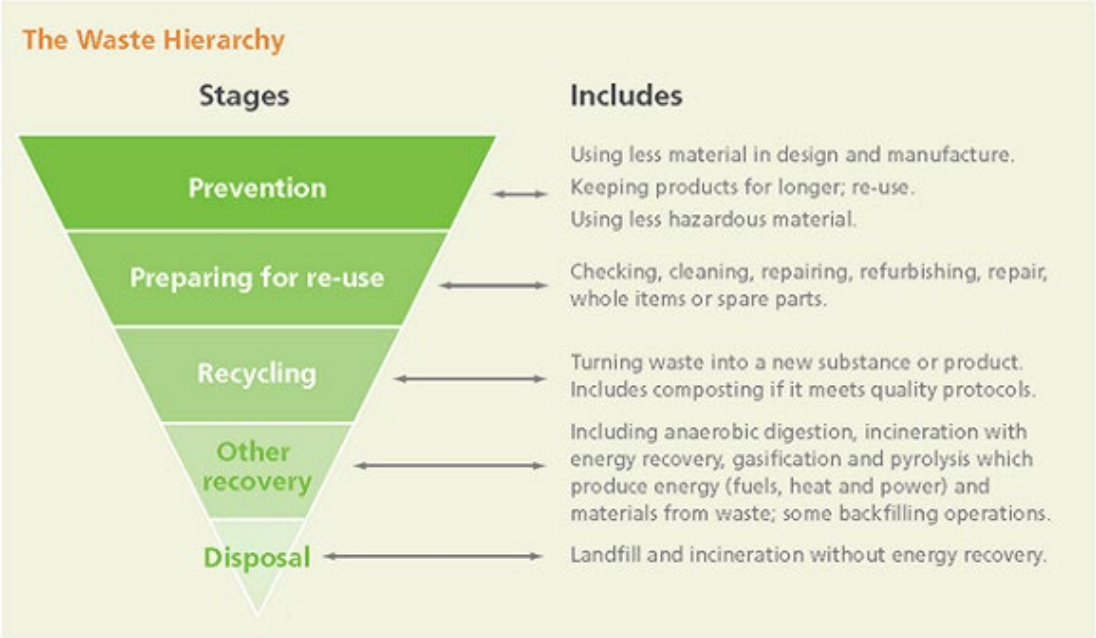


Figure 11.1: Waste Hierarchy. (Source: Defra, Guidance on applying the Waste Hierarchy, June 2011.)

It is expected that:

- Residents will take their waste to a centralised waste storage area on the basement floor – one store per block so that residents don't need to carry waste too far;
- Restaurants – similarly; and
- Office units - similarly

The service management company will be responsible for managing the waste store(s) and arranging for the collection/treatment/disposal of the wastes by a licensed contractor.

11.7 Predicted Impact of the Proposed Development

The implementation of the mitigation measures outlined in Section 16.6 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the demolition, excavation and construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

11.7.1 Construction Phase

A carefully planned approach to waste management as set out in Section 11.6.1, 11.6.2 and adherence to the *CMP* during the construction and demolition phase will ensure that the effect on the environment will be short-term, imperceptible and neutral.

11.7.2 Operational Phase

A carefully planned approach to waste management as set out in Section 11.6.2 and adherence to the *OWMP* during the construction and demolition phase will ensure that the effect on the environment will be short-term, imperceptible and neutral.

11.7.3 Do-Nothing Scenario

If the proposed development was not to go ahead there would be no demolition, excavation or construction or operational waste generated at this site. There will would be a neutral effect on the environment.

11.8 Monitoring Measures

The management of waste during the construction phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the *CMP* including maintenance of waste documentation.

The management of waste during the operational phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

11.8.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP specifies the need for a waste manager to be appointed who will have

responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

11.8.2 Operational Phase

The building's facilities management team will be responsible for monitoring compliance with various aspects of the OWMP. This will include the following:

- Checking the waste deposited in the bins to make sure it complies with the waste segregation requirements. If necessary they will advise residents and occupants of units in a particular block about which wastes can be placed in each of the four main types of container;

- Checking on the permit of the waste collection contractor prior to contract award and periodically throughout the contract;

- Checking on the suitability of the vehicle and security of the waste as the waste is collected by the waste transporter;

- Ensuring that all wastes are being taken to appropriately licensed waste processing/disposal facilities; and

- Periodically checking the facilities to which the building's waste is taken to make sure it is being managed appropriately and as much as possible is being recycled.

In addition, records will be kept of the volumes of waste produced from operation of the building together with data regarding the proportion of waste that is recycled and disposed (landfilled and incinerated). Trends in these data will be analysed and the building's occupants will be advised accordingly – for example by means of notices in residents' communal areas. The aim will be for the building as a whole to meet the targets set by Dublin City Council to recycle at least 50% of all the waste generated. In addition the target will be to reduce year on year the amount of waste generated (on a per capita basis) as well as increasing the percentage of waste recycled.

In order to help achieve these target, the facilities management team will monitor any developments in local waste management services – specifically the introduction of any new recycling schemes. The four-bin system of waste collection will be periodically reviewed and revised if appropriate (eg through the collection of additional materials and/or introduction of a different segregation system).

11.9 Interactions

Adherence to the mitigation measures outlined in Section 11.6 will ensure that there are no significant impacts on resource or waste management from the proposed development. The management of waste during the construction phase in accordance with the *CMP* and during the operational phase in accordance with the *OWMP* will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy.

11.9.1 Land and Soils

As noted previously the sites basement excavation is been completed under an earlier approved planning application.

11.9.2 Traffic

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the development. The increase in vehicle movements as a result of waste generated during the construction phase will be temporary in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase and has been addressed in Chapter 12 Material Assets – Traffic.

Provided the mitigation measures detailed in Chapter 12 and the requirements of the OWMP are adhered to, the effects should be short to long-term, slightly adverse. 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, traffic signalling redesign, or changes in general traffic flow restrictions) have the potential to improve the operational efficiency generally, as well as to reduce vehicle trips to/from the subject development.

11.9.3 Population and Human Health

The potential impacts on human beings in relation to the generation of waste during the construction and operational phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin. A carefully planned approach to waste management and adherence to the project specific C&DWMP and OWMP, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects will be long-term, imperceptible and neutral.

11.10 References

- *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006.
- EPA *National Waste Database Reports 1998 – 2012 and the EPA National Waste Statistics Web Resource.*
- EU legislation is the *Waste Framework Directive* (2008/98/EC).
- *Waste Management Act 1996.*
- *A Resource Opportunity – Waste Management Policy in Ireland.*
- *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* was also consulted in the preparation of this assessment.
- *EMR Waste Management Plan 2015 – 2021.*
- BS 5906:2005 *Waste Management in Buildings.*
- *North Lotts & Grand Canal Dock SDZ Planning Scheme, 2014.*
- *Waste Management Regulations 2007*.

APPENDIX 11.A.1 - ***OUTLINE CONSTRUCTION MANAGEMENT PLAN – WATERFRONT SOUTH CENTRAL – RESIDENTIAL DEVELOPMENT***

OUTLINE CONSTRUCTION MANAGEMENT PLAN

FOR

WATERFRONT SOUTH CENTRAL RESIDENTIAL DEVELOPMENT,

NORTH WALL QUAY, DUBLIN 1

DEVELOPER:	RONAN GROUP REAL ESTATE
APPLICANT:	WATERSIDE BLOCK 9 DEVELOPMENTS LTD.
ARCHITECTS:	HENRY J LYONS
STRUCTURAL ENGINEERS:	CS CONSULTING GROUP
SERVICES ENGINEERS:	AXIS CONSULTING ENGINEERS
PREPARED BY:	PJ HEGARTY & SONS
DATE:	JANUARY 2021
ISSUED FOR:	PLANNING APPLICATION

1. Introduction

Waterside Block 9 Developments Limited propose a Strategic Housing Development (SHD) application to An Bord Pleanála. The proposed scheme is situated on part of the lands identified in the North Lotts & Grand Canal Dock Planning Scheme 2014 as 'City Block 9'.

The overall landholding of 1.95 hectares enjoys two permissions for development of a residential and a commercial scheme, respectively, together with a third combining the previously permitted basements. This submission reconsiders the site's potential in light of the changing economic circumstances that pertained in 2014, but also changing town planning circumstances including the National Framework and the Ministerial Guidelines on apartments and heights, respectively.

This construction management plan refers to the application for the residential element only - a complementary commercial development proposed for the balance of the lands is shown for illustrative purposes only.

An Architectural Design Report and drawings are included with the application to fully illustrate the detailed design proposals for Waterfront South Central.

This document describes a stand-alone SHD proposal. The SHD scheme represents a component of an overall masterplan proposal. Subject to a separate application, a commercial scheme sits on the balance of the lands. The overall masterplan is shown in this document for illustrative purposes only.

The SHD proposal consists of three residential blocks; Block A (13 floors), Block B (10-40 floors) & Block C (10-44 floors). A series of public, open spaces at ground floor creates connectivity of space and people to the surrounding street network. Streets at ground floor are activated with public and resident-only amenities.

1005 apartments are proposed under this SHD application. There is a mix of one, two and three bed apartments. 100 Part V apartments have been included between Blocks A & B. An extensive series of roof terraces have been provided across the scheme. The residential terraces offer a variety of rooftop experiences across all three blocks.

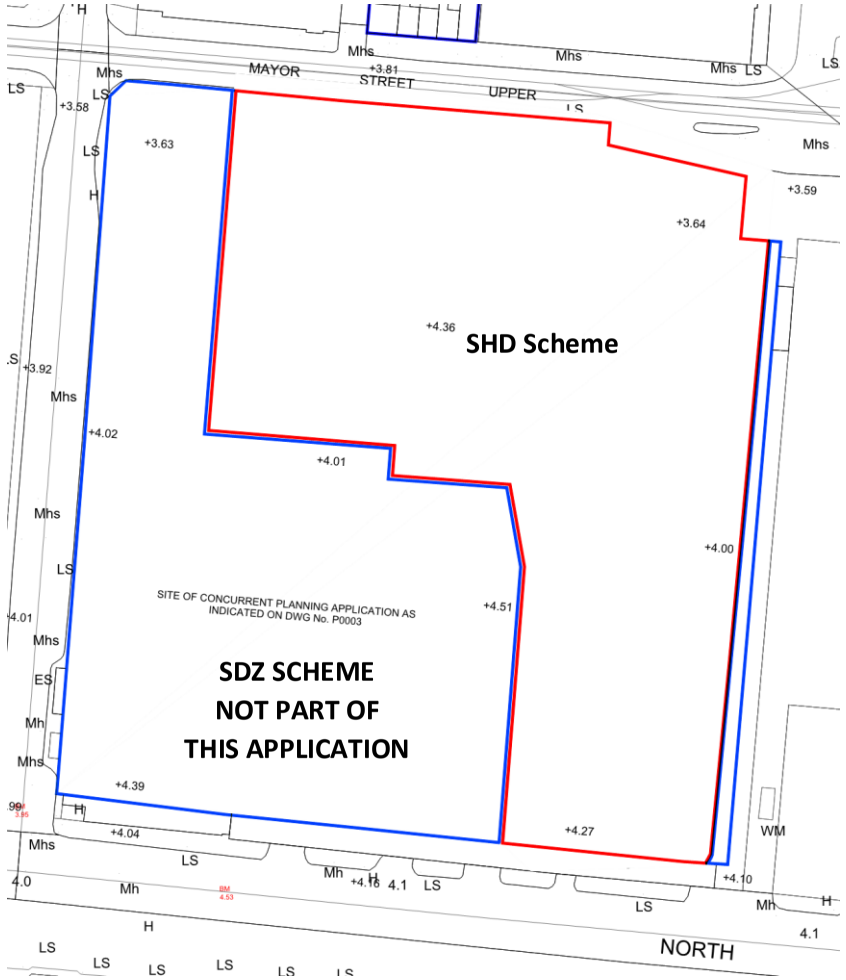
This Construction Management Plan is intended to set out the methodology and procedures that will be put into operation on the Waterfront South Central SHD Project for the duration of construction.

The Construction Management Plan will provide Dublin City Council and An Bord Pleanála with an outline proposal of how construction will be managed to comply with Local Authority and statutory requirements and will be updated post award of planning to reflect specific planning conditions which may be applied to the development.

The start date for the project is dependent on receipt of planning permission but is likely to be in Q4 2021. Construction is expected to require approximately 4 years from Q4 2021 to Q4 2025.

The combined City Block 9 basement to a depth of -9.70m is permitted by Dublin City Council Reg. Ref. DSDZ3042/19. The basement relates only to the SHD scheme and excludes the adjacent basement associated the commercial scheme. Two separate basements are proposed. The 'Commercial' basement has been excluded as part of this application. Basement works will commence under this planning permission in advance of the main construction works described in this application. Issues to be addressed during construction include:

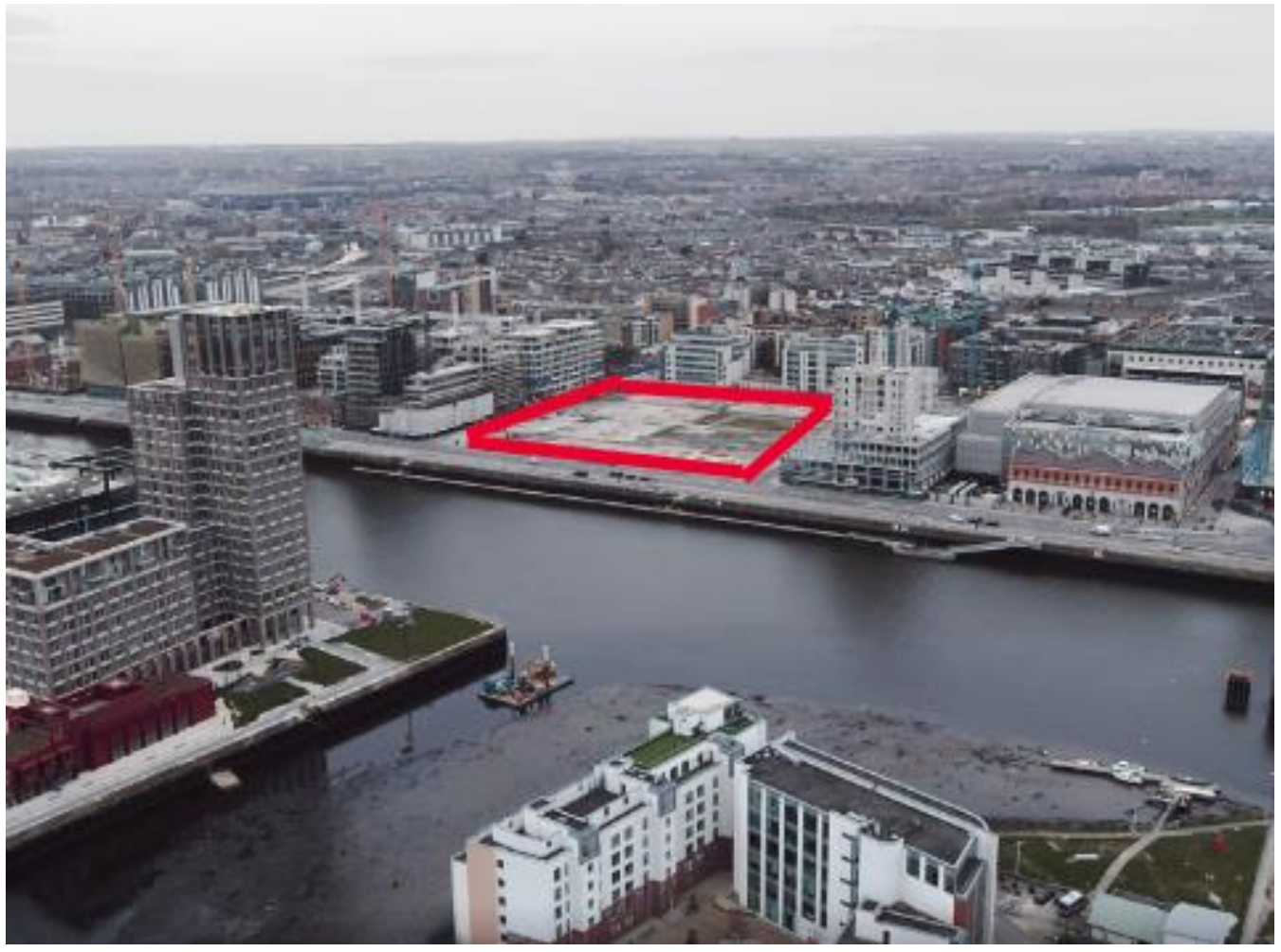
- Site Setup
- Liaison with Third Parties
- Safety Management
- Traffic Management
- Environmental Management
- Construction methodology
- Public Relations



2. Site Location

The site is located in City Block 9 of the Dublin Docklands Strategic Development Zone and lies within the administrative area of Dublin City Council. The site has previously been cleared and securely hoarded off in preparation for basement construction works granted under Dublin City Council Reg. Ref. DSDZ3042/19.

The site is bounded by North Wall Quay to the South, North Wall Avenue to the east, Mayor Street Upper to the North and Castleforbes Road to the west.



Site Location

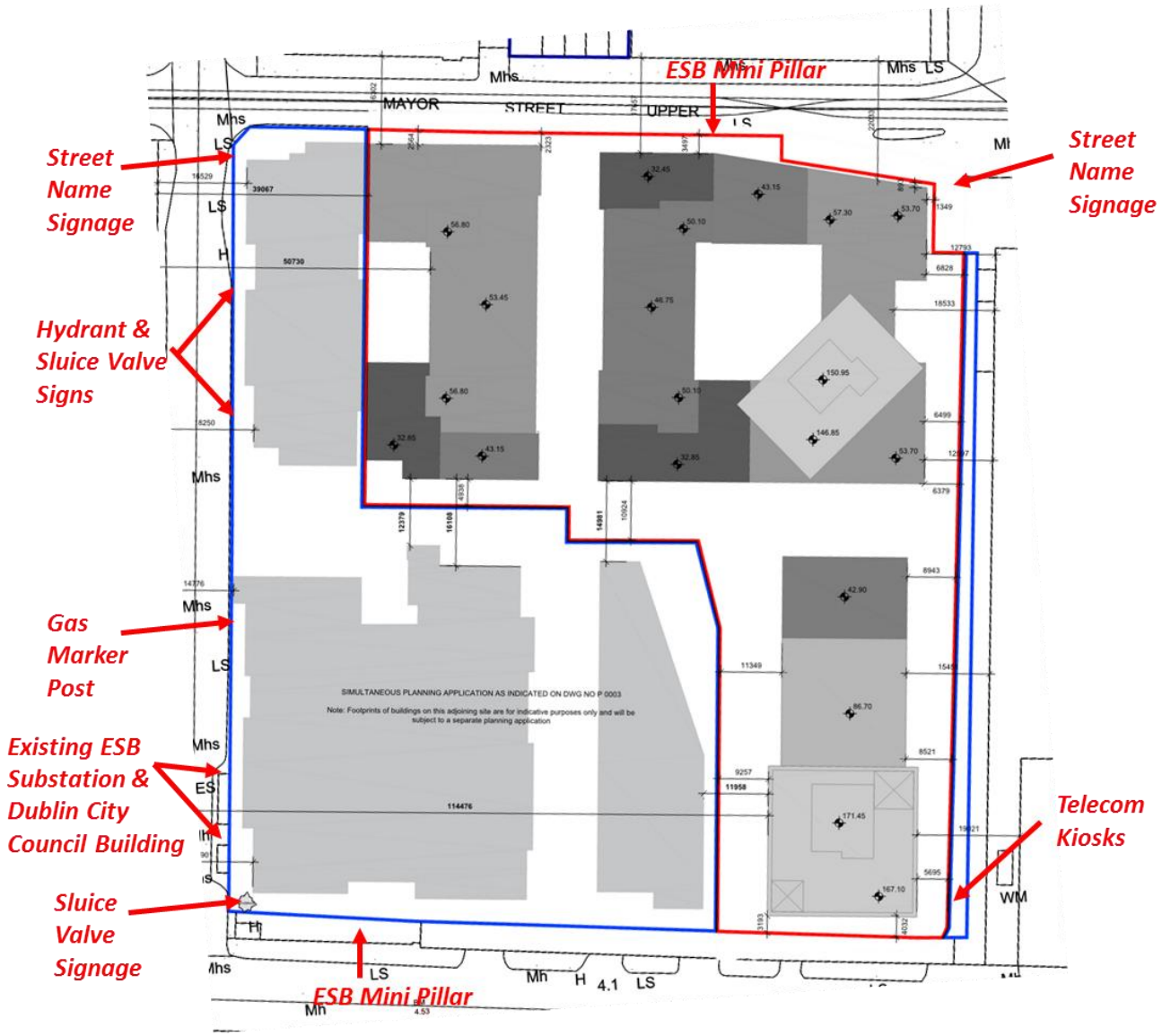
3. Site Setup

3.1 Site Boundary

The first works required on site will be to ensure the site boundary is secure from trespass. The site is currently enclosed with a timber hoarding on all sides with sections of blockwork walls mixed in with the existing timber hoarding at the northwest and west boundaries. This secure line will be maintained at all times during construction. In the event of any of the hoarding having to move outwards to facilitate construction, this will be done with the agreement of Dublin City Council including obtaining hoarding licenses as required. If this encroaches on minimum footpath widths, we will erect covered walkways or diversions to opposite footpaths will be put in place as required by Dublin City Council.

The existing sections of blockwork boundary walls at the northwest and west boundaries will be demolished as part of the works. They will be replaced with secure timber hoarding to match the existing.

There are also ESB mini pillars, telecom and Dublin City Council traffic light kiosks and signage including hydrant and sluice valve locator signage and street names on or near the existing block walls and hoardings. Access to the mini pillars and kiosks will be maintained while the signs will be displayed at all times. There are 2 existing buildings at the southwest corner of the site – an ESB substation and Dublin City Council drainage system building. These will also be maintained during construction.



Services & Signage on or Near Hoarding to be maintained

Various Kiosks & Signage on Existing Site Boundary to be Maintained During Construction Works

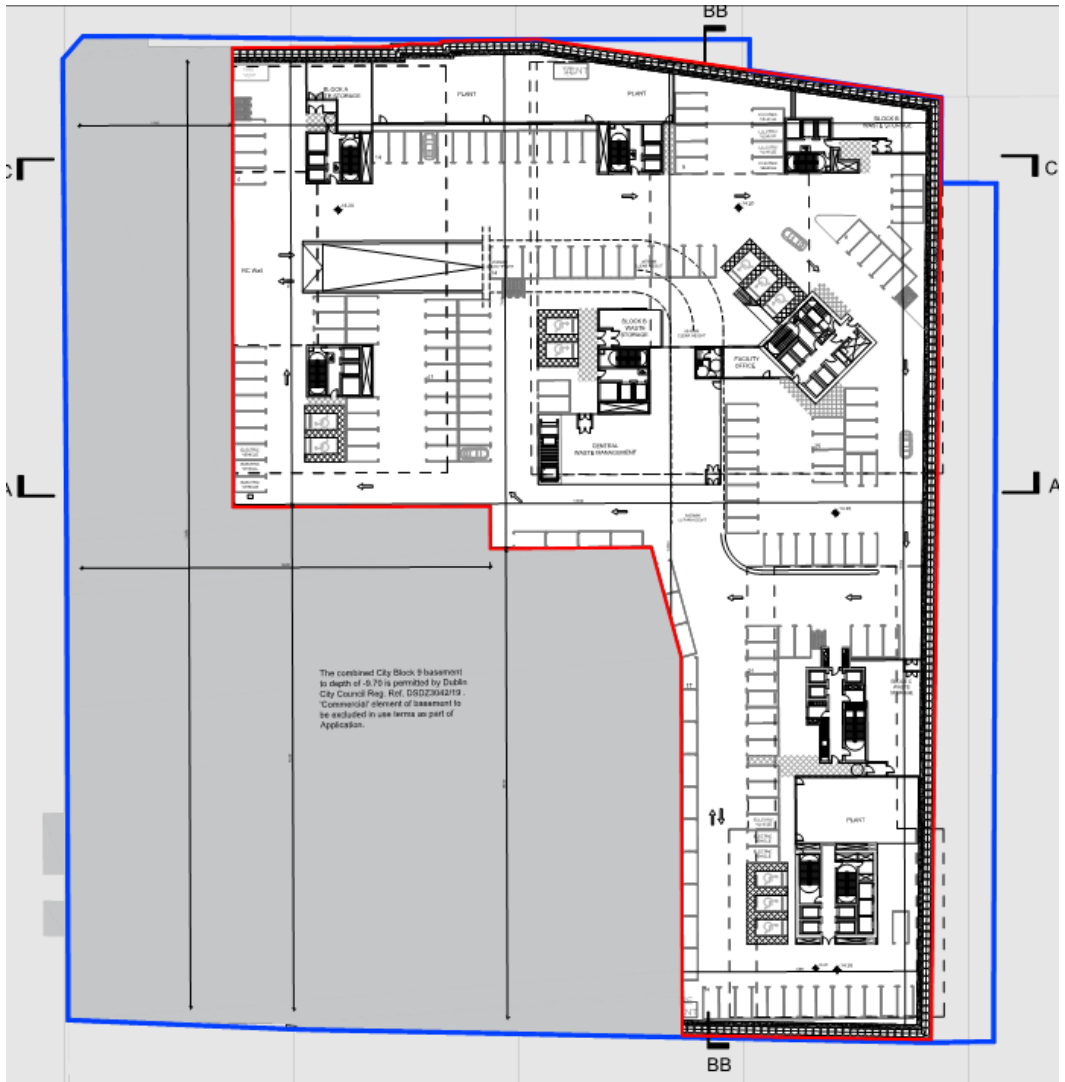
Existing ESB Substation and Dublin City Council Drainage Building on Site Boundary to be Maintained

3.2 Site Compound

The compound will consist of:

- Offices
- Meeting Rooms
- Toilet / Shower Rooms
- Drying Rooms
- Canteens
- Storage Containers

The entire footprint of the site will be excavated to form a basement so that the offices will be required to be partially located on public footpath. This will require buy out of public footpath and parking space to facilitate office installations. We have surveyed the footpath widths around the site and would suggest that the northeast corner would be best suited for positioning of offices due to generous footpaths widths at this location that will facilitate setup of the offices and provision of a covered walkway between the offices and the road edge. Alternative locations can be considered and final positioning of these offices will be done with full approval and agreement of Dublin City Council. We will also ensure that the nearby overhead electrical cables powering the LUAS line are not interfered with.



Basement Footprint to full Extent of Site – SHD site Highlighted Above

The first phase of the project will be the installation of secant piling of the basement perimeter and basement excavation during which time we will be able to locate offices and welfare facilities inside the site. As the last of the excavation approaches, we will then setup offices outside the secant piles and partially on the public footpath in agreement with Dublin City Council as previously described.

As the project progresses and key trades such as façade, mechanical and electrical subcontractors commence on site, further offices and welfare facilities will be placed in this area as the numbers on site increase. The full office setup will only be in place when these trades commence on site. Stacking of offices will be required.

All cabins will be steel securi-type with steel lockable shutters to windows and steel lockable door. All cabins will come to site in good condition and will be maintained in good order throughout the project. Double stacking of cabins will be required and safe stairs and walkways will be provided to the upper levels of offices.

Concrete footpaths will be poured to form walkways beside the offices and provide a base for the steel access stairs and gantries to the upper levels of stacked offices.

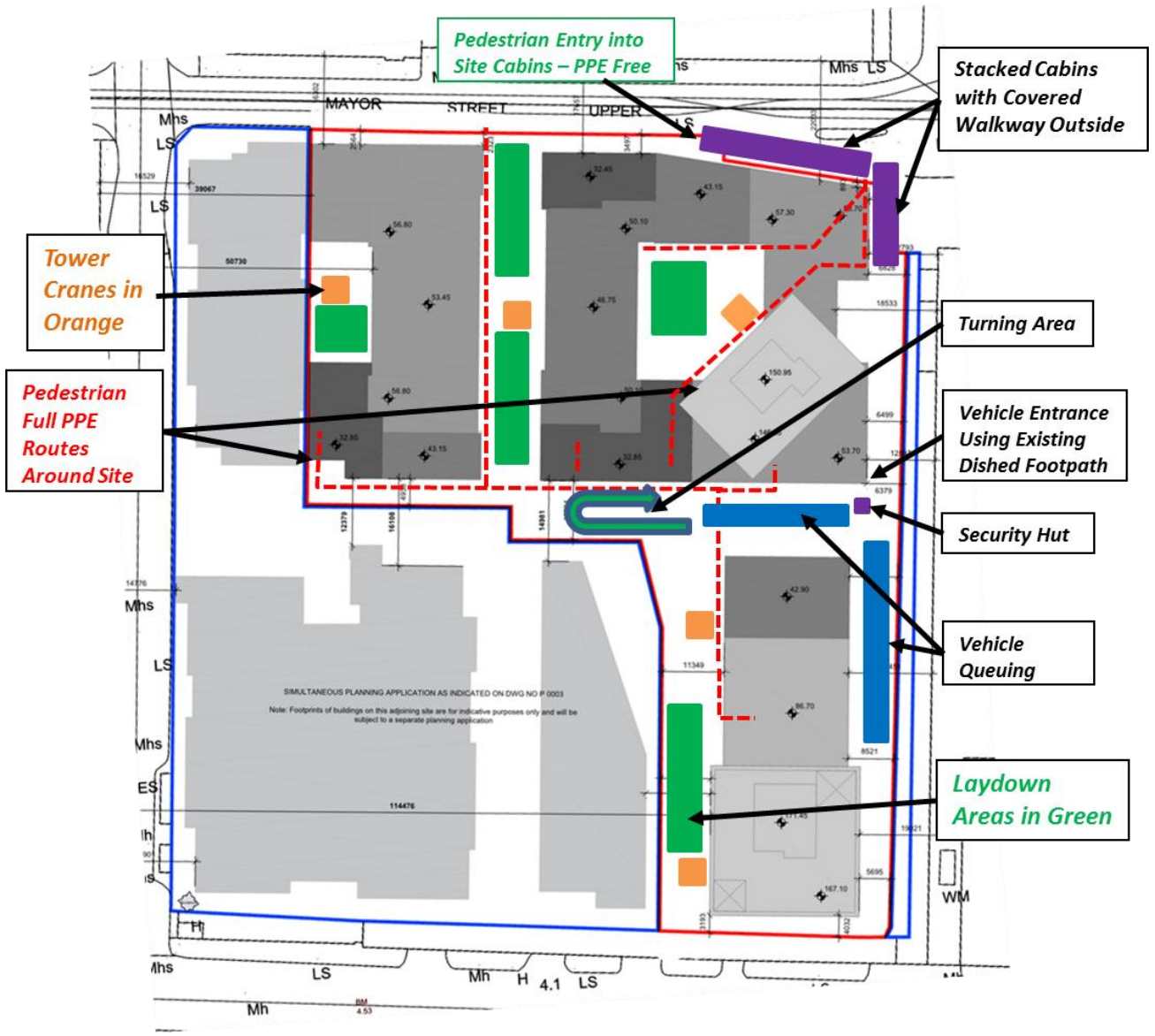
Workers will be able to enter the compound via a security turnstile and will change in to their personal protective equipment / work clothing in the drying rooms before enter the site.

Designated pedestrian routes around the construction site will be set up using fencing and signage to separate pedestrian routes from vehicle routes.

Clearly designated areas will be set up for storage and laydown of materials, waste management skip areas and truck queuing areas.

The site logistics shown here illustrates the proposed site compound location and layout.

Covered Walkway at RGRE Spencer Place South Construction Site – Same Robust and Well Maintained Type of Walkway & Hoarding to be used on this Project



3.3 Car Parking

Car parking will initially be available on site when installing piling to the basement perimeter and beginning excavation. Once the basement construction progresses, parking space will no longer be available within the site.

On street pay parking and local multi-storey car parking will be available to personnel. The use of Public Transport will be encouraged with easy access to the Luas directly north of the site – "The Point" being the nearest stop while Dublin Bike Bays are located directly south of the site beside the river on North Wall Quay. Workers will be allowed to store their own bikes within the site compound.

3.4 Site Power, Water & Drainage

A power supply from ESB Networks to power both the compound and the construction site will be applied for. The size of supply will be calculated to ensure it is sufficient to power both the site compound office and welfare facilities and construction site which will include tower cranes, task lighting, power tools and charging stations for plant such as electric hoists.

In the event of any delays securing the required power supply to power offices and cranes, generators may be required. Diesel generators will have sound enclosures and will be regularly serviced to prevent noise and odour pollution and setup in a spill tray to prevent any spillage contaminating the ground. Temporary site lighting will be installed to provide safe and well-lighted walkways around the site compound and task lighting to the construction site.

Water and drainage will be required to service the site toilet and canteen facilities. We will carry out a site survey to identify the locations of the water and foul drainage connections to the warehousing units that previously operated on the site. We will apply to Irish Water for connections to the water main and foul drain, ideally utilising the previous connection points if possible to avoid excavation of public footpaths or roads.

3.5 Site Access

Pedestrian access will be through the site office as shown over. The vehicle entrance will be on North Wall Avenue.

There is also a construction entrance to an adjacent construction project at the Junction of North Wall Avenue and Mayor Street Upper. The main site entrance on North Wall Avenue as shown on the Compound and Logistics Plan over will coincide with the future basement ramp access but will be wide enough to allow vehicles drive onto the podium slab when it is completed. The site entrance can be accessed from both North Wall Quay to the South and from Sherriff Street Upper to the North as shown over.

Existing Dished Footpath on North Wall Avenue Proposed for Use as Main Vehicle Entrance

Proposed Site Entrance and Access Routes

The vehicle gate at the entrance will be recessed from the road line so vehicles can turn into the site entrance before stopping at the entrance gate for security personnel to take their details. This will ensure the vehicle will not protrude on to public roads causing traffic disruption.

Days of large vehicle activity, such as concrete pours will be managed to prevent disruption to the public. Existing car parking on North Wall Avenue may be purchased from Dublin City Council to facilitate queuing at this location. Where possible, delivery trucks will be brought into site and queued internally. A detailed traffic management plan will be put in place to prevent any disruption to public traffic. Wheel washing will be provided at the site entrance.

As the project proceeds and the basement access ramp is constructed, the access to this ramp on North Wall Avenue will align with the main Site Entrance. Small rigid type trucks will be able to access the basement to make deliveries – trucks will immediately enter the basement to avoid any queuing on the street.

All personnel will undergo a site safety induction upon their arrival on site. These will be held on Monday, Wednesday and Fridays at 08:30. The induction will be by appointment only so site management will know in advance who will be attending. Once the induction is complete, workers will be issued with a swipe card that will allow them to access the site via turnstile at the site entrance. First time visitors to site will sign in with security who will direct the visitor to the site office.

All workers will also be issued with a helmet sticker identifying that they have been inducted on this site and a name sticker will be required to be displayed on safety helmets so staff or security can identify workers by name.

The pedestrian route into site will be PPE free and will be fenced off from the work area. Workers will be able to change in the drying rooms provided in the site compound and can access the site wearing full PPE via designated pedestrian routes as shown below.

3.6 Site Security

The site will be enclosed by a secure timber hoarding as previously outlined. The existing hoarding will be maintained and upgraded as required to enhance the visual amenity of the project.

Hoarding at RGRE Spencer Place South Construction Site – Similar Hoarding will secure this Site.

The pedestrian entrance into the site compound will be controlled by swipe card and turnstile. The site reception will be located adjacent to this turnstile so persons entering site for the first time to attend induction can be brought into the site office by reception.

Security Turnstile at RGRE Spencer Place South

Vehicle Entrance at RGRE Spencer Place South

There will be a security hut located at the vehicle entrance. Security will record vehicles entering and leaving site. A gateman will monitor the entrance to ensure only authorised vehicles and personnel may enter.

Swipe cards will only be issued following safety induction as previously outlined. Issue of cards will be recorded at the induction and the swipe reader will record all swipes on computer so the access system will record who accesses or leaves the site and when. It will also serve as a database for roll call in the event of emergency and evacuation of the site.

The vehicle entrance will be manned by security during site opening hours and monitored PTZ CCTV will provide security during closing hours. Statutory requirements regarding CCTV will be strictly adhered to.

An intruder alarm system will be set up to secure offices and a series of motion sensors will be set up along the inside of the site hoarding to detect trespass. These motion sensors will be connected to the CCTV monitoring control centre so security personnel will be able to direct the PTZ cameras at the location where the motion sensor has been activated and An Garda and the Project manager can both be contacted.

Security will be monitored on an ongoing basis and will be improved if required to both prevent trespass and to ensure the safety of the public passing by the site. The Main Contractor insurance company will audit the site to ensure site security systems are in place and functioning as required.

A full time security presence may be required as the project finishes and fit-out commences. This will be decided when the project reaches this stage.

3.7 Working Hours

The working hours will be dictated by the planning conditions and are expected to be as follows:

Days	Start Time	Finish Time
Monday –Friday	8:00	18:00
Saturday	8:00	14:00
Sunday	No work permitted	No work permitted
Bank or Public Holidays	No work permitted	No work permitted

We shall wherever possible work within the hours permitted by the Planning Decision for the development. It will be necessary to work outside these hours at times, for example for early morning concrete pours and late evening concrete finishing. Dublin City Council will be consulted about out of hours working and local residents and businesses will be informed of any out of hours works required. A planning derogation will be applied for to Dublin City Council when out of hours working is required. The terms and conditions of the planning derogation will be strictly adhered to at all times.

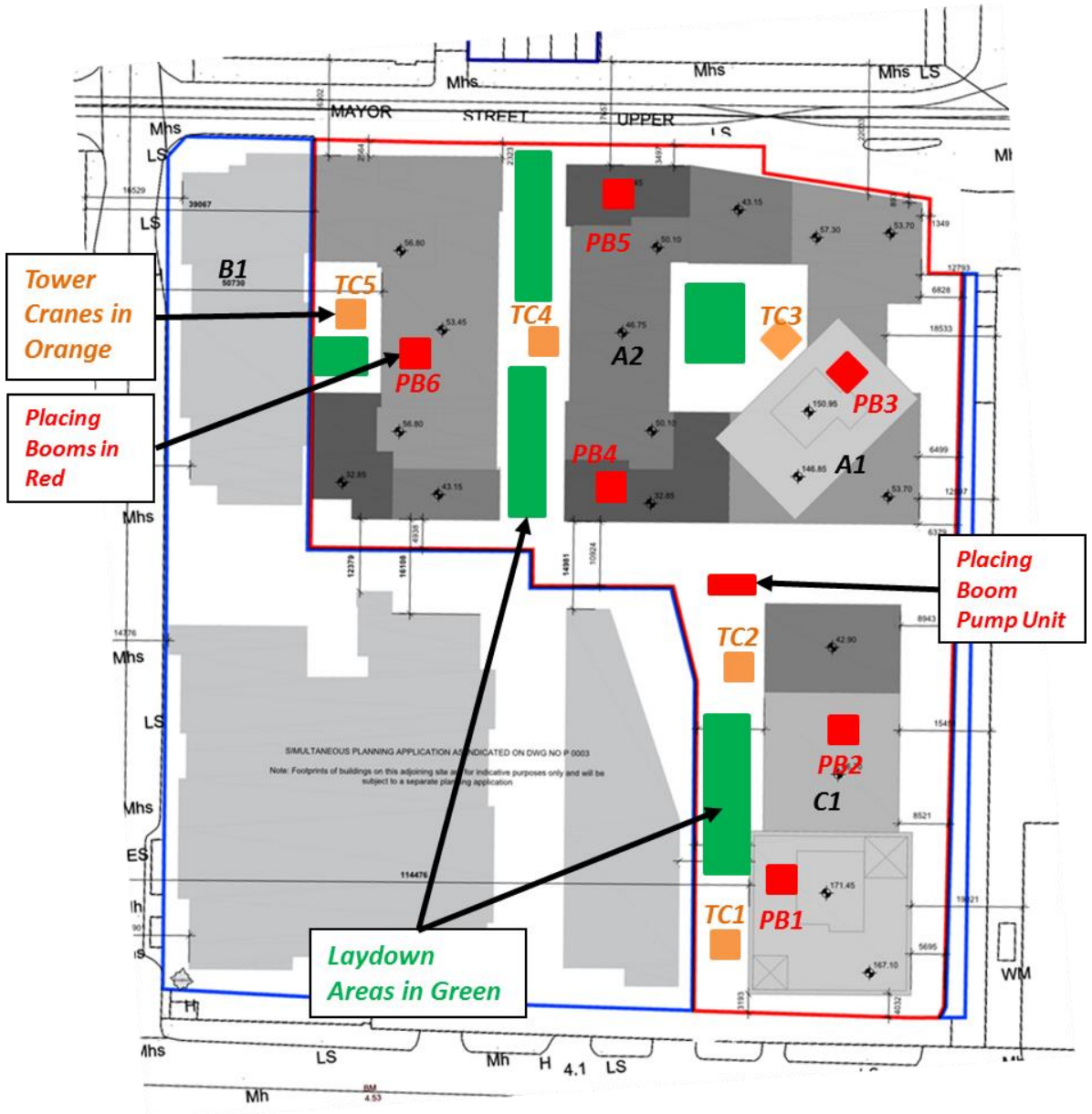
3.8 Site Logistics

The traffic and pedestrian routes have already been outlined. The new buildings will be a concrete frame construction which will require tower cranes and concrete placing booms to service the concrete crews. The tower cranes will then also service the envelope and fit-out lifting requirements. 5 tower cranes and six placing booms will be required as shown over. These will be complemented with teleporters, mobiles cranes and mobile concrete pumps as required. This is detailed further under the construction methodology section.

Trucks will be off loaded from designated laydown areas – each building will have a designated laydown area where the delivery truck will park up as shown on the logistics plan below. Propping to the basement slabs will be installed to ensure the trucks can travel safely on the podium level slabs.

The concrete pump unit feeding the placing booms will be located near the site entrance where concrete trucks can queue and back up to discharge.

If any plant setups are required outside the site, a road lane closure may be required. The road closure license will be obtained from Dublin City Council if this is required and an agreed traffic management plan will be implemented as required. Any traffic management measures will be designed by qualified personnel in accordance with Chapter 8 of the Traffic Signs Manual and implemented by Signing, Lighting & Guarding (SLG) trained operatives.



Tower Crane & Placing Boom Locations & Typical Logistics for a Concrete Pour

The logistics plan will presented to workers during the site induction. Refresher training in the logistics plan will be presented in toolbox talks.

4. Liaison with Third Parties

The PJ Hegarty Contract Manager will be appointed as Liaison Officer to deal with third parties. As Contract Manager, he will be in a position to immediately deal with any issues that may arise. Third parties may include:

- Members of the public
- Dublin City Council
- Health & Safety Authority
- An Garda Siochána
- Ambulance Service
- Fire Brigade

In the unlikely event that the public complain about nuisance caused by the works, the Contract Manager will be responsible for immediately dealing with this complaint and ensuring that it is addressed to the satisfaction of the person in question. A contact number of the Liaison Officer will be exhibited on all construction site notice boards and on any other information or correspondence, which may be distributed via leaflet drop or direct contact with local resident representatives from time to time. A system of recording all queries and complaints will be maintained.

We will ensure we operate as a 'good neighbour' throughout the Construction Period. The intention is for the project to add value to the neighbourhood, and will not detract nor be a nuisance. We will carry out the works in a manner which are sensitive to the adjoining owners and the wider local community. We will operate to an equivalent standard as the UK *"Considerate Constructors Scheme"* including their code of practice.

Interaction with Dublin City Council will be required and will continue in line with existing procedures operated on our other Dublin City Centre sites. Planning conditions must be adhered to and clear lines of communication will be maintained with the relevant persons in the Local Authority to ensure all planning conditions are complied with on an ongoing basis.

Other interaction with Dublin City Council may be required for obtaining hoarding licenses if we are required to move the hoarding line or place offices onto footpaths, road opening / road closure licenses in case of service tie-ins outside the site boundary or apply for planning derogations for out of hours working.

We will also ensure, in conjunction with the Client appointed Assigned Certifier, that a commencement notice will be submitted with all required information to Building Control. This will be uploaded to the Building Control Management System ahead of the project commencing. We will comply fully with the Building Control (Amendment) Regulations for the duration of the project including submittal of documentation upon completion to ensure certificate of compliance is placed on the register before the buildings come into use.

We will submit Approved Form AF2 to the Health & Safety Authority to ensure they are aware of the project in accordance with Regulation 22 - Schedule 3 of the Safety, Health and Welfare at Work (Construction) Regulations, 2013.

The emergency services will be made aware of the site location and the access and egress points both for both the construction area and the site compound so they are familiar with the site if they are ever required in the event of an emergency.

5. Safety Management

Our Safe-T-Cert accredited safety management system will be implemented on site. The Project Supervisor Design Stage and Project Supervisor Construction Stage will liaise with each other to ensure the relevant documentation is in place and that the safety management system to be implemented on site is fully agreed.

The Project Supervisor Construction Stage will then work closely with our Site Management Team including the Site Safety Officer to ensure safety is given the number one priority on site.

A safety induction will be given to all personnel and the site induction register will include details of safe pass and CSCS card. Tracking of expiry dates will ensure training is kept up to date and valid while workers are on site.

Method statements with comprehensive risk assessments will be prepared 2 weeks in advance of commencing a task on site to allow time for review and revision so that the method statement is approved 1 week in advance of commencement. This will allow time to organise any specific requirements or safety resources to carry out the work safely.

Site safety stations with the daily whiteboard are setup to provide a location for sub-contractor foremen to gather each morning to complete their Safe Plan of Action and obtain their work permits and outline to each other where on the site they are working. A spill kit, fire extinguishers and safety glasses lens cleaning kit are located at these stations.

Site Safety Station

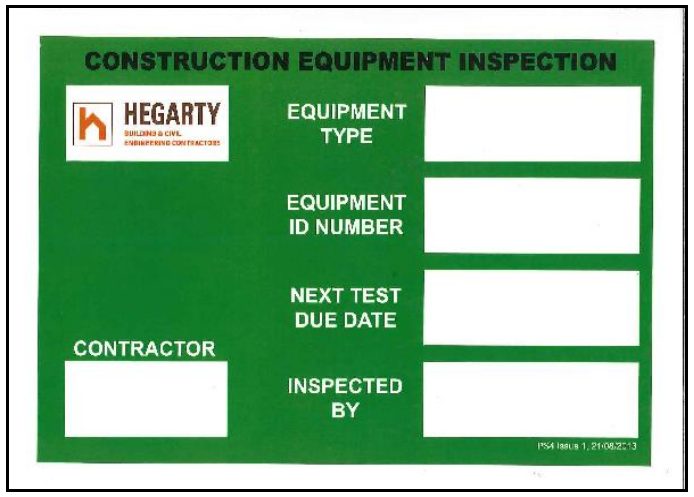
Safe Plan of Action Form

Daily Whiteboard Meeting – Attended by Project Manager, Area Supervisor and Subcontractor Foremen

Typical Pedestrian Crossing Point & Pedestrian Route Separated from Vehicles Route

Typical Safety Signage Erected on Site

Plant and equipment will be inspected upon arrival on site. Their details including certificates and expiry dates will be entered on to a site plant register and tracking of this will identify when inspection and servicing is due. All plant will be provided with a plant sticker to identify dates of inspection and next inspection due.



Plant ID Sticker

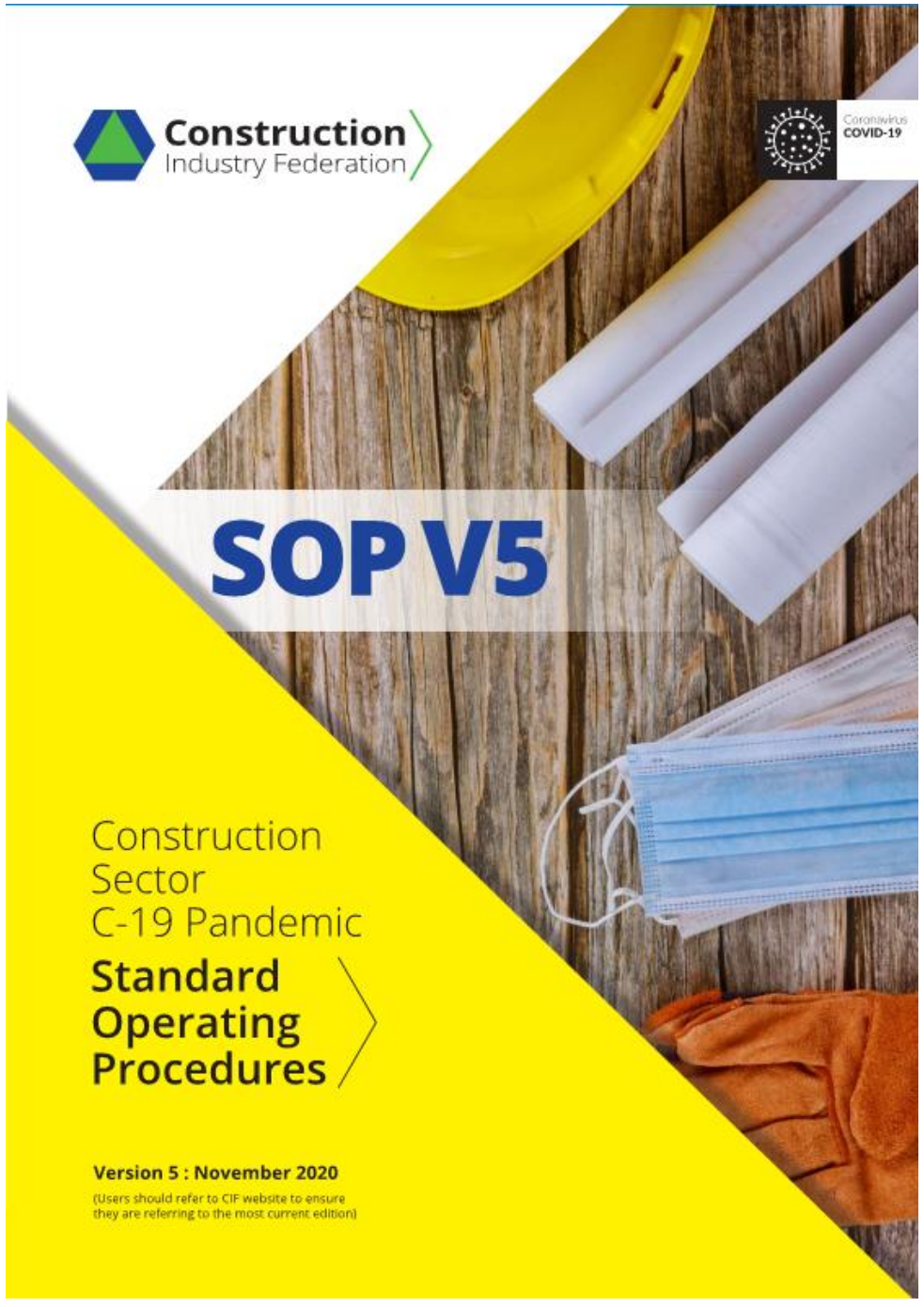
Working at height will be a major requirement on this project with buildings varying from 8 to 44 floors above ground. Access systems will include scissors lifts, boom hoists, goods hoists, personnel / good lifts and scaffolding. Each of these will be inspected and signed off as being in good order and safe to use each day. Training will be required to use the mobile elevated work platforms and this will be recorded at induction. Scaffolding will be built and inspected by qualified scaffolders.

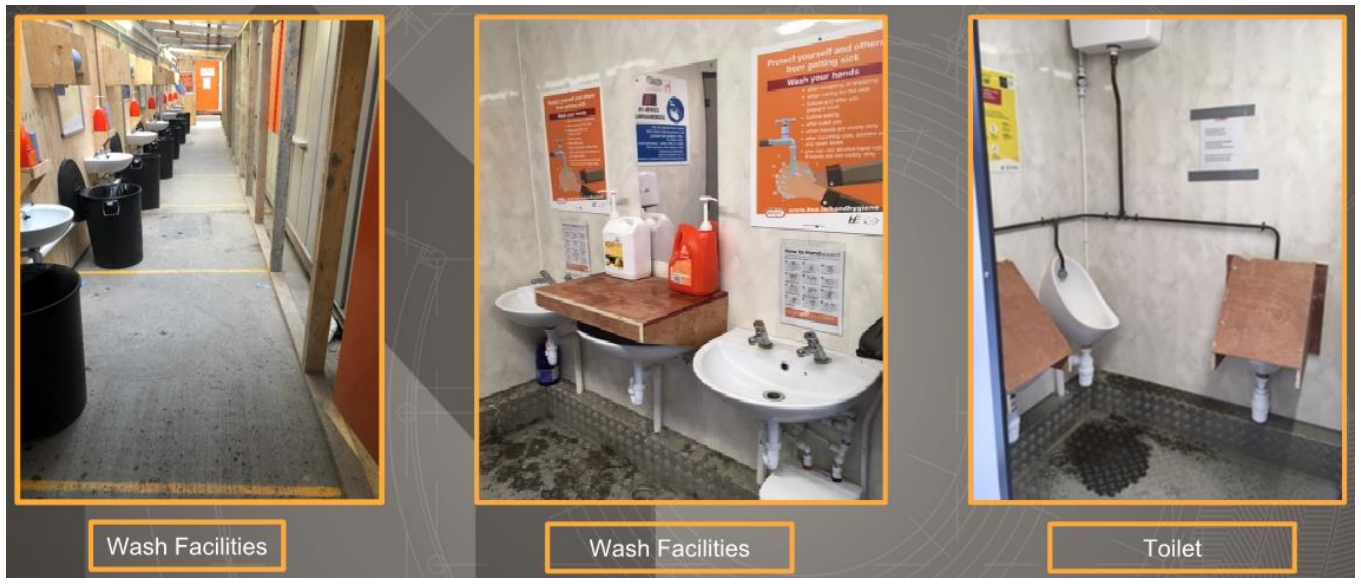
As previously outlined, a secure hoarding will be put in place and swipe controlled access gates will be utilised to prevent entry into the site by members of the public.

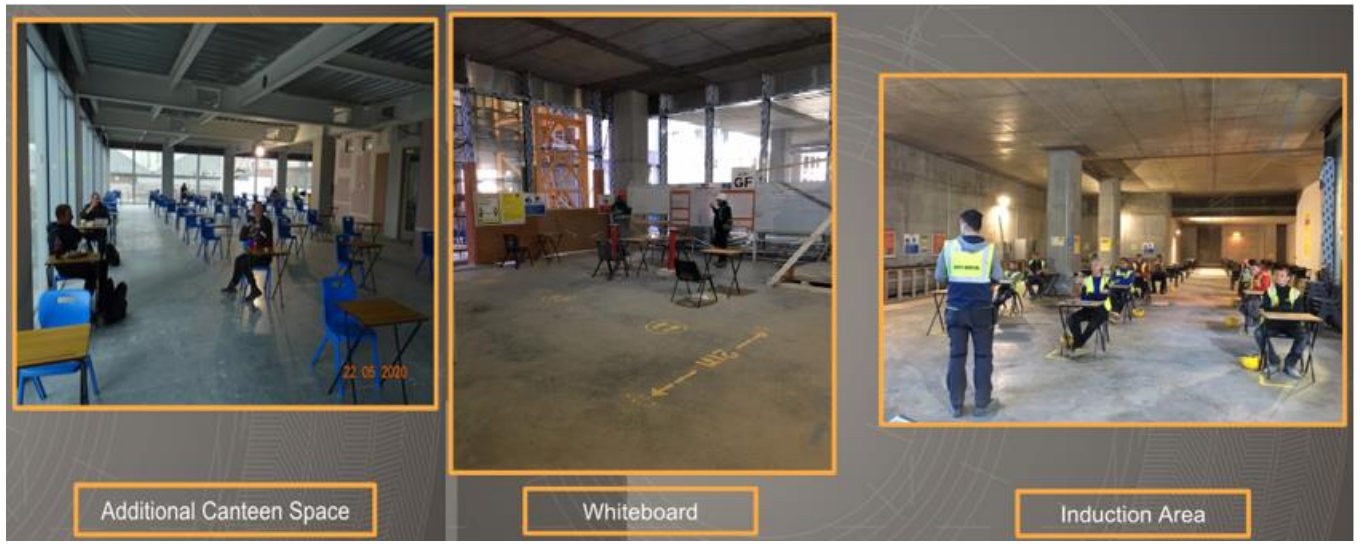
The hoardings will also to prevent construction debris from site, which could cause damage or harm to members of the public or public property, escaping to public areas. Walkways outside the site hoarding will be covered to protect pedestrians in the event of falling debris. Cantilevered debris net fans will be erected where required as the building superstructures progress above ground level to catch any falling debris.

COVID 19

COVID 19 precautions will be implemented on site in accordance with the Construction Industry Federation approved document. We will keep up to date with the latest updates and ensure these are implemented on site. Where we commence on an existing site.







Key control measures including hand sanitizing and social distancing through installation of walkways, extra canteens, drying rooms, outdoor facilities, etc. as shown over will be put in place. Covid-19 will be considered when preparing method statements and when carrying out the works on site. All works will be monitored by the Site Covid Compliance Officers and Safety Officers.

An Emergency Incident Response Plan will be prepared for the site. In the event of an emergency or incident of serious and imminent danger, the Safety Officer will be immediately notified. This will be addressed at the safety induction and all workers will be provided with the contact details for the safety officer. Alternatively, if any workers witness an emergency situation, they can immediately notify their supervisor who will in turn contact the safety officer.

The Safety Officer will then notify all persons concerned of the risks involved and the steps to be taken. The Safety Officer or supervisor will instruct on how to proceed next depending on the nature of the incident. Work may be able to continue or it may have to stop work or immediately and workers would have to leave the place of work and proceed to a designated safe place.

Possible hazardous situations which may require evacuation are: - serious fire, explosion, rupture of gas or fuel line, serious accidents, collapse of building or structure, flooding, electrocution, chemical spills or articles falling on personnel. The following will be the emergency procedures.

- **Alarm**
  Alarm will be raised by contacting the Safety Officer or Project Manager who will arrange the alerting of the emergency services immediately by phoning 999 and requesting the appropriate services – fire brigade, ambulance, etc. The person making this call will provide full details as requested by the dispatcher. The next call will be to the Site Supervisors so they can initiate emergency procedures outlined to all workers at site induction.

- **Control**
  The Safety Officer will ensure immediate and accurate assessment of the situation, its seriousness and emergency services required and will exercise full control over the incident.

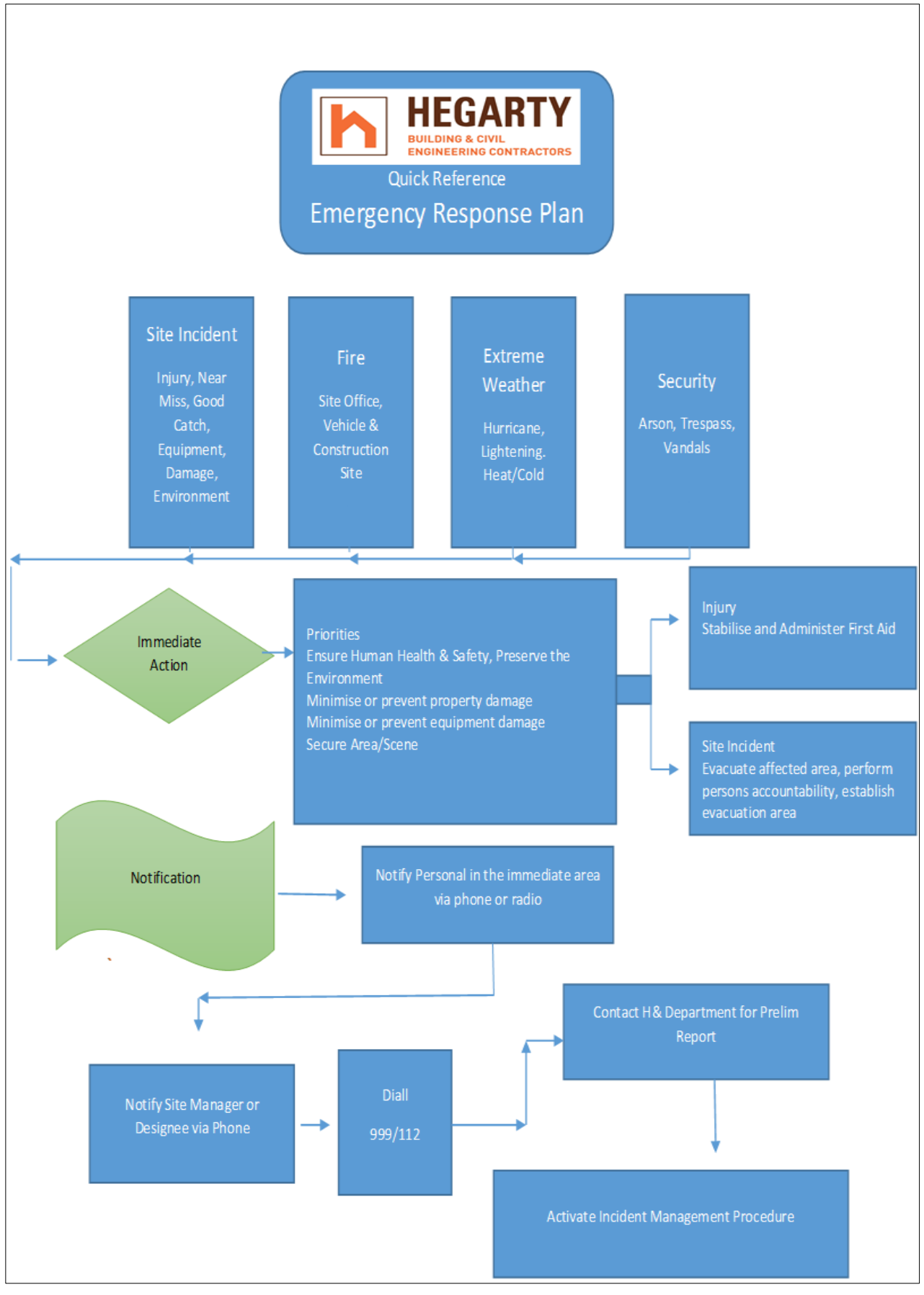
- **Communication**
  The Safety Officer will keep his mobile phone clear throughout the emergency (if it is safe to do so) and will be responsible for communicating with the emergency services following the initial call from the Safety Officer. Another member of staff, will be despatched to the North Wall Quay to direct emergency vehicles to the site and others may be arranged around the site to ensure the speedy arrival of the emergency services to the site of the incident.

- **Assembly Point**
  The main assembly point will be located at the site compound and will be pointed out to workers at the site induction. Tool box talks will be used to remind workers of this.

- **Treatment of Injuries**
  Only approach an injured person if safe to do so. Remove the person from further danger if necessary and safe to do so. Administer first aid if necessary until ambulance personnel arrive on site.

- **Environmental Incident**
  Minor spillages will be cleaned up using the spill kits that will be maintained in site. This may include hydraulic oil from burst excavator hose or similar minor spills. If the incident is hazardous in nature, wait for fire brigade / specialist clean up personnel – do not attempt clean-up of any hazardous waste.

Safety management systems will be inspected weekly and audited monthly by the Company Health & Safety Manager who will visit site to carry out these inspections and audits. A full time Site Safety Manager supported by a number of full time safety officers will monitor safety continuously while site management and site supervisors will promote a safety culture to target zero incidents on site.



6. Traffic Management

Site logistics governing traffic flow within the site have already been described in section 3 of this document. A traffic management plan will be implemented from day one of the project and will be kept under constant review and adjusted as required to reflect changing conditions on site.

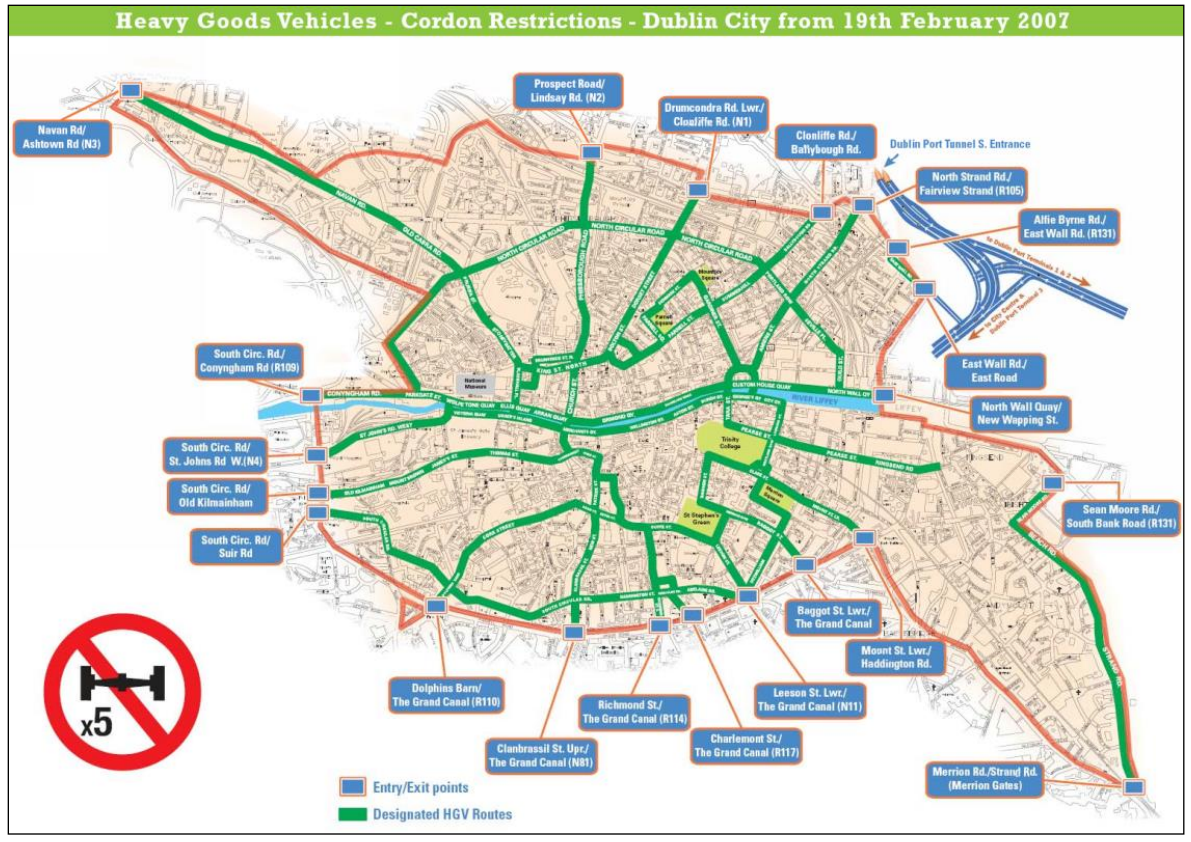
Provisions of this plan including erection of signage on public roads will be agreed with Dublin City Council in advance of implementing any changes to the traffic management system. The traffic management plan shall be updated appropriately to ensure coordinated and effective traffic management practices and arrangements are in place throughout the construction period.

External to the site, traffic will include construction workers travelling to site and materials deliveries which will include small delivery vans, large rigid trucks, articulated trucks and trailers and concrete trucks. Large volumes of excavated material will be removed off site due to the basement excavation works.

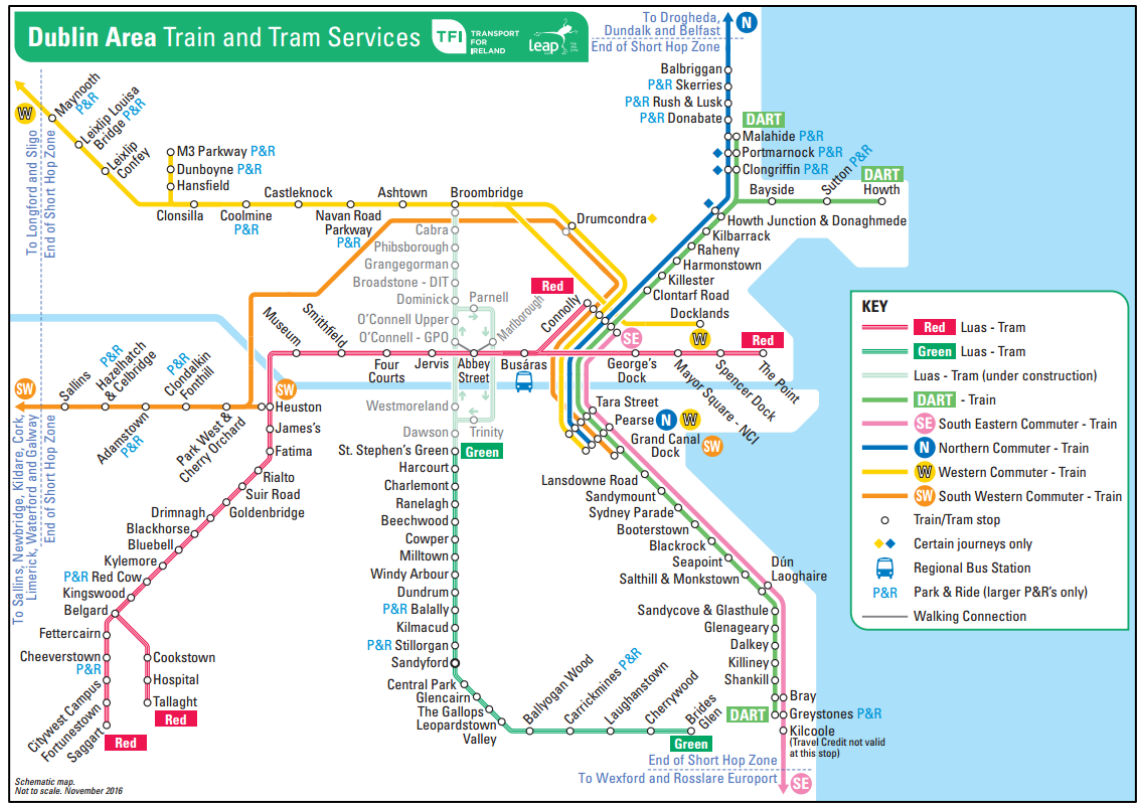
PJH will organise deliveries to minimise congestion on public roads by avoiding peak traffic periods where possible. During particularly busy periods such as during concrete pours, trucks will be queued up inside the site as previously outlined to avoid queuing on public roads.

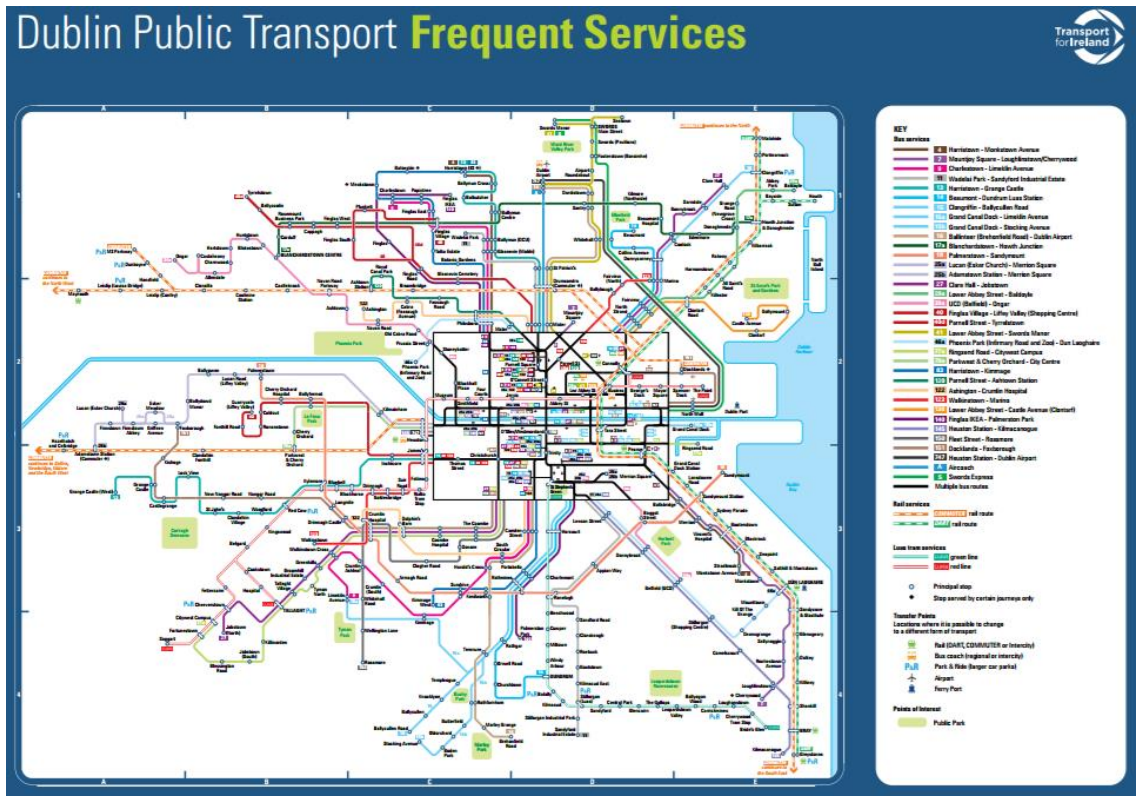
We will also liaise with the neighbouring construction sites to the east and west of the CB9 site to ensure congestion is minimised. Ideally, we will be able to schedule large deliveries at different times or days from the neighbouring properties to avoid congestion.

Deliveries will be on a just in time basis and this system will be strictly controlled between our Site Supervisors and our Purchasing Manager who will organise the deliveries. The purchasing Manager will provide the Site Supervisors with contact details for suppliers who will make contact to ensure drivers are made aware of the site location and the correct route to site in accordance with the Dublin City Council heavy goods vehicles cordon restrictions as shown below.



As previously mentioned in section 3, workers will be encouraged use public transport where possible to reduce congestion on public roads. The area is well served by public transport and options include LUAS and bus services as shown on the Dublin Area Train and Tram Services and Dublin Public Transport Frequent Services maps shown here.





7. Environmental Management

PJH are accredited to ISO14001: 2015 environmental management and environmental protection measures will be put in place to prevent damage to the environment and to comply with planning conditions. In addition to the following mitigation measures listed below please see Appendix A for revised Dublin City Council Construction Protocols which will be adhered to during the construction period.

7.1 Noise, Dust & Vibration Monitoring

Noise and vibration monitoring already in place on site will be continued in line with existing planning conditions. These will be maintained in accordance with any new planning conditions placed on the project. Vibration monitors together with the monitor enclosure, battery, and GSM modem to enable remote downloading and a dual alarm system.

The alarm system will alert us if vibrations exceed the allowable limit. If this happens, work will be stopped and the methodology will be revised to reduce vibrations. A monthly report will be prepared showing the actual vibrations recorded.

Noise monitors together with Enclosure, Battery, GSM Modem and microphone protection system will also allow reporting showing noise levels generated by the construction works.

Dust monitoring locations will be set up as agreed and will follow the German TA-Luft Standard for deposition of non-hazardous dust.

Noise & Dust Monitoring Points on RGRE Spencer Place South Development

7.2 Wheel Washing

On this site in a prominent city centre location, the main source of any environmental problem will be the visibility of debris or dust on public roads. The site entrance roadway off the North Wall Quay is a good surfaced road, which keeps the majority of delivery trucks on a clean surface during their time on site. This road will be maintained in a good clean condition for the duration of the project. In the event of construction activities generating mud or other debris, wheel washing will be implemented and road sweeping will be carried out as required.

Wheel Washing

7.3 Dust Control

Dry weather coupled with high winds can sometimes lead to dust being generated on site. In the event of this occurring, dust suppression will be implemented through water spraying. This will be carefully managed as application of too much water can lead to mud forming. Road sweeping will be carried out if required to control this.

Dust Suppression

Road Sweeping

7.4 Waste Management

A waste management plan will be implemented on site to control waste generated. Lean construction techniques will be implemented on site to minimise waste.

- Accurately quantify materials to be ordered
- Ensure approved materials that comply with specification are ordered
- Arrange just in time delivery of materials to minimize possibility of damage
- All deliveries to be inspected and placed in appropriate storage areas
- Incorrect deliveries will be returned to the supplier immediately.
- Handle materials to avoid damage and waste of good materials.
- Completed work to be protected from damage and maintained in good order.

Waste Reuse and Recycling will be required and will be implemented as follows:

- Setup dedicated skip area
- Segregate waste into separate skips for recycling
- Ensure subcontractors use the various skips correctly

7.5 Storage & Use of Fuel

- fuels will be stored in a dedicated bunded fuel storage area
- fuels stored in approved storage containers within this area
- fuel storage isolated from any source of ignition or impact
- refuelling of plant at designated refuelling points or from bowser
- spills to be contained, reported and dealt with using an agreed method.

7.6 Energy Efficiency

- Electrical equipment to be will be switched off when not in use.
- Non-essential lighting will also be turned off when not in use
- Office equipment to be switched off nightly and at weekends
- All electrical equipment to be kept in good order by a qualified electrician.
- Ensure that water is not wasted; taps will be turned off, leaks repaired
- All plant and machinery turned off when not in use to conserve fuel
- plant such as generators, lighting towers not to be used unnecessarily

7.7 Management of Odours & Other Emissions

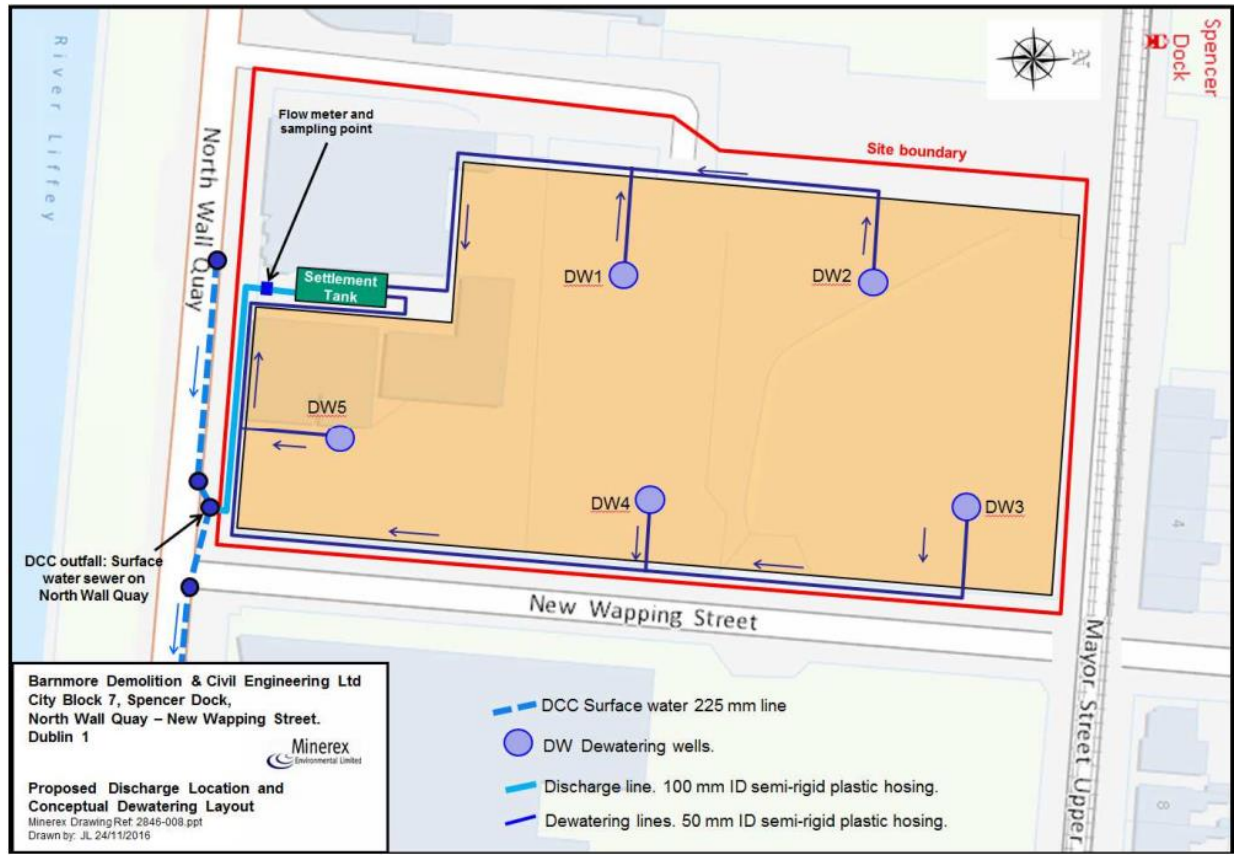
- Engines must be switched off when not in use.
- All equipment will be correctly operated & maintained.
- Burning of waste materials on-site is strictly prohibited.
- Refuelling will be in a designated area, away from the general public/sensitive residents.
- All organic wastes will be stored in covered containers or bins, prior to removal from site.
- Temporary and drains will be maintained so as to prevent emission of odours.
- Domestic and canteen bins skips will be emptied regularly in the designated skip.

7.8 Management of Noise

- Ear Protection Zones shall be clearly identified
- Ensure our employees are provided with, and use, suitable approved hearing protection when working in these zones.
- Ensure that noise levels produced by plant or machinery on the site are as low as practicably possible.
- All plant and equipment on site must comply with European Standards.
- Advise the Client if we anticipate excessive noise levels from our work operations so that all reasonably practicable precautions can be taken to protect persons who may be affected.

7.9 Management of Water Pollution

- We will comply with planning conditions regarding water pollution
- Construction related substances such as oil or diesel to be stored in secure bunded containers
- Spill trays to be used under generators
- Concrete lorries to wash their chutes only in a designated area and all wash will be collected and treated.
- The basement works will be assessed for water infiltration and a dewatering system will be installed if required. Water from any dewatering system will be pumped to a settlement tank before discharge to the Dublin City Council sewer – this will remain in place until the basement has been completed.



RGRE Spencer Place South Dewatering System – similar system to be used on Project Waterfront

7.10 Management of Hazardous Waste

- Provide MSDS for hazardous materials in advance of being brought to site
- Comply with Safety, Health and Welfare at Work (Chemical Agents) Regulations
- Carry out risk assessments for the transport, storage, use and disposal of such substances
- Use suitable and secure storage in bunded areas

8. Construction Methodology

8.1 Introduction

As the project is currently only approaching planning stage, there is no detailed design commenced yet. This is due to commence in Q1 2021 in advance of the construction works in Q4 2021 subject to planning permission.

For the purposes of explaining the construction methodology to be employed, the substructure will consist of secant piles to the basement perimeter with CFA piles supporting the foundations pile caps and raft slabs. Stair and lift cores will be constructed in concrete with a reinforced concrete frame wrapping around these cores.

The facades will be a mixture of glazing, rain screen cladding, stone cladding and vertical green walls.

Proposed Waterfront South Central Development

The basement works have begun under a separate planning permission. The main construction works will require approximately 4 years from Q4 2021 to Q4 2025 as shown in the indicative bar chart programme below. This start date will be dependent on obtaining the required planning permission.

	Q4 '20	Q1 '21	Q2 '21	Q3 '21	Q4 '21	Q1 '22	Q2 '22	Q3 '22	Q4 '22	Q1 '23	Q2 '23	Q3 '23	Q4 '23	Q1 '24	Q2 '24	Q3 '24	Q4 '24	Q1 '25	Q2 '25	Q3 '25	Q4 '25
Secant Piling																					
Basement Excavation																					
Foundation Piling																					
Basement Structure																					
Superstructures																					
Envelopes																					
Fit-outs																					
Site Finishes																					

LEGEND	Combined City Block 9 Basement Works Permitted under Dublin City Council Reg. Ref. DSDZ3042-19
	Construction Works Associated with this Application

8.2 Commencement Notice

BCAR requirements will be complied with in full. A commencement notice along with the required information will be submitted by the Assigned Certifier to Building Control. A dedicated BCAR Champion will be appointed to the project to ensure the required inspection, testing and logging of all BCAR information is kept up to date.

8.3 Site Mobilisation

The existing site hoarding will inspected in full prior to commencement and plans will be made to upgrade the hoarding as required to meet the proposed specification.

The site offices will initially be setup inside the site until such time as the basement excavation requires the offices to be moved to the site perimeter as previously outlined.

Dust suppression will be used as required to prevent dust and road sweeping will be used to maintain public roads in a clean and tidy state. Noise and vibration monitors will be installed to ensure dust and noise levels comply with planning conditions. Immediate corrective action will be implemented in the event of any noise or dust limits being broken.

8.4 Sub-Structure

The secant piling to the basement perimeter will be installed first. Excavation will follow on with anchors being installed through the secant piles as the excavation progresses.

A dewatering system will be installed ahead of the excavation and all water will be pumped through settlement tanks before discharge to a location agreed with Dublin City Council.

A ramp will be maintained into the basement to allow the piling rigs track into the site and install foundation piles at low level. Once cured and tested, breakdown of the piles will be progressed allowing pouring of the concrete pile caps, ground beams and basement slabs to commence.

Ground investigations carried out in advance of the main works as part of the detailed foundation design will determine if any ground contamination is present. All excavated material will be disposed of to licensed landfill sites. Any contaminated materials will be kept separate and removed to specialist facilities in accordance with environmental legislation.

Dust suppression and road sweeping will be undertaken as required to maintain the site, neighbouring properties and adjacent public roads in clean condition.

8.5 Super-Structure

As the basement level slabs are completed, stair and lift cores will be constructed. Tower cranes will be erected as required to service the lifting requirements for the project.

The reinforced concrete suspended slabs at each floor level above will use the Peri Skydeck formwork system. The decking will be erected complete with edge handrails and access towers to each level. Steel reinforcement will then be installed on the deck. Lifting of decking and rebar will be by tower crane while a static concrete pump will be used to pour the concrete.

After curing of the slab, the skydeck panels will be removed for reuse on the next floor above while the skydeck supports remain in place as back propping. Back props will be removed at a later date when the building has progressed and the structure has cured sufficiently to remove the props.

Skydeck system (left) and decking panels removed with back propping left in place (right)

Reinforcement on Skydeck Formwork

After each floor is poured, the columns and core walls will be poured to the next level and the decking and steel fixing will commence again. Safe access will be provided for steel fixing of walls and columns and preparatory platforms at the top of the wall formwork will be used for pouring of the concrete by crane and skip.

Super deck platforms will be utilised to allow removal of materials off floors or loading materials into floors. These platforms are installed between completed floors as shown below and cantilever outwards from the building allowing the crane to remove and drop materials on the deck. These decks will be installed on internal elevations of the buildings so they are not located over public streets.

The process of pouring slabs followed by rising elements will be repeated until roof level is reached. At roof level, structural steel and metal decking will be used to form the roof slab.

Superdeck Platform, Skydeck and Preparatory Access Platforms in use on Similar Project

Sufficient tower craneage will be provided to service the individual buildings and a crane co-ordination plan will be put in place to manage lifts. All banksmen and drivers will be in radio contact and will be overseen by a crane co-ordinator. Concrete pumping will be used for all large pours to free up cranes for other lifting operations. Wind and weather will be monitored and crane usage will be restricted as required during inclement weather to ensure safety of all personnel.

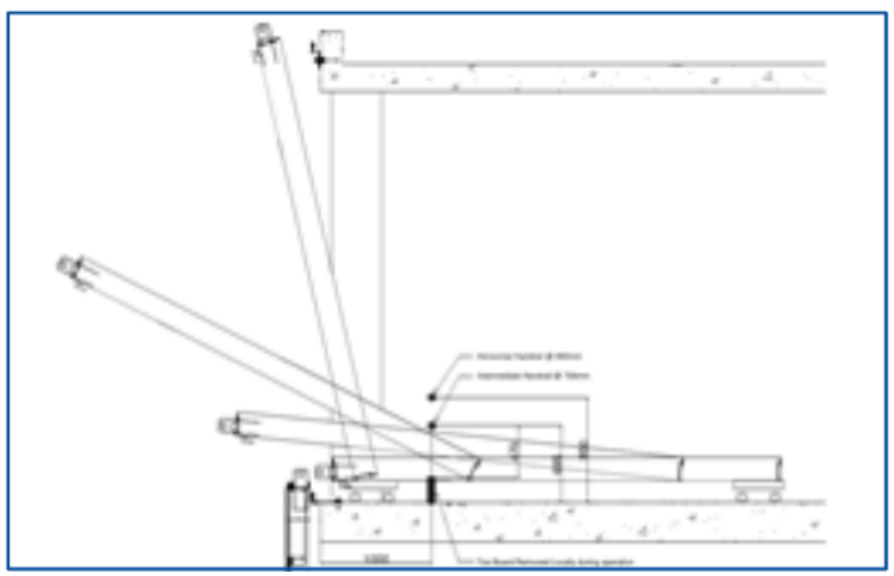
8.6 Envelope

Extensive deliveries will be required for the façade. All deliveries will be brought to site on a just in time basis.

Curtain walling will be erected by a specialist glazing company. They will erect the framing and glazing units using a teleporter/mini crane for lifting and a mobile elevated work platform (MEWP) for access for workers. Suction lifters will be used to lift heavy glass units.

Installing ground floor glazing using mini crane and power sucker.

A unitised glazing system will be lifted directly from the delivery truck on to a superdeck platform at each floor level and moved into the floor of the building. A mini crane sitting two floors above where the unit is being installed will lift the unit into place. The glazed unit will be horizontal on the floor and the mini crane will lift it into the vertical position when operatives will then fixed brackets on the internal face of the unit into the floor slab at the base and slab soffit at the top. All lifting and access will be from inside the building with no external MEWP / scaffolding required. All workers will wear harnesses tied off to a secure line.



Sketch of unit being lifted from the floor to the external

Crane Set-Up

Crane lifting from floor above

Final engagement and levelling of unitised panel

Typical method and product used to form the slab edge fire and smoke barrier.

Picture also illustrating retaining bracket to the slab.

The installation of unitised glazing will overlap with the concrete frame works overhead. Debris net fans will be installed to protect the glazing operatives working below as required.

Unitised Façade Installation – Mini Crane on Floor Above Lifting Unit into Position; Debris Net Fans Above.

Scaffolding and / or mast climber hoists may be required for parts of the façade. Where required, safe access stairs and loading bays will be provided and scaffolding will be tied into the building structure. The tower cranes will lift materials on to the loading bays.

Where works require a setup of plant outside the site, this will require a lane closure to facilitate MEWPs and a mobile crane lifting elements of the façade into position. This may occur if there is insufficient space between the building façade and site hoarding to fit a crane or MEWP. We will ensure the relevant license from Dublin City Council which will be obtained well in advance of the works and an agreed traffic management system will be implemented.

At roof level, there will be green roofs, roof lights as well as roofing membrane. The roof light locations will have a scaffolding crash deck erected below to provide a safe working platform for installation of the roof lights.

8.7 Fit-Out

The fit-out works will consist of:

- Partitions
- Mechanical
- Electrical
- Sprinkler
- Lift Installations
- Firestopping
- Decoration
- Ceilings
- Joinery
- Flooring
- Furniture, Fixtures and Equipment

The mechanical and electrical 1st fix works will commence early in the project when floor areas are cleared of all decking materials. Heavy plant such as chillers, boilers, etc. will mainly be placed in the basement level plant rooms. These will be brought into the basement via the access ramp off North Wall Avenue where a lane closure will occasionally be required for offloading.

Finished elements such as plasterboard partitions and ceilings will progress as the façade of the building progresses. Full weathering will be required before completion of joinery, doors, flooring, final fix mechanical and electrical items, etc.

Materials will be brought into the buildings using goods hoists and lifts will be protected and used once they are installed.

8.8 External Site Works & Finishes

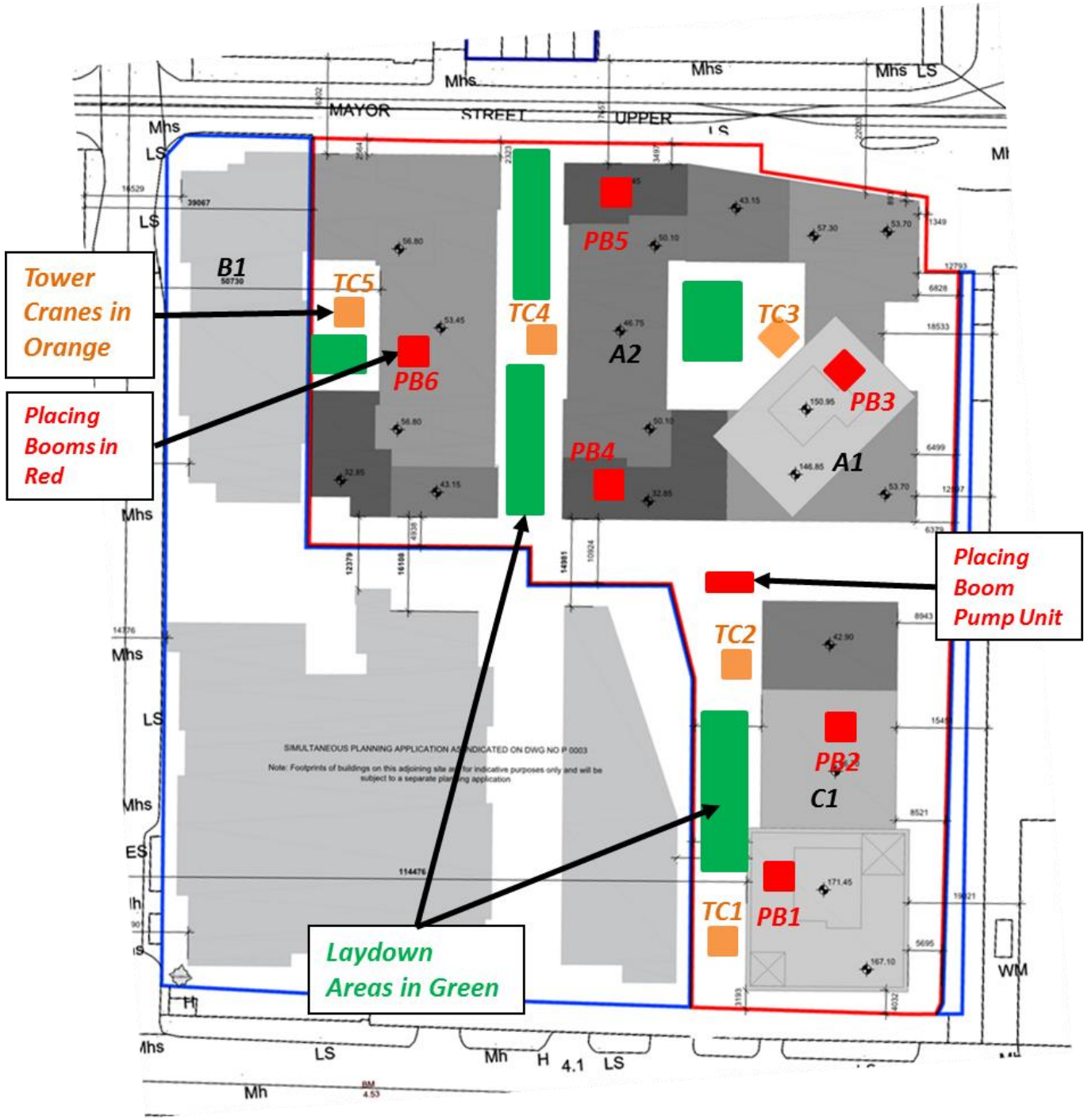
As each façade is completed, the site services and finishes will be completed adjacent to that façade. Each building will have an ESB substation which will be serviced with ducts from the nearest street manholes. Storm, foul, gas, water and telecom services will also be installed in agreement with relevant parties including Irish Water, Dublin City Council, Gas Networks Ireland, ESB Networks and Eircom.

Any road opening licenses required for ducting or sewer tie-in works will be obtained from Dublin City Council and full traffic management systems will be implemented for the works.

As hoardings are removed, the new paving will be worked into existing surfacing in agreement with Dublin City Council.

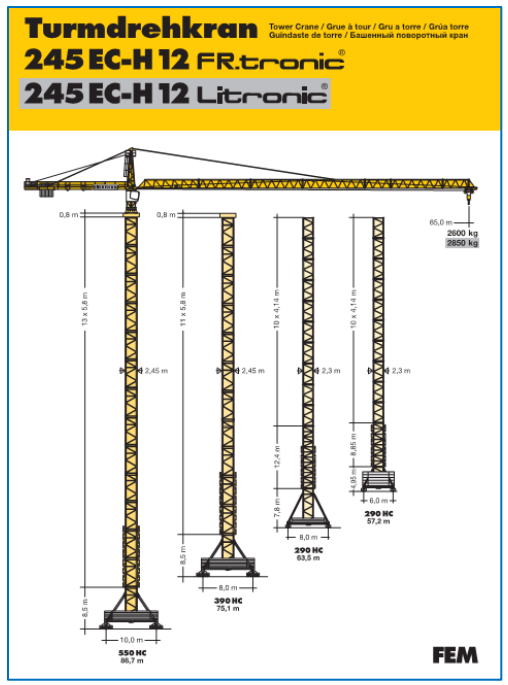
8.9 Tower Cranes & Concrete Placing Booms

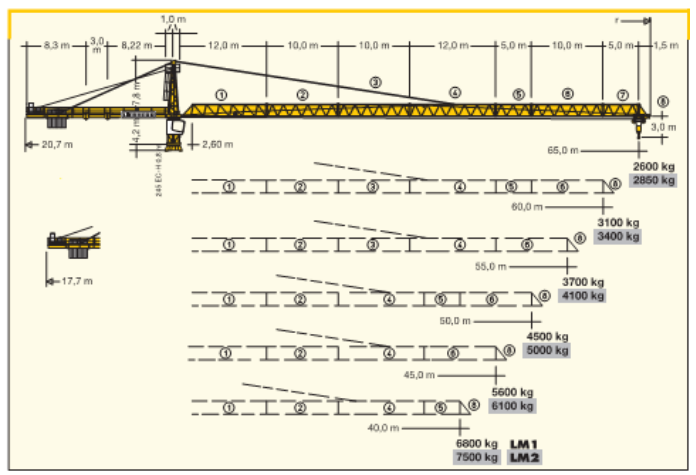
The construction of the new concrete frame buildings will require 5 tower cranes (shown in orange below) and 6 concrete placing booms (shown in red below) to manage the lifting and concrete pumping requirements for the project.



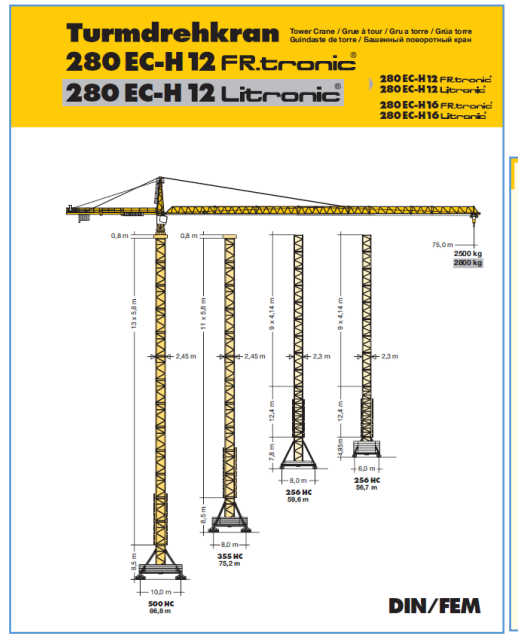
These will be as detailed below:

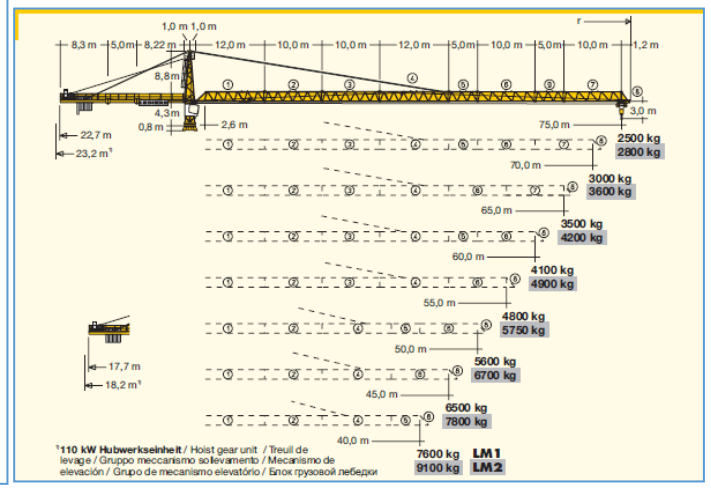
Crane / Placing Boom No.	Crane Jib Radius / Placing Boom Reach	Serves Block	Crane Type
TC1	55m	C – South	Liebherr 280 ECH
TC2	50m	C – North	Liebherr 280 ECH
TC3	60m	B – East	Liebherr 280 ECH
TC4	50m	B – West	Liebherr 245 ECH
TC5	50m	A	Liebherr 245 ECH
PB1	30m	C – South	
PB2	30m	C – North	
PB3	30m	B – East	
PB4	30m	B – Northwest	
PB5	30m	B - Southwest	
PB6	30m	A	





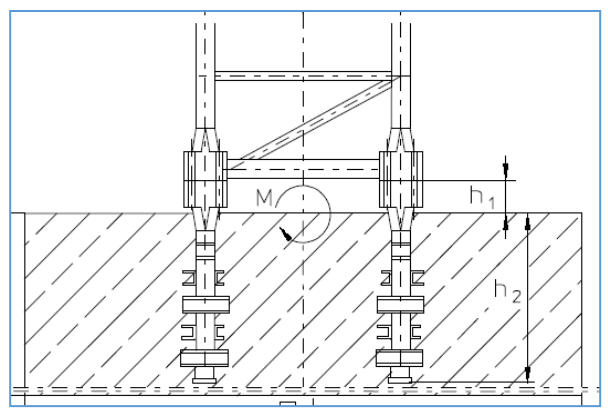
Typical Tower Crane to be used





The tower cranes will be erected to heights so that jibs are at different heights to avoid clashes and to over-sail other cranes. The tallest tower cranes will be fixed back to the building structure for shaft support. A crane co-ordination plan will be put in place to manage crane operations when there are mobile cranes or concrete pumps in operation alongside the tower cranes to ensure there are no collisions. Banksmen will control crane lifts and will be in radio contact to co-ordinate lifts. A crane co-ordinator will oversee all lifting operations. Beacon lights will be placed on the cranes for aviation purposes and flood lights will be placed on the crane shafts for site lighting. Drivers will be instructed to slew loads so that materials remain over the foot print of the site although jibs will oversail properties outside of the site.

Cast-in anchors in the basement slab will be used to secure the tower cranes. These crane foundations will be progressed early to allow erection of the cranes to proceed. Where a crane is located inside a building due to space constraints, openings in floor slabs will be cast around the crane shaft and will be infilled upon removal of the cranes.



Cast in crane anchors to be used to secure tower cranes into basement slab

The crane bases will be enclosed in a secure hoarding with door access available to the driver only as shown below.

Secure Fencing, Lockable Door and Anti Climb Fan around Crane Base

The tower cranes will be used primarily for lifting decking, structural steel and metal decking, rebar and for small concrete pours such as columns. After superstructure, they will be used for lifting materials to the facade of the building for envelope installation and for lifting materials into the building for fit out works.

8.10 Other Plant

Mobile cranes will be required from time to time on site while a teleporter will also be on site for offloading of smaller delivery trucks.

The podium slab will be checked for the loading in the event of any plant being required to travel on it. Back propping will be installed as required to facilitate this.

Concrete pumps will be used for all large pours including floor slabs and walls. This will take pressure off the tower cranes and allow them to concentrate of lifting of steel, rebar and decking false work and formwork.

Minor small plant will include vibrators, power floats, compressors, generators, etc. during the course of the concrete works. Boom hoists will be used in conjunction with scaffolding to access wall and column pours.

Plant required to install the building envelope will include scaffolding, scissors hoists, boom hoists and mini cranes.

Fit-out works will mainly require small electric powered scissors hoists suitable for use indoors. These will be required for installation of partitions and services during the fit-out period.

Proprietary decking systems will be used to pour the concrete frames consisting of both wall and floor shutters. Wind shields will be erected around the higher buildings which will be moved up hydraulically as the building frame progresses. Reinforced concrete decking systems will be removed when concrete slabs have achieved their required strength and will be replaced with back propping. The decking will then be moved to the upper floors for reuse. This will reduce the amount of decking materials required on site and will reduce storage requirements.

Loading bays will consist of both scaffolding and super-deck platforms. Cranes will lift materials on to the loading bays where workers will immediately bring materials into the building. Fit out materials will be loaded in once decking systems and back propping are removed to ensure the materials can be brought into the building ahead of façade works which will close off access.

Concrete stairs will be precast and will be installed as soon as stair cores are ready to receive them. This will provide a safe access to each floor level. An electric hoist will also be used before stairs are in place.

Permanent lift installations will be used for the latter stages of fit-out to bring in furniture and equipment. Lifts will be protected to prevent damage.

8.11 Labour Resources

The expected numbers will vary throughout the project commencing with 30- 40 personnel when excavating the basement to in excess of 250 personnel when at the height of construction.

8.12 Building Control (Amendment) Regulations

Inspection, testing and certification of all works will be carried out in agreement with the Assigned Certifier for the project.

The compilation of handover documents and other documentation required for BCAR uploads will be an ongoing task throughout the project.

At completion, all required information will be completed and submitted to Building Control to ensure the Certificate of Completion for the project is validated and placed on the statutory register.

9. Public Relations

A communication system will be put in place to ensure good relationships with the public and with neighbours.

Ronan Group Real Estate and PJ Hegarty & Sons will observe the Dublin City protocol outlined below:

Following the receipt of multiple complaints relating to large scale commercial development sites in Dublin Docklands Area relating to;

Alleged breaches of standard permitted working hours, excessive noise and dust levels, dirt and debris on approach roads, damage to surrounding footpaths, illegal parking, lack of courtesy from contractors and sub-contractors to residents in the vicinity.

Alleged excessive hours of work extensions being sought by contractors and granted by Dublin City Council which is allegedly causing undue disruption to the lives of residents in the vicinity of certain sites in the area.

The following updated protocol has been produced (with reference to the London Good Practice Guide: Noise and Vibration Control for Demolition and Construction produced by the London Authorities Noise Action Forum, July 2016) to alleviate/mitigate some of the issues that are being raised by existing residents in the Docklands Area.

1. General Considerations

All site staff shall be briefed on noise mitigation measures and the application of best practicable means to be employed to control noise.	All sites
Site hoarding should be erected to maximise the reduction in noise levels	All sites
The contact details of the contractor and site manager shall be displayed to the public, together with the permitted operating hours, including any special permissions given for out of hours work	All sites
The site entrance shall be located to minimise disturbance to noise sensitive receptors	All sites
Internal haul routes shall be maintained and steep gradients shall be avoided	All sites
Material and plant loading and unloading shall only take place during normal working hours unless the requirement for extended hours is for traffic management(i.e. road closure) or health and reasons(application must be made to DCC a minimum of 4 days prior to proposed works)	All sites
Use rubber linings in chutes, dumpers and hoppers to reduce impact noise	All sites
Minimise opening and shutting of gates through good coordination of deliveries and vehicle movements	All sites
No materials shall be burned on site	All sites
Adequate dust/debris screening should be in place at the site boundary to contain and minimise the amount of windblown dust. This must be maintained in good condition at all times.	All sites
All consignments containing material with the potential to cause air pollution being transported by skips, lorries, trucks or tippers must be covered during transit on and off site.	All sites
The site shall be dampened down as necessary to minimise windblown dust when necessary or during periods of dry weather.	All sites
Dust suppression equipment must be used when point source emissions are likely.	All sites
The entry and exit points to the site should be constructed of hard standing which is regularly dampened to minimise dust emissions.	All sites

2. Plant

Ensure that each item of plant and equipment complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC	All sites
Fit all plant and equipment with appropriate mufflers or silencers of the type recommended by the manufacturer	All sites
Use all plant and equipment only for the tasks for which it has been designed	All Sites
Shut down all plant and equipment in intermittent use in the intervening periods between work or throttle down to a minimum	All sites
Power all plant by mains electricity where possible rather than generators	All sites
Maximise screening from existing features or structures and employ the use of partial or full enclosures for fixed plant	All sites
Locate movable plant away from noise sensitive receptors where possible	All sites

3. Vehicle activity

Ensure all vehicle movement (on site) occur within normal working hours. (other than where extension of work requiring such movements has been granted in cases of required road closures or for health and safety reasons)	All sites
Plan deliveries and vehicle movements so that vehicles are not waiting or queuing on the public highway, if unavoidable engines should be turned off	All sites
Minimise the opening and closing of the site access through good coordination of deliveries and vehicle movements	All sites
Plan the site layout to ensure that reversing is kept to a minimum	All sites
Where reversing is required use broadband reverse sirens or where it is safe to do so disengage all sirens and use banks-men	All sites
Rubber/neoprene or similar non-metal lining material matting to line the inside of material transportation vehicles to avoid first drop high noise levels.	All sites
Wheel washing of vehicles prior to exiting the site shall take place to ensure that adjoining roads are kept clean of dirt and debris. Regular washing of adjoining streets should also take place as required by road sweepers	All sites

4. Demolition Phase

Employ the use of acoustic screening; this can include planning the demolition sequence to utilise screening afforded by buildings to be demolished.	All sites
If working out of hours for Health and Safety reasons (following approval by DCC) limit demolition activities to low level noise activity unless absolutely unavoidable)	All sites
Use low impact demolition methods such as non-percussive plant where practicable	All sites
Use rotary drills and 'bursters' activated by hydraulic or electrical power or chemically based expansion compounds to facilitate fragmentation and excavation of hard material.	All sites
Avoid the transfer of noise and vibration from demolition activities to adjoining occupied buildings through cutting any vibration transmission path or by structural separation of buildings	All sites
Consider the removal of larger sections by lifting them out and breaking them down either in an area away from sensitive receptors or off site.	All sites

5. Ground Works and Piling Phase

The following hierarchy of groundwork/piling methods should be used if ground conditions, design and safety allows; • pressed in methods, e.g., hydraulic jacking • Auger/bored piling • Diaphragm walling • Vibratory piling or vibro-replacement • Driven Piling or dynamic consolidation	All sites
The location and layout of the piling plant should be designed to minimise potential noise impact of generators and motors	All sites
Where impact piling is the only option utilise a non-metallic dolly between the hammer and driving helmet or enclose the hammer and helmet with an acoustic shroud	All sites
Consider concrete pour sizes and pump locations. Plan the start of concrete pours as early as possible to avoid overruns	All sites
Where obstructions are encountered, work should be stopped and a review undertaken to ensure that work methods that minimise noise are used.	All sites
When using an auger piling rig do not dislodge material from the auger by rotating it back and forth. Use alternate methods where safe to do so.	All sites
Prepare pile caps using methods which minimise the use of breakers, e.g., use hydraulic splitters to crack the top of the pile.	All sites

6. Monitoring

Establish pre-existing levels of ambient noise by baseline monitoring or use of the noise maps.	All sites
Carry out regular on site observation monitoring and checks/audits to ensure that 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 Site reviews must be recorded and made available for inspection	All sites
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.	All sites
Appraise and review working methods, processes and procedures on a regular basis to ensure continuous development of BPM	All sites
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.	All sites
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.	All sites
Appropriate dust suppression must be employed to prevent fugitive emissions affecting those occupying neighbouring properties or pathways	All sites
Street and footpath cleaning must be undertaken during the demolition and ground works phase to minimise dust emissions	All sites
Continuous dust monitoring along the site boundary should be undertaken during any demolition or ground works	All sites

7. Communication and Liaison

A Community Liaison Plan should be developed by the developer in consultation with local residents/businesses and a single point of contact nominated to engage with Dublin City Council and the residents/businesses and to handle complaints and communication of site information	All sites
Contact details for the site manager and liaison officer should be displayed prominently on the site hoarding	All sites
All site staff should be briefed on the complaints procedure and mitigation requirements and their responsibilities to register and escalate complaints received.	All sites
Send regular updates at appropriate intervals to all identified affected neighbours/ businesses via a newsletter and post relevant information on the site hoarding. Also make the information available via email/website	All sites
Arrange regular community liaison meetings at appropriate intervals (including prior to commencement of the project in the future).	All sites
Meet regularly with neighbouring construction sites to ensure activities are coordinated to minimise any potential cumulative issues.	All sites

8. Extensions of Working Hours in <u>exceptional</u> circumstances

Ensure at least 4 days' notice is given to Dublin City Council when applying for extensions to normal working hours. Do not undertake out of hours work unless permission to do so has been granted.	All sites
The applicant must demonstrate in writing that the works required cannot be carried out during normal working hours. The documentation sent in must be accompanied by a detailed engineering or traffic management or safety case as to why the works are required outside normal hours. The application must give the times and dates of the proposed work, and the mitigation measures that are to be used to minimise noise/disturbance	All sites
Advise neighbours about reasons for and duration of any permitted works outside of normal working hours, following receipt of approvals from DCC.	All sites
All complaints will be referred directly to the site liaison person and a reply must issue to the complaint within 3 hours of receipt of the complaint.	All sites
A log of all complaints and a summary of how they were dealt with should be kept and be made available to DCC, as required.	All sites
No more than two work extensions will be considered per week to facilitate required concrete pours. Power floating after 6pm is the only activity that will be permitted during the extensions relating to large concrete pours. Measures such as the use of electrical power floats should be considered to minimise noise associated with this work.	All sites
Any breaches of permitted working hours or permitted extended working hours or developers or subcontractors not carrying out their requirements under this protocol will lead to enforcement action and may also result in the withdrawal of any extension of hours of works for a period that will be at the discretion of Dublin City Council.	All sites

APPENDIX 11.A.2 - ***OPERATIONAL WASTE MANAGEMENT PLAN – WATERFRONT SOUTH CENTRAL – RESIDENTIAL DEVELOPMENT***

Waterside Block 9
Developments Limited

Waterfront Development Dublin

Draft Operational Waste Management Plan

9 December 2020

Project No.: 0524744

The business of sustainability

ERM

Document details	The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.
Document title	Waterfront Development Dublin
Document subtitle	Draft Operational Waste Management Plan
Project No.	0524744
Date	9 December 2020
Version	3.0 FINAL
Author	Paul Fletcher
Client Name	Waterside Block 9 Developments Limited

Document history

				ERM approval to issue		
Version	Revision	Author	Reviewed by	Name	Date	Comments
Draft	00	Paul Fletcher	Peter Rodgers	Peter Rodgers	22.11.2019	DRAFT
Final	01	Paul Fletcher	Peter Rodgers	Peter Rodgers	18.11.2020	FINAL
Final	02	Paul Fletcher	Peter Rodgers	Peter Rodgers	09.12.2020	FINAL

Signature Page

Waterfront Development Dublin

Draft Operational Waste Management Plan

Name: Paul Fletcher
Job title: Senior Waste Consultant

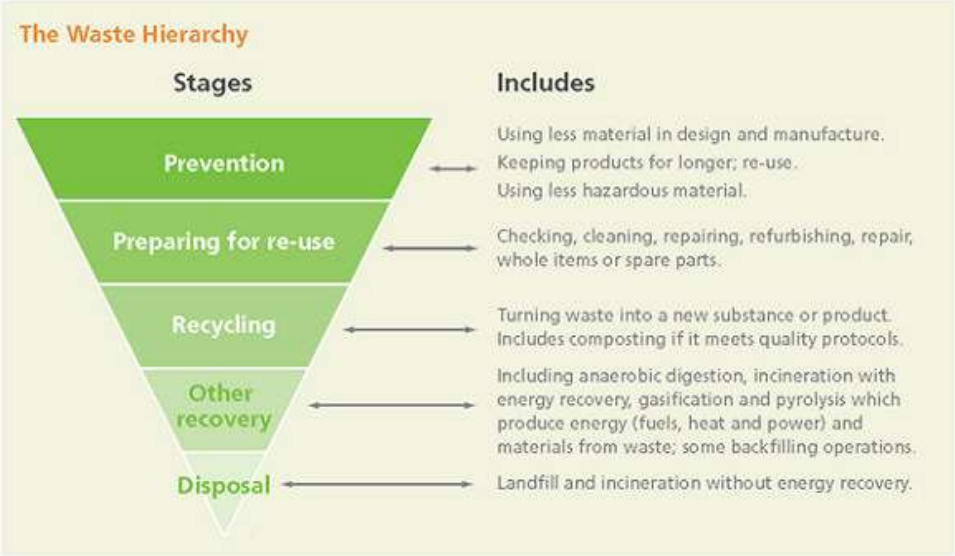
Name: Peter Rodgers
Job title: Country Manager

Environmental Resources Management
Suite G01, The Victorians
15-18 Earlsfort Terrace
Dublin
Ireland
D02 HR23

CONTENTS

1. INTRODUCTION

This Operational Waste Management Plan (OWMP) details how waste generated from the operation of a proposed residential and commercial development at City Block 9, North Wall Quay, Dublin will be managed. The OWMP has been developed to ensure that the wastes will be managed in accordance with all legal requirements and to meet current best practice in waste management. Specifically, the OWMP seeks to ensure that waste is managed in accordance with the Waste Hierarchy such that opportunities for waste reuse and recycling are maximised and the amount of waste sent to landfill is minimised.



Source: Defra, Guidance on applying the Waste Hierarchy, June 2011

The OWMP has been developed taking account of guidance prepared by the Waste and Resources Action Programme (WRAP) for the management of waste from office buildings (1) and BS 5906:2005 (2).

The following sections of the OWMP discuss the legislative requirements relating to management of waste from the development and local waste management infrastructure, provide a description of the development and expected waste streams, and describe proposed waste management arrangements for the development including monitoring to be undertaken.

(1) Waste Management in Office Buildings, WRAP, 2009

(2) BS 5906:2005 - Waste management in buildings - Code of practice

2. POLICY AND LEGISLATIVE SETTING

The development will be impacted by European, national and local waste management policies and laws.

2.1 European Waste Management Policies and Laws

In general, European legislation comprises Directives and Regulations. EU Directives set out objectives or policies that must be implemented by each member state but it is up to individual member states to pass relevant domestic legislation to give effect to the terms of each Directive. EU Regulations are self-executing and do not require implementing measures from individual member states. European waste management policy is generally implemented by means of Directives and hence through laws enacted in individual countries although there are some waste Regulations. Ireland transposes EU Directives into national law by means of Acts and Regulations.

There are several EU Directives relating to the management of waste but those of particular relevance to the development include the following.

The ***Waste Framework Directive*** (3) – this sets out basic concepts and definitions as well principles for other legislation related to waste management. It includes the concepts of the 'polluter pays principle' and the 'waste hierarchy'. The latter specifies a hierarchy of preferred means of managing waste (see diagram in *Section 1*).

The ***Landfill Directive*** (4) – although this includes a lot of technical detail regarding how landfill sites are to be operated, it also obliges member states to reduce the amount of biodegradable waste they send to landfill through a series of targets. It also requires waste to be treated prior to landfill.

The ***WEEE Directive*** (5) - as well aiming to improve the design of electrical and electronic equipment, this Directive promotes the reuse, recycling and other forms of recovery of waste electrical and electronic equipment (WEEE).

The ***Industrial Emissions Directive (IED)*** (6) – relates primarily to the reduction of pollution from industrial processes but it also includes requirements regarding the permitting of potentially polluting processes such as waste management operations.

2.2 National policy and Legislation

2.2.1 Policy

Over the past 20 years or so the Irish Government has issued a number of policy documents relating to the management of waste, partly in response to European initiatives to increase reuse and recycling and to reduce reliance on landfill. The main policy documents and their key objectives have been as follows (7):

(3) Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

(4) Directive 1999/31/EC of 26 April 1999 on the landfill of waste

(5) Directive 2012/19/EC of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment

(6) Directive 2010/75/EU on industrial emissions

(7) https://www.epa.ie/waste/policy/

Changing Our Ways, 1998 – endorsed the international 'waste hierarchy' including objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste. Specifically, it introduced the requirement to reduce reliance on landfill and instead to adopt alternative methods for managing waste. It specified a target of at least 35% recycling of municipal (including household, commercial and non-process industrial) waste.

Preventing and Recycling Waste – Delivering Change, 2002 - proposed several programmes to increase recycling of waste and divert waste away from landfill to other waste management methods higher up the waste hierarchy. It also stressed the need for waste minimisation at source and announced the establishment of a National Waste Prevention Programme in the Environmental Protection Agency.

Taking Stock and Moving Forward, 2004 – reviewed the progress in waste management in Ireland between 1998 and 2003. It envisaged the introduction of thermal waste treatment as an alternative to landfill and highlighted the need for local authorities to expand collection schemes for dry recyclable materials.

A Resource Opportunity, 2012 – sets out the measures needed for Ireland to make further progress to become a recycling society, with a focus on resource efficiency and the virtual elimination of landfilling of municipal waste. Several actions are listed under a number of sub-headings and some of the key ones relating to this development are as follows:

Planning

- Monitoring of compliance with the waste management hierarchy
- Waste management planning to be undertaken at regional level with no more than 3 regions

Waste Collection

- Strengthened permitting system which ensures only fit and proper persons can hold permits and which requires that collectors deliver mandated service levels and manage waste in accordance with the waste hierarchy
- Increased inspection and enforcement

Waste Prevention

- A focus on resource efficiency, waste prevention and reuse through co-ordination of different agencies, enhanced producer responsibility schemes and use of economic measures (such as the plastic bag levy).

Reuse

- Encouragement and promotion of reuse through awareness campaigns and schemes which facilitate reuse of unwanted goods and materials.

Recycling

- Diversion of organic waste away from landfill through separate collection, via 'brown bin' scheme, and more productive use of this material
- Mandatory service standards for waste collection which will progressively increase the degree of segregation of different materials

Recovery

- Rigorous enforcement of the requirement that waste materials that have been segregated to facilitate recycling are not sent for (energy) recovery or disposal

- A co-ordinated approach to the provision of recovery facilities

Disposal

- Consideration to be given to the use of landfill bans depending on the rate of diversion achieved
- Further review of the rate of landfill tax to ensure it remains a strong disincentive for landfilling

2.2.2 Legislation – Acts and Regulations

Many of the Acts and associated Regulations related to waste management transpose relevant European Union Policy and Directives into Irish law.

Government policy is generally to apply the polluter pays principle. This means that the generator of the waste is obliged to ensure that the waste is properly managed. This applies equally to householders and businesses. In pursuit of the polluter pays principle, the government has imposed producer responsibility obligations on several sectors and waste streams, most notably packaging, waste electrical and electronic equipment, end-of-life vehicles, batteries & accumulators, tyres and farm plastics.

A large number of legal instruments govern the management of waste and outline the responsibilities of waste generators, waste management organisations (private sector and local authorities), waste planning authorities and waste regulators. The principal law is the Waste Management Act 1996 as amended. A series of regulations have been made under the Acts in relation to, for example:

- the authorisation of waste management facilities
- the authorisation of waste collection activities
- the imposition of a landfill levy
- waste management planning
- packaging waste
- hazardous waste
- waste electrical and electronic equipment
- end-of-life vehicles
- batteries and accumulators
- hazardous waste movements within Ireland
- the import and export of waste.

The Environmental Protection Agency (EPA) licenses certain waste activities and these licences are enforced by the EPA's Office of Environmental Enforcement. Industrial installations licensed by the EPA (IED and IPC licences) are also obliged to prevent or minimise waste generation.
The management of municipal and other wastes is provided for in the three Regional Waste Management Plans (Connacht-Ulster Region, Eastern-Midlands Region and Southern Region).

Hazardous waste management is provided for in the National Hazardous Waste Management Plan prepared by the EPA.

The EPA also produces national waste statistics to meet numerous legislative reporting obligations and it makes these data available to the public. These include Ireland's progress towards meeting EU waste targets and estimates for municipal (household and commercial) waste generation together with levels of recycling, recovery and disposal. The EPA estimated the amount of municipal (household and commercial) waste generated in Ireland in 2016 was 2.8 million tonnes – a 6%

increase over 2014. The municipal waste recycling rate was 41% in 2016 and hadn't changed significantly since 2012 (8).

Movement of waste
The movement of waste is regulated and controlled by the *Waste Management Act 1996, as amended*, and related regulations. For movements of waste within Ireland, a waste collection permit must be obtained from the National Waste Collection Permit Office (NWCPO).

Certificate of Registration
Certain waste management activities require a certificate of registration, as listed in Part II of the Third Schedule of *the Waste Management (Facility Permit and Registration) Regulations 2007, S.I. No. 821 of 2007*. The list of activities was amended in 2008 by *S.I. No. 86 of 2008*.

When these activities are carried out by local authorities, the EPA can grant a certificate of registration as authorisation for the activity. When these activities are carried out by private companies, certificates of registration are granted by the local authority in whose area the activity is to be carried out.

The Waste Management Act includes the concept of Duty of Care whereby a waste producer is responsible for his waste from the time it is generated through until its disposal (including its method of disposal.) Clearly, in most cases, a waste producer does not physically transfer his waste from where it is produced to the final disposal area but rather he employs a waste contractor to transport the waste to the final waste disposal site.

The building's facilities management company must manage waste on-site in accordance with all legal requirements and employ suitably permitted contractors to undertake off-site management of the waste in accordance with all legal requirements. The selected contactor must handle, transport and manage the waste (by reuse, recovery, recycling or disposal) in a manner that ensures there is no adverse environmental impact arising from the development's waste. As noted above, a collection permit to transport waste, issued by the NWCPO, must be held by each waste contractor.

The facilities to which the waste is sent for processing or disposal must also be appropriately permitted or licensed. Operators of waste management facilities should have an appropriate Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007, as amended*, or a waste or IED (Industrial Emissions Directive) licence granted by the EPA. The COR/permit/licence will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

2.3 Local Policy and Bye-laws

The development is located within the Dublin City Council (DCC) administrative area which is within the Eastern-Midlands Region (EMR) for waste planning purposes. The EMR *Waste Management Plan 2015 – 2021* was published in May 2015 and has three specific objectives and associated targets:

1. Prevent waste: a reduction of one per cent per annum in the amount of household waste generated over the period of the plan
2. More recycling: increase the recycle rate of domestic and commercial waste from 40 to 50 per cent by 2020
3. Further reduce landfill: eliminate all unprocessed waste going to landfill from 2016.

(8) https://www.epa.ie/irelandsenvironment/waste/

The *Dublin City Development Plan 2016 – 2022* (9) presents the spatial planning policies of the City Council and sets out a number of policies and objectives in line with the objectives of the regional waste management plan. Chapter 9 of the Development Plan deals with Sustainable Environmental Infrastructure and Section 9.5.5 addresses Waste Management.

The waste management policies stated in the Plan are as follows:

SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin city and the region to become self-reliant in terms of waste management.

SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.

SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.

SI22: To ensure that effect is given as far as possible to the 'polluter pays' principle.

The associated waste management Objectives presented in the Plan are as follows:

SIO15: To provide for municipal/public recycling and recovery facilities in accessible locations throughout the city.

SIO16: To require the provision of adequately-sized-recycling facilities in new commercial and large scale residential developments, where appropriate.

SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.

SIO19: To implement the Eastern-Midlands Waste Management Plan 2015 -2021 and achieve the plan targets and objectives.

The second of these objectives is of particular relevance to the proposed development.

The development will be subject to the *Dublin City Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws, 2018*. These Bye-Laws, adopted by DCC in accordance with Part 19 of the *Local Government Act 2001*, came into effect in May 2019 and apply to both household and commercial waste within the Council's area.

The Bye-Laws set a number of enforceable requirements on waste holders and collectors with regard to storage, separation, presentation and collection of waste within the Council's functional area. The main provisions of the Bye-Laws are as follows (10):

- Holders of waste must have their waste collected by an approved collector or disposed of at an approved facility.
- Segregation of organic waste is required for holders of household and commercial waste (Brown Bin scheme).
- A recommended list of materials that are acceptable for the household 'brown bin' scheme.
- The holder of waste and authorised waste collector for a household or commercial premises must be clearly identified from the waste container itself (includes bag collections).
- Waste Collectors must offer Household and Commercial customers the same service frequency in the Central Commercial District.
- If a customer has storage space restrictions the priority of bins is as follows;

(9) Dublin City Development Plan 2016-2022 - Written Statement
https://www.dublincity.ie/sites/default/files/content/Planning/DublinCityDevelopmentPlan/Written%20Statement%20Volume%201.pdf

(10) http://www.dublincity.ie/main-menu-services-water-waste-and-environment-waste-and-recycling/waste-bye-laws

1. Organic
2. General
3. Recylables.

- Within the Central Commercial District (CCD) waste collection is only to take place between 7pm and 12pm on collection day. Waste is not to be presented for collection before 5pm.
- Outside the CCD collections are only to take place between 6am and 9pm. This is restricted to 8am to 8pm at weekends and Bank Holidays. Waste is not to be presented for collection before 6pm on the day before collection.
- Waste Operators will only be able to collect waste in defined areas on a designated day which can be determined by the City Council.
- Provision is made for an on-the-spot fine of €75 for breaches of the Bye-Laws.

Municipal landfill charges in Ireland are based on the weight of waste disposed and include landfill tax introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2013.

3. LOCAL WASTE MANAGEMENT INFRASTRUCTURE

There are several private sector contractors that offer waste collection services for the household and commercial sectors in the Dublin area. As noted in *Section 2.2*, details of waste collection permits (granted, pending and withdrawn) are available from the National Waste Collection Permit Office (NWCPO).

In line with the waste hierarchy and the move away from landfill disposal, there is a decreasing number of landfills available in Ireland and specifically within the Dublin area. There are currently five landfills that accept municipal waste for disposal and two municipal waste incinerators that accept municipal waste for energy recovery in Ireland (11). Details of all waste/industrial emissions (IE) licenses issued are available from the EPA.

(11) https://www.epa.ie/irelandsenvironment/waste/

4. THE PROPOSED DEVELOPMENT

The scheme, totalling 125,388 sq m, provides 22,499 sq m at basement levels, with 102,889 sq m from ground upwards. The development will consist of the:
1. Construction of 1,005 No. residential units (with balconies and winter gardens) arranged in 3 No. blocks ranging in height from 8 No. storeys to 45 No. storeys over a triple-level basement, the former comprising: Block A (8-14 No. storeys (with extended core to access roof level); with an apartment mix of: 116 No. 1-bed; and 92 No. 2-bed; with landscaped terraces at Level 1 (south east elevation), Level 8 (south west elevation), Level 11 (south west elevation) and Level 14 (north east elevation)); Block B (8-41 No. storeys (with extended core to access roof terrace); with an apartment mix of: 172 No. 1-bed; and 247 No. 2-bed; with landscaped terraces at Level 5 (south west elevation), Level 8 (north west elevation and south west elevation), Level 11 (north elevation), Level 12 (west elevation), Level 13 (east elevation), Level 14 (east elevation), and at Level 41 (roof level)); and Block C (11-45 No. storeys (with extended core to access roof level); with an apartment mix of: 207 No. 1-bed; 168 No. 2-bed; and 3 No. 3-bed units; with landscaped terraces at Level 11 (north elevation), Level 24 (south elevation), Level 32 (south elevation), and Level 45 (roof level), incorporating a public viewing deck at Levels 44 and 45).

2. Provision of ancillary residential amenities and support facilities including: live/work suites (321 sq m), a gym/spa reception (52 sq m), a residents' games room (91 sq m), a residents' common room (110 sq m), a residents-only social space (193 sq m), a management office (96 sq m), a security office (50 sq m), concierge spaces (GFA of c. 381 sq m) all located at ground floor level; a residents' games room (90 sq m) located at Level 1 of Block B; a residents' common room (86 sq m) located at Level 14 of Block B; a residents' wellness club and common room (408 sq m) located at Level 24 of Block C;

3. Construction of triple height basement which will comprise double basement with mezzanine plant level (total basement area 22,499 sq m), accommodating: waste storage areas (659 sq m), plant rooms (4,228 sq m), maintenance / management offices (GFA of 92 sq m), residents' courier / parcel rooms (GFA of 210 sq m), residents' laundry rooms (GFA of 138 sq m), ancillary residential storage (GFA of 291 sq m), residents' WCs (65 sq m), a residents' gym / spa (1,529 sq m) and ancillary gym storage room (100 sq m), residents' screening rooms (240 sq m), a residents' indoor plant cultivation room (356 sq m), 176 No. car parking spaces, 10 No. motorcycle parking spaces and 1,693 No. bicycle parking spaces, with vehicular access provided by ramp from North Wall Avenue.

4. Provision of "other uses" as defined by the Planning and Development (Housing) and Residential Tenancies Act 2016, comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmer's Market/foodhall (299 sq m), an external market area, a winter garden/seating area (130 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Floor Level 41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C. The total area of "other uses" provided is 4,307 sq m.

5. Provision of a pocket park and new pedestrian lanes from North Wall Quay, North Wall Avenue and Mayor Street Upper to the center of the site.

6. All enabling and site development works, landscaping (including living walls), lighting, services and connections, waste management and all other ancillary works above and below ground including the use of existing secant piling permitted under Reg. Ref. DSDZ3779/17 and DSDZ3780/17 (as amended by DSDZ3042/19).

4.1 Expected Waste Arisings

The majority of waste generated during the operation of the development will comprise household waste from the residential units. In addition there will be food and packaging waste from the four restaurants and a very small amount of non-hazardous dry waste from the leisure facilities and few commercial units.

The main types of waste expected from the operation of the building are listed in the table below.

Waste type	Example sources
Paper and cardboard	Scrap paper, packaging, newspapers and magazines from residential units and offices
Plastic	Packaging, drinks bottles
Metal (ferrous and non-ferrous)	Drinks cans, food tins
Glass	Drinks bottles
Composite packaging	Food and drinks packaging
Organics	Food waste – from the residential units and restaurants
Cooking oil	From the residential units and restaurants
Textiles	Discarded clothes from the households
Batteries (hazardous and non-hazardous)	Household and office equipment
Waste Electrical and Electronic Equipment (WEEE)	Computers and other electrical equipment from households and commercials
Chemicals	Pest control, detergents used by building maintenance company

Over time, any periodic refurbishment of the residential units, restaurants and offices is likely to result in a range of other wastes including wood, plasterboard, polystyrene tiles, electrical wire, paints and adhesives and discarded furniture and equipment.

4.2 Waste Volumes

The volumes of waste expected to be generated during the operation of the development have been estimated as follows.

4.2.1 Residential Waste

Type of Unit	Assumed average occupancy per unit (persons) (1)	Number of units	Total number of residents
1 bedroom	1	495	495
2 bedroom	4	507	2,028
3 Bed	6	3	18
Total	-	1,005	2,541

Note (1) Tom Phillips Associates - Compilation of Final Drawings and Areas, 3rd December 2020

Waste generation rates:

Waste type	Waste Generation		
	Per person	For Waterfront development	
units	kg/year (1)	tonnes/year	m3/year (2)
Mixed Residual Waste (MRW)	143	363	1,646
Mixed Dry Recyclables (MDR)	53	135	748
Organic Waste (OW)	24	61	203

Notes
1) Assuming averages rates of waste generation for Irish households based on EPA waste statistics - http://www.epa.ie/nationalwastestatistics/municipal/
2) Based on un-compacted densities – WRAP: *UK conversion factors for waste*

4.2.2 Restaurant Waste

Four restaurants
Assumed total throughput = 400 covers (meals) per day

Waste type	Waste Generation		
	Per meal	For Waterfront development	
units	kg (1)(2)	tonnes/year	m3/year (3)
Mixed Residual Waste (MRW)	0.75	110	521
Mixed Dry Recyclables (MDR)	0.25	37	174
Organic Waste (OW)	0.28	41	204

Notes
1) Taken from WRAP data for restaurant waste - http://www.wrap.org.uk/sites/files/wrap/Restaurants.pdf
2) Assuming 25% of non-food waste can be recycled (similar proportion as for household waste)
3) Based on un-compacted densities – SEPA: *UK Conversion factors for waste*

5. PROPOSED WASTE MANAGEMENT ARRANGEMENTS

The overall objectives of the proposed waste management arrangements for the development are to ensure that waste is managed in accordance with all legal requirements, as discussed in *Section 2* above, and to seek to manage wastes in accordance with the waste hierarchy (see diagram in *Section 1*). By ensuring that different wastes are appropriately segregated, the aim will be to maximise the potential for reuse and recycling of materials and hence to minimise the amount of waste that needs to be disposed and, specifically, the amount that needs to be landfilled.

It is expected that
- Residents will take their waste to a centralised waste storage area on the basement floor – one store per block so that residents don't need to carry waste too far
- Restaurants - similarly
- Office units - similarly

The service management company will be responsible for managing the waste store(s) and arranging for the collection/treatment/disposal of the wastes

Will wheel bins to a central loading bay which will be accessible to RCVs
- Layout of basement designed to allow access of RCVs , height basement (approx. 4.5m) provides sufficient clearance for wheeled bins to be emptied into a rear end loader (REL) RCV

5.1 Waste Segregation

Residents requested to segregate their wastes

A series of different containers will be provided in order to separately store different waste materials pending their collection for either recycling or disposal. Specifically, the following four categories of waste will be stored separately within the building's waste storage areas:

- Dry recyclables
- Glass
- Organics
- Residual

Residents and other occupants (restaurants, commercial units etc) within the building will be required to separate their waste materials into the four categories within their own premises and store them temporarily in suitable bins/containers and periodically/when convenient transfer the segregated wastes to the building's waste storage area.

The table below shows examples of the individual types of waste for the four categories of waste. The facilities management team will provide information to residents and other occupiers to make sure that everyone living or working in the building understands how the waste segregation system is supposed to operate and it will monitor the waste materials being put into the different containers to make sure that wastes are being segregated appropriately. If necessary further instruction will be provided to residents and individual units.

Waste Category	Example wastes
Dry recyclables (1)	Paper – scrap paper, newspaper, magazines Cardboard Plastics – drinks bottles, packaging. Not plastic film(2). Metals – drinks cans Composite drinks/food cartons (Tetra-Pak' cartons)
Glass	Glass bottles
Organics	Food scraps Plants, flowers
Residual (mixed non-recyclables)	Other non-hazardous wastes Plastic film Mixed wastes that cannot be separated Contaminated materials (eg 'wet' paper)

Notes
(1) All dry materials for recycling must be clean and, in the case of containers, empty
(2) https://voiceireland.org/news/post.php?s=2018-03-20-soft-plastics

In order to ensure that the dry recyclable materials can be recovered for recycling and to ensure that as little material as possible is subsequently 'rejected', residents and occupants of other units will be requested to ensure that materials are dry and clean. Any materials which become contaminated will need to be disposed with the residual, non-recyclable wastes.

The expected very small amounts of more hazardous wastes such as printer toner cartridges, waste electrical equipment, fluorescent bulbs and batteries will be taken to a separate area within the waste storage area and stored securely until a sufficient volume has been accumulated to make up a load for treatment/disposal by a specialised waste contractor (see below).

Similarly, the restaurants will store any used cooking oil securely in suitable containers and regular collections by a suitably authorised waste contractor for recycling will be arranged.

5.2 Waste Storage

There will be dedicated waste storage areas in the basement of each block to which the residents and other occupiers will take their wastes. These waste storage areas will have containers for the four general types of waste discussed above. The exact details of the containers will depend on the appointed waste contractor (to be compatible with the contractor's collection vehicles) but they are likely to be 1100 litre wheeled containers similar to the ones shown below.

All containers used will comply with legal requirements and recognised standards such as BS EN 840-2:2012 (12).

To facilitate correct segregation, suitable labels and pictograms will be placed on all waste bins to show the types of waste that should be placed within each bin.

The waste containers will be kept closed at all times except when waste is being placed into them and collection will be frequent enough to avoid problems of odour and the attraction of vermin (in the case of organic waste). The rate of waste generation will be monitored and a sufficient number/size of containers will be provided to ensure adequate capacity for the safe and environmentally sound storage of all waste from the building. If necessary, the frequency of collections will be adjusted to match the rate of waste generation.

In addition, separate containers will be used for storing the small quantities of other wastes such as toner cartridges and batteries until sufficient volumes have been accumulated to warrant collection and treatment or disposal by a specialist contractor, each tenant will arrange disposal.

The waste storage areas will be easily accessible for residents and tenants to place their waste into the storage containers but the skips will be secured so that only authorised persons can move them (see Section 5.3).

In addition, the waste storage areas will:

- be well ventilated to prevent the build-up of odours;
- have suitable lighting to allow safe operation (loading and unloading of containers);
- have a non-slip floor;
- have appropriate signs to indicate the contents of each container and also to indicate contact names and phone numbers for emergencies; and
- be subject to vermin control measures as required.

All containers will be clearly labelled and colour-coded to minimise the risk of contamination of the recyclable materials by incorrect waste materials being put into those containers.

(12) Mobile waste and recycling containers. Part 2: Containers with 4 wheels with a capacity up to 1 300 l with flat lid(s), for trunnion and/or comb lifting devices – Dimensions and design

The facilities management team will maintain the bins in good condition and ensure the waste storage area is kept clean and tidy at all times. The rate at which the bins are filling will be closely monitored and collection will be arranged before any containers become full.

As noted above, the facilities management team will monitor wastes being put into the different containers. In the case of incorrect materials being found in a bin, if it is safe to remove the items this will be carried out but generally, for example in the case of contamination of dry recyclables, the particular bin will be 'reclassified' as a 'residual waste' container. If there is ongoing miss-allocation of waste to bins the occupants of the block(s) concerned will be notified by means of noticeboards and leaflets with instruction as to how to segregate waste properly.

If any potentially hazardous materials are found, the individual load will be quarantined and a specialist waste management contractor will be contacted to manage the waste.

5.3 Waste Collection

Co-ordinaton with the nominated waste contractor and at appropriate time bins will be moved from the individual waste storage areas for each block to a centralised loading bay at which the skips will be emptied into the waste collection vehicle (RCV) for onward transport for treatment/disposal.
Only authorised members of the FM team will have keys to unlock skips and be allowed to move them to the loading bay at the appropriate time.

The loading bay will be designed to allow safe access for collection of the different wastes by suitable waste collection vehicles.

Arrangements will be made for waste to be transported from the building by contractors with appropriate NWCPO-issued collection permits using suitable vehicles. The permits will be checked before contracts are arranged and at least annually during the contract period. Collection of waste will be supervised to make sure appropriate vehicles are being used and that waste is secured safely/covered, to avoid problems of windblown litter for example, before the vehicle leaves the building.

5.4 Treatment/ disposal

As noted above, the aim will be for as much as possible of the building's waste to be recycled. The waste which cannot be recycled, the mixed residual waste (MRW) stream, will be sent for energy recovery at an energy from waste (EfW) facility. Discussions will be held with the collection contractor(s) to confirm the fate of the different waste streams and to ensure, for example, that all wastes are going to appropriately permitted waste processing facilities and that, in the case of dry recyclable materials, the amounts being recycled are being maximised.

Periodically during the collection contracts, contact will be made with the treatment/disposal contractors to confirm that the building's waste is going to the agreed facilities. In case of any doubt or suspicion that waste is not being taken to the agreed waste treatment facility, this will be discussed immediately with the waste collection contractor. In the event that it is discovered that waste has been sent to an inappropriate facility the EPA will also be advised accordingly.

Before changing to any alternative waste treatment/disposal arrangements the waste collection contractor will be required to agree this with the building's facilities management team who will carry out suitable checks to ensure the proposed treatment/disposal contractor is appropriately licensed. Checks will also be carried out to ensure that the proposed method of treatment meets the aim of maximising waste recycling.

5.5 Monitoring

The building's facilities management team will be responsible for monitoring compliance with various aspects of this OWMP. This will include the following:

- Checking the waste deposited in the bins to make sure it complies with the waste segregation requirements. If necessary they will advise residents and occupants of units in a particular block about which wastes can be placed in each of the four main types of container.
- Checking on the permit of the waste collection contractor prior to contract award and periodically throughout the contract.
- Checking on the suitability of the vehicle and security of the waste as the waste is collected by the waste transporter.
- Ensuring that all wastes are being taken to appropriately licensed waste processing/disposal facilities.
- Periodically checking the facilities to which the building's waste is taken to make sure it is being managed appropriately and as much as possible is being recycled

In addition, records will be kept of the volumes of waste produced from operation of the building together with data regarding the proportion of waste that is recycled and disposed (landfilled and incinerated). Trends in these data will be analysed and the building's occupants will be advised accordingly – for example by means of notices in residents' communal areas. The aim will be for the building as a whole to meet the targets set by Dublin City Council to recycle at least 50% of all the waste generated. In addition the target will be to reduce year on year the amount of waste generated (on a per capita basis) as well as increasing the percentage of waste recycled.

In order to help achieve these target, the facilities management team will monitor any developments in local waste management services – specifically the introduction of any new recycling schemes. The four-bin system of waste collection will be periodically reviewed and revised if appropriate (eg through the collection of additional materials and/or introduction of a different segregation system).

6. CONCLUSIONS

The principles and proposed waste management arrangements detailed in this Operational Waste Management Plan (OWMP) are line with national and local waste management policy and will ensure that waste from the development is managed in accordance with all legal requirements. Specifically, the waste generated by all occupants (residents, restaurants and other units) will be managed by the building's facilities management organisation to comply fully with the *Dublin City Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws, 2018* in the way that waste is segregated, stored and treated/disposed. Specifically:

- an authorised waste collector, with a permit to transport waste issued by NWCPO, will be engaged to service the waste containers used for the storage of waste at the development
- The facilities management company will ensure that:
  - separate containers of sufficient capacity (size and number) are provided for the proper segregation, storage and collection of recyclable and residual (non-recyclable) waste materials
  - separate receptacles will be provided for the storage and collection of food waste
  - written information will be provided to each resident and tenant of other units to explain the arrangements for waste separation, segregation, storage and presentation for collection
  - Waste containers will be clearly labelled to indicate the contents (type of waste) and provide contact numbers for further information.

The OWMP also addresses the main objectives and targets in the Eastern-Midlands Region (EMR) *Waste Management Plan 2015 – 2021* namely:

- More recycling: increase the recycle rate of domestic and commercial waste from 40 to 50 per cent by 2020 – the development will aim to achieve at least a 50% recycling rate
- Further reduce landfill: eliminate all unprocessed waste going to landfill from 2016 – the aim will be for all mixed residual waste (that waste which is not recycled) to be disposed via energy from waste so that no waste from the building is sent to landfill.

ERM has over 160 offices across the following countries and territories worldwide

Argentina
Australia
Belgium
Brazil
Canada
Chile
China
Colombia
France
Germany
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
Myanmar
The Netherlands
New Zealand
Norway
Panama
Peru
Poland
Portugal
Puerto Rico
Romania
Russia
Singapore
South Africa
South Korea
Spain
Sweden
Switzerland
Taiwan
Thailand
UAE
UK
US
Vietnam

ERM Dublin

Environmental Resources Management

Suite G01, The Victorians

15-18 Earlsfort Terrace

Dublin

Ireland

D02 HR23

www.erm.com

The business of sustainability

ERM

12.0 MATERIAL ASSETS – TRAFFIC AND TRANSPORTATION

12.1 Introduction

This Chapter of the EIAR assesses any likely or significant impacts associated with traffic and transport issues arising from the proposed development. The report presents an assessment of both the operational and construction stages of the proposed development. The focus of the assessment is however primarily on the operational stage, which is anticipated to have a greater impact on the prevailing environment than the construction stage. Relevant mitigation measures are also presented in this chapter.

This chapter has been prepared by Gordon Finn, BA, BAI, MAI, MIEI, Roads and Traffic Engineer with Cronin & Sutton Consulting Engineers (CS Consulting). This assessment is based in part on the outcome of the Traffic Impact Assessment (TIA) report prepared by CS Consulting and submitted separately in support of this SHD planning application.

12.2 Methodology

The methodology adopted for the assessment of traffic impact is summarised as follows:

1) A vehicular traffic count survey was undertaken at 6 No. sites on the surrounding street network, to establish background traffic flows and existing peak hours;

2) A development trip generation assessment was carried out using TRICS data, to determine the potential vehicular trips to and from the proposed development site during peak hours. The vehicular trip generation of other nearby permitted and planned developments was also assessed;

3) An appropriate distribution across the surrounding street network was assigned to vehicular trips generated by the subject development and by other permitted and planned developments, based upon existing traffic characteristics;

4) A spreadsheet model was created containing baseline year do-nothing traffic flow data. These traffic data were used to develop a TRANSYT model incorporating 5 No. surveyed junctions, as well as the proposed development access junction on North Wall Avenue; and

5) 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 junctions in this model was assessed for the baseline year (2020), the proposed year of opening (2023), 5 years after opening, and 15 years after opening (the Design Year Assessment).

12.2.1 Background Peak Hour Identification

A 12-hour classified vehicular traffic count survey was undertaken on Wednesday the 10th of April 2019 by Irish Traffic Surveys, on behalf of CS Consulting. This survey was conducted

between 07:00 and 19:00, at 6 No. sites on North Wall Avenue, North Wall Quay, Mayor Street Upper, and Castleforbes Road. The surveyed traffic flows were then scaled up using TII growth factors to obtain background traffic flows for the baseline year of 2020.

Including Luas movements, the weekday peak hour background traffic flows across all survey sites were found to occur between 07:15 and 08:15 (AM peak hour) and between 17:15 and 18:15 (PM peak hour). Further detail of this traffic survey is given in **paragraph 12.3.3 (Traffic Surveys).**

12.2.2 Vehicular Trip Generation of Subject Development

The subject development comprises:

- 1,005 No. apartments;
- 1,894 sq m GFA of commercial office space;
- a childcare facility with a total GFA of 450 sq m;
- a gym/spa with a GFA of 1,529 sq m;
- restaurant/café/bar units with a combined GFA of 1,964 sq m; and
- other minor ancillary uses.

Some 905 No. apartments shall be privately owned and 100 No. apartments shall be assigned to Part V social housing. Trip generation factors from the industry-standard TRICS database have been used to predict the trip generation to and from the proposed development, for both the AM and PM peak hour periods. The TRICS sub-categories '03 Residential / C – Flats Privately Owned' and '03 Residential / D – Affordable/Local Authority Flats', and '02 Employment / A – Office' have been employed, as these represent the sub-categories most applicable to the subject development.

The TRICS trip rates for the proposed development have been selected from the above sub-categories, restricted insofar as possible to similar locations at the edges of city centres, and further refined with reference to 2016 CSO census data on the basis of the:

- Population within 1 mile of the development site (50,000 approx.);
- Population within 5 miles of the development site (700,000 approx.); and
- Aggregate mean car ownership rate within 5 miles of the development site (0.94 cars per household).

TRICS Sub-Category	Arrivals		Departures	
	AM Peak	PM Peak	AM Peak	PM Peak
Flats Privately Owned (trips per apartment)	0.027	0.085	0.075	0.060

Affordable/Local Authority Flats (trips per apartment)	0.022	0.058	0.045	0.039
Offices (trips per 100 sq m GFA)	0.220	0.041	0.020	0.350

Table 12.1: TRICS Trip Generation Rates

All car parking spaces within the development shall be assigned to residential use; the development's childcare facility, gym/spa, and restaurant/café/bar units have therefore not been included in the trip generation calculations. The development's commercial office element has however been included, as this has the potential to generate a limited number of vehicular trips (including taxis and deliveries) during peak hours.

Vehicular trip numbers were calculated as a function of the TRICS trip rates given above and the total numbers of residential units (905 No. BTR/BTS apartments and 100 No. Part V apartments) within the proposed development, as well as the total office floor area (1,894 sq m GFA). The following trip generation figures were calculated for the development as a whole:

Development Element	**Arrivals**		**Departures**		**Total Trips**	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
BTR/BTS Apartments	24	77	68	54	92	131
Part V Apartments	2	6	5	4	7	10
Office Space	4	1	0	7	4	8
TOTAL	**30**	**84**	**73**	**65**	**103**	**149**

Table 12.2: Subject Development Trip Generation from TRICS

12.2.3 Vehicular Trip Generation of Nearby Permitted and Planned Developments

Vehicular trips predicted to be generated by permitted developments in the vicinity of the subject site, which were not operational at the time of the traffic survey, were also included in the background traffic flows for future assessment years.

Trips to be generated by permitted developments under the following register references were included (see TIA report for development locations):

- DSDZ2135/18 (commercial development with GFA of 43,445 sq m, primarily comprising offices, with 91 No. car parking spaces and vehicular access to/from existing service road between Sheriff Street and Castleforbes Road);

- DSDZ3350/15 and subsequent amendments ('Project Wave' development, comprising 63,697 sq m GFA office space, 283 No. apartments, gym, café, and retail, with vehicular access to basement car park to/from Castleforbes Road); and

- DSDZ3800/17 & DSDZ3805/17 (241-bedroom aparthotel and 18,679 sq m GFA office development, with 30 No. car parking spaces and vehicular access to/from North Wall Avenue)

The predicted trip generation for the above permitted developments is given in **Table 12.3**. Further detail on the calculation of these figures (including the relevant TRICS data employed) is given in the Traffic Impact Assessment report prepared in support of this SHD planning application.

Permitted Development Ref.	Arrivals		Departures		Total Trips	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
DSDZ2135/18	96	18	9	152	105	170
DSDZ3350/15	85	40	44	137	129	177
DSDZ3800/17	28	6	4	36	32	42

Table 12.3: Permitted Development Trip Generation

In addition to the relevant permitted developments included, the Traffic Impact Assessment also takes account of planned development on the remaining areas of City Block 9. It is presently envisaged that future development of these areas will accommodate a total of 50,561 sq m of office space, with basement car parking and a vehicular access to/from Castleforbes Road (facing the recently constructed Project Wave basement access). The predicted trip generation for this planned development is given in **Table 12.4**.

Arrivals		Departures		Total Trips	
AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
111	21	10	177	121	198

Table 12.4: Associated Planned Development Trip Generation

12.2.4 Vehicular Trip Distribution

Vehicular trips generated by the subject development, nearby committed developments, and associated planned development within City Block 9 have generally all been distributed across the surrounding street network on the basis of the following assumptions:

- at each of the surveyed or assessed junctions encountered by traffic to or from a development, such traffic shall follow the directional splits observed at that junction in the relevant peak hour period; and

- at development accesses (where not part of a surveyed junction), the proportions of traffic that will arrive or depart in either direction along that street shall follow the surveyed directional splits of existing traffic along the street in the relevant period.

Further detail of the trip distributions applied is given in the Traffic Impact Assessment report prepared in support of this SHD planning application.

12.2.5 Operational Assessment

The operational performance of 6 No. existing and proposed road junctions was assessed using industry-standard TRANSYT software (see **Figure 12.1**):

J1. Castleforbes Road / Mayor Street Upper
(existing 4-arm signal-controlled junction, including Luas);

J2. North Wall Avenue / Gibson Hotel Access / Luas Stop / Exo Construction Site Access / Mayor Street Upper
(modelled as existing 6-arm signal-controlled junction, including Luas);

J3. North Wall Quay / Castleforbes Road
(existing 3-arm priority-controlled junction);

J4. North Wall Quay / North Wall Avenue
(existing 3-arm signal-controlled junction);

J6. Castleforbes Road / Planned Development Access (east) / Underground Car Park (west)
(partially existing staggered 4-arm priority-controlled junction); and

J7. North Wall Avenue / Committed Dev. Access (east) / Subject Development Access (west)
(future 4-arm priority-controlled junction)

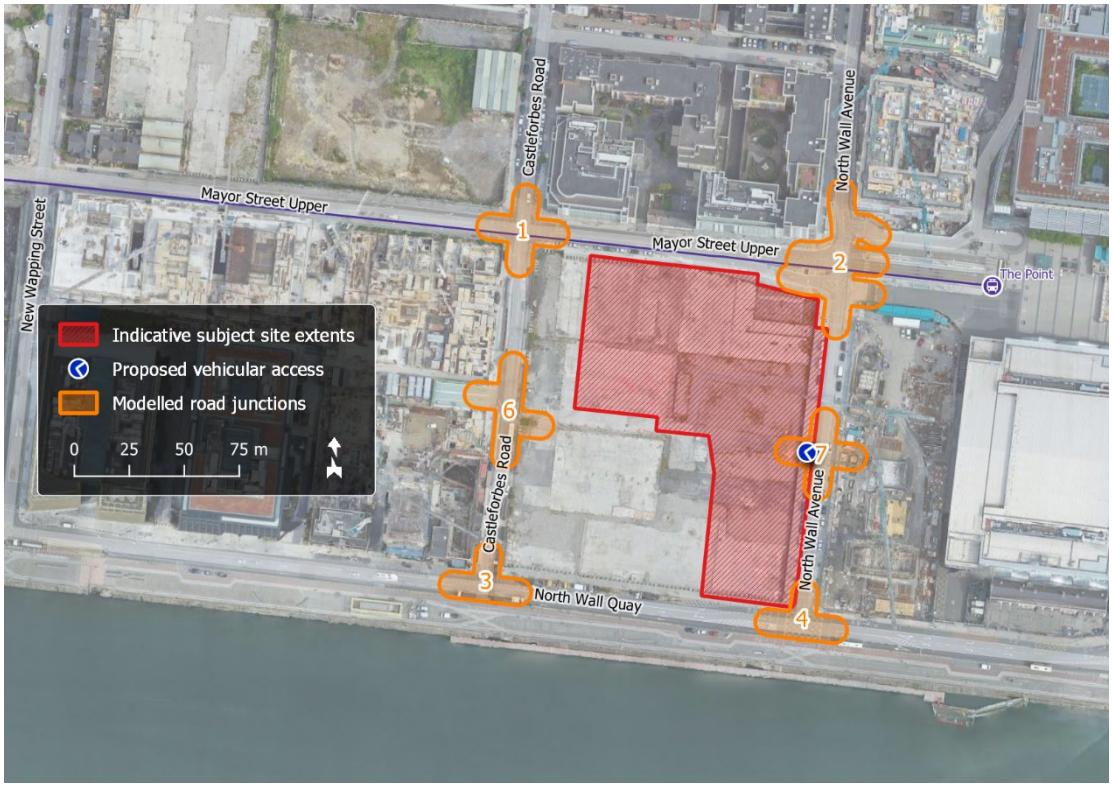


Figure 12.1: Modelled road junction sites (map data & imagery: OSM Contributors, Google)

Note: the assessed junctions have been numbered so as to be consistent with the numbering of the surveyed junctions (see **paragraph 12.3.3 (Traffic Surveys)**). Junction site J5 therefore

does not feature in this list; this junction was surveyed but has not been assessed by reason of its distance from the subject site and the subject development's negligible proportional contribution to traffic volumes at this location.

An integrated model was constructed that incorporated the above-listed six linked junctions. The performances of these were then assessed under the following scenarios:

- 2020 (baseline year) – existing traffic conditions;
- 2023 (planned year of opening) – with & without subject development;
- 2028 (5 years after opening) – with & without subject development;
- 2038 (design year) – with & without subject development.

For all assessment years, the surveyed 2019 background traffic flows were scaled up using standard growth factors sourced from Unit 5.3 of the TII *Project Appraisal Guidelines* (PE-PAG-02017 *Travel Demand Projections*). Traffic flows relating to the permitted and planned developments described in **paragraph 12.2.3** were included in the assessment of all future year scenarios.

Junction performance was assessed under the following criteria, for each junction approach arm:

- Degree of Saturation (the ratio of current traffic flow to ultimate capacity on a link or traffic stream);
- Maximum Queue at End of Red (the maximum 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);
- Mean Maximum Queue (the highest estimated mean number of Passenger Car Units queued in any lane of a junction approach link, averaged over the entire analysis period);
- Mean Delay per PCU (the average delay incurred by a vehicle on a junction approach); and
- Practical Reserve Capacity (the percentage by which the arriving traffic flow on a stream could increase before the stream would reach its effective capacity).

12.3 Receiving Environment (Baseline Situation)

12.3.1 Location

The site of the proposed development forms part of City Block 9 within the North Lotts and Grand Canal Dock Strategic Development Zone, and is bounded by North Wall Avenue to the

east, Mayor Street Upper to the north, North Wall Quay to the south, and Castleforbes Road to the west. City Block 9 has a total area of approx. 1.95ha and is located in the administrative jurisdiction of Dublin City Council.

The location of the proposed development site is shown in **Figure 12.2**; 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**.

The subject site is brownfield and has been excavated as part of ongoing permitted construction activity. The site currently generates negligible vehicular traffic.

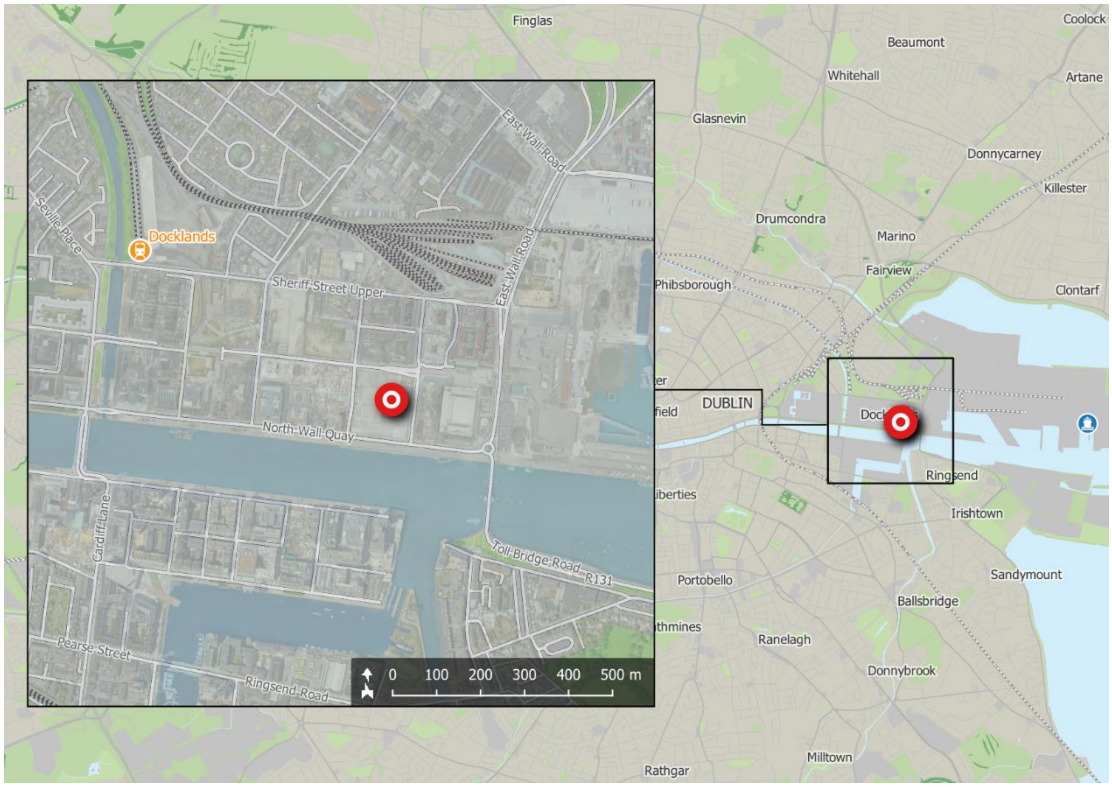


Figure 12.2: Development site location (map data & imagery: EPA, OSi, OSM Contributors, Google)

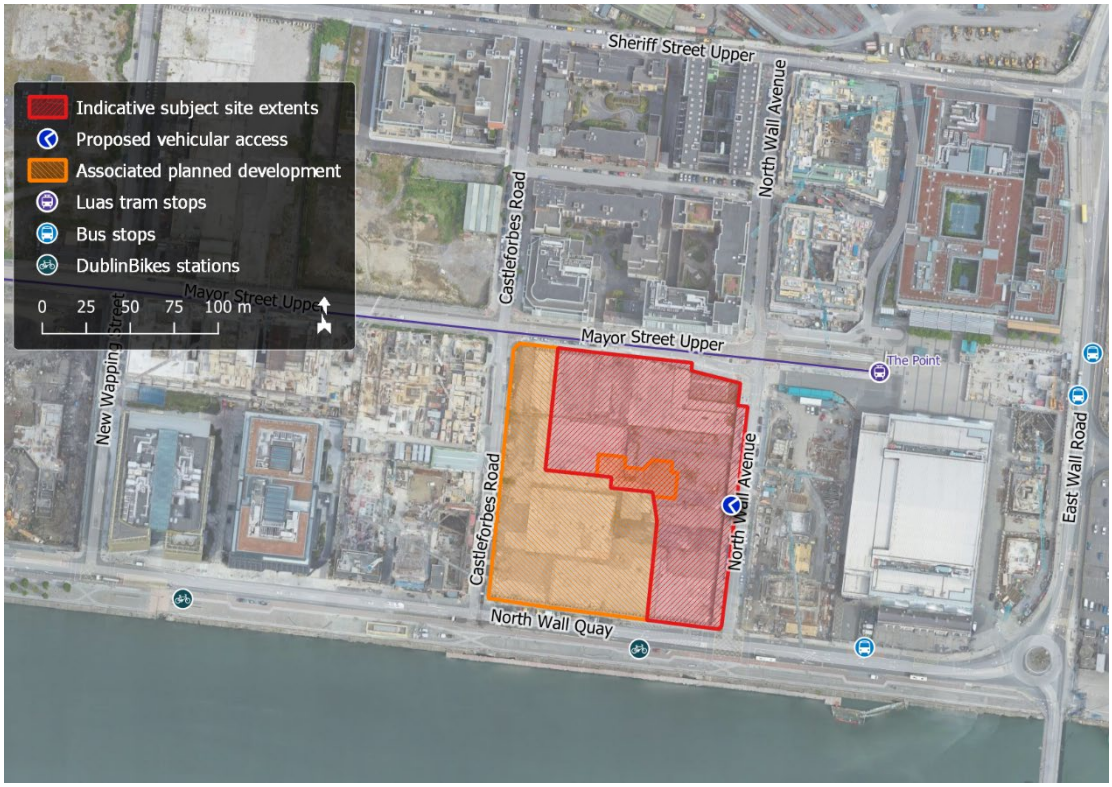


Figure 12.3: Site extents and environs (map data & imagery: NTA, OSM Contributors, Google)

12.3.2 Existing Transport Infrastructure

Road Network

The existing road network in the immediate vicinity of the subject site comprises the streets of North Wall Avenue, Mayor Street Upper, Castleforbes Road, and North Wall Quay. The characteristics of these streets are given below.

North Wall Avenue

- Single carriageway street with a total pavement width of approx. 6.3m generally in the vicinity of the subject site.
- Local street with a north-south alignment, connecting to North Wall Quay in the south and to Mayor Street Upper and Sheriff Street Upper in the north.
- Raised footpaths are present along both sides of North Wall Avenue. No cycle lanes or bus lanes are present.
- A number of recessed on-street parking bays are in place along both sides of North Wall Avenue in the vicinity of the subject site.
- North Wall Avenue is subject to a 30km/h speed limit.

Mayor Street Upper

- Single carriageway street with a total pavement width of approx. 8.5m generally in the vicinity of the subject site.
- Local street with an east-west alignment, running from the Point Village in the east to the Royal Canal in the west (there becoming Mayor Street Lower).
- Bi-directional LUAS light rail traffic runs along Mayor Street Upper. Between Castleforbes Road and North Wall Avenue, general traffic along Mayor Street Upper is restricted to the westbound direction only.
- Raised footpaths are present along both sides of Mayor Street Upper. No cycle lanes or bus lanes are present.
- Limited recessed on-street parking (8 No. spaces approx.) is in place on Mayor Street Upper adjacent to the northern boundary of the subject site.
- Mayor Street Upper is subject to a 30km/h speed limit.

Castleforbes Road

- Single carriageway street with a total pavement width of approx. 9.2m generally in the vicinity of the subject site (at present partially constrained by construction hoardings along the western side).

- Local street with a north-south alignment, connecting to North Wall Quay in the south and to Mayor Street Upper and Sheriff Street Upper in the north.

- Raised footpaths are present along both sides of Castleforbes Road. No cycle lanes or bus lanes are present.

- A number of recessed on-street parking bays are in place along both sides of Castleforbes Road in the vicinity of the subject site.

- Castleforbes Road is subject to a 30km/h speed limit.

North Wall Quay

- Single carriageway road, with a cumulative pavement width of approx. 13m generally in the vicinity of the subject site, inclusive of a bus lane in the eastbound direction.

- Regional road with an east-west alignment, connecting to the R131 in the east and to the R105 in the west.

- Raised footpaths are present along both sides of North Wall Quay in the vicinity of the subject site. Segregated two-way cycle lanes are present along the southern road edge.

- On-street parking and loading bays are in place on the northern side of North Wall Quay, along the subject site boundary. Limited recessed on-street parking (3 No. spaces approx.) is also in place on the southern side of the road.

- North Wall Quay is subject to a 50km/h speed limit.

Existing Cycling and Pedestrian Facilities

Segregated eastbound and westbound cycle lanes are present along the North Quays in the vicinity of the subject site. Two DublinBikes bicycle sharing stations, with spaces for 80 No. bicycles in total, are located on North Wall Quay within a 5-minute walk of the subject site.

Existing pedestrian facilities in the vicinity of the development site are extensive and of good quality. Raised footpaths and public lighting are in place along all nearby streets, including North Wall Avenue, Mayor Street Upper, North Wall Quay, and Castleforbes Road. Existing signalised pedestrian crossings of North Wall Avenue, Mayor Street Upper, North Wall Quay, and Castleforbes Road are provided adjacent to the development site.

Public Transport – Bus

Bus stops on North Wall Quay and East Wall Road, within a 5-minute walk of the subject site, are served by 20 No. regular bus routes operated by Dublin Bus, Bus Éireann, and other NTA-licenced operators.

In addition to these, a frequent shuttle bus service to and from the East Point Business Campus also serves bus stops within a 5-minute walk of the subject site. A further 3 No. regular bus routes also serve other bus stops within a 10-minute walk of the subject site.

The main bus station at Busáras is located approx. 1.3km from the subject site and is connected to it by the Luas light rail line. This gives access to the wider network of interurban and long-distance bus routes operated by Bus Éireann.

Greater detail of the existing bus services close to the subject site is given in the Mobility Management Plan Framework prepared in support of this SHD planning application.

Public Transport – LUAS

The Luas light rail network consists of two principal lines, which until recently did not connect with one another:

- LUAS Red Line (E-W) Dublin Docklands to Tallaght/Saggart; and
- LUAS Green Line (N-S) St. Stephen's Green to Bride's Glen.

The Point stop, at the eastern terminus of the Luas Red Line, is located 30m from the subject site. Light rail services operating via this stop connect the Dublin Docklands to the city centre, continuing on to Tallaght and Saggart in the southwest. Trams run at intervals of approximately 5 minutes at peak times. The main railway stations of Connolly and Heuston are also located on the Luas Red line.

The recently completed Luas Cross City project has extended the Luas Green Line northward from St. Stephen's Green, running as far as Broombridge on the Royal Canal, and created an interchange with the Luas Red Line at Abbey Street (5 stops west of The Point); this has provided a significant further improvement to the public transport provision at the subject development site.

Public Transport – Heavy Rail Network

The subject site is located approx. 550m east of the Docklands railway station, which is within a 10-minute walk. Services from this station operate towards Sligo, serving commuter towns in Meath and Kildare.

Pearse Street railway station is approx. 1.2km to the southwest of the subject site; Connolly Railway station, to which the subject site is connected by the Luas light rail line, is approx. 1.2km to the west (within a 20-minute walk). Intercity rail services from these stations operate towards Belfast, Sligo and Rosslare, serving commuter towns in counties Dublin, Meath, Louth, Kildare, Wicklow and Wexford. Frequent DART rail services also operate via these stations, between Malahide/Howth in the north and Greystones in the south. A limited number of commuter rail services also operate from these stations to Newbridge in southern Kildare, via the recently reopened Phoenix Park rail tunnel.

Heuston Station, 4km to the west, is within a 16-minute cycle of the subject site and is connected to it by both the Luas Red Line and Dublin Bus route 747. This is the terminus for intercity and commuter rail services on the Mayo, Galway, Limerick, Cork, and Waterford lines.

Site Accessibility – Walking

Figure 12.4, on the following page, shows existing walking times from the development site, as well as relevant public transport service points in the vicinity.

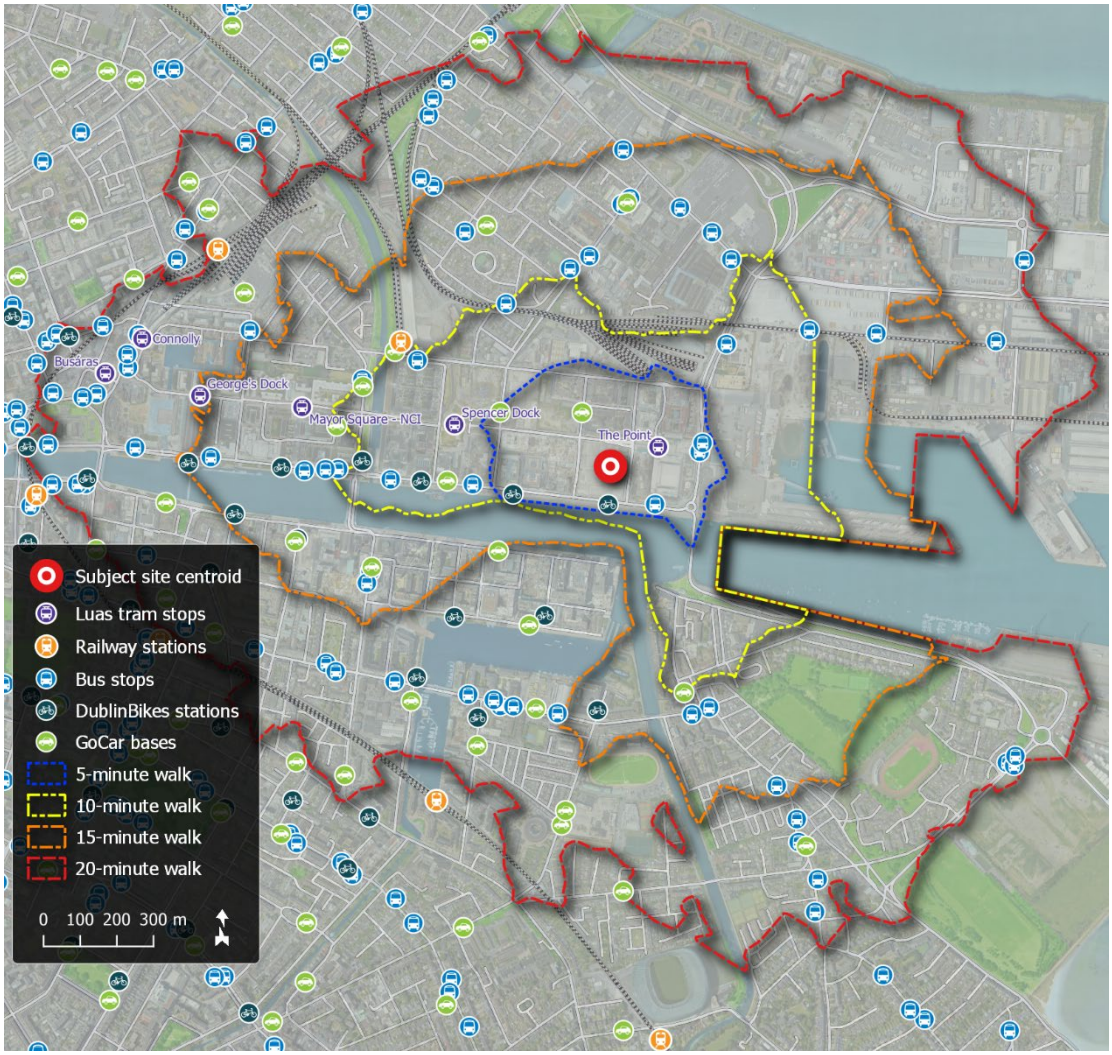


Figure 12.4: Walking isochrones (map data & imagery: NTA, GoCar, DCC, OSM Contributors, Google)

Site Accessibility – Cycling

As shown in **Figure 12.5**, the entirety of Dublin city centre is easily accessible by bicycle from the development site, as are most inner suburbs. Docklands, Connolly, and Pearse Street railway stations are within a 5-minute cycle, as are numerous Luas tram stops, and Heuston railway station is within approximately 16 minutes' cycle.

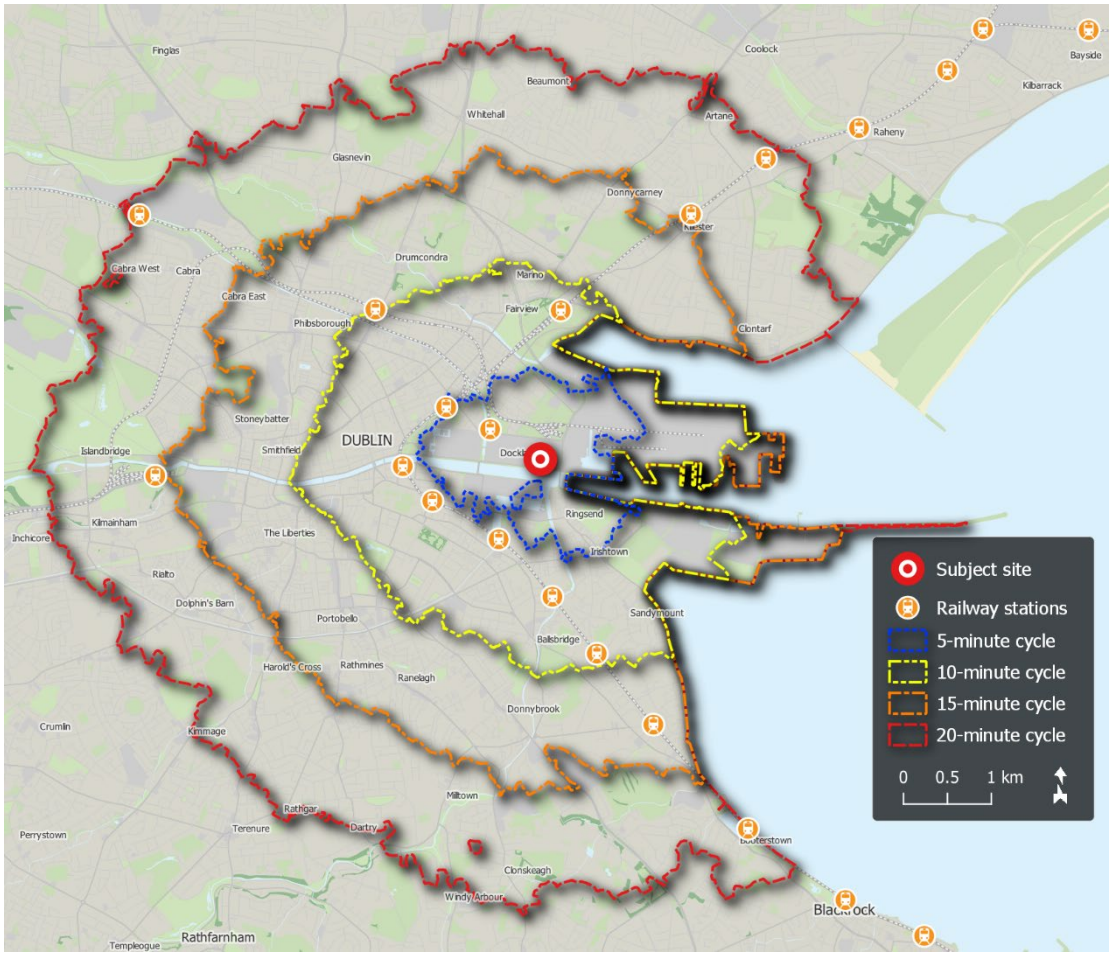


Figure 12.5: Cycling isochrones (map data & imagery: OSM Contributors, Google)

Site Accessibility – Public Transport & Walking

Figure 12.6 shows the reach of public transport journeys from the development site by total travel time (including walking to and between stops), based upon a departure time of 08:00 on a typical weekday.

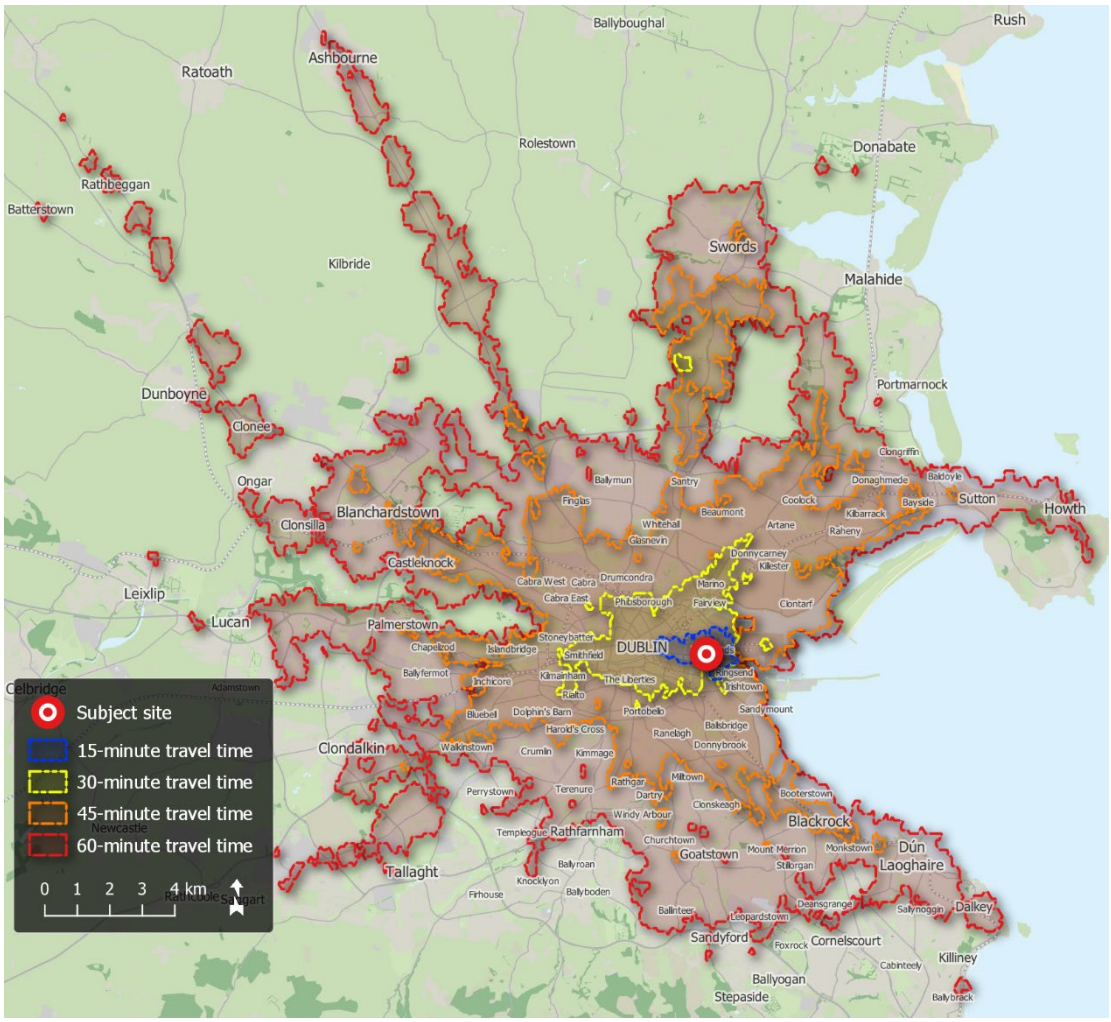


Figure 12.6: Public transport isochrones (map data: NTA, OSi, OSM Contributors, TravelTime platform)

12.3.3 Existing Traffic Conditions

Traffic Surveys

A 12-hour classified vehicular traffic count survey was undertaken on Wednesday the 10th of April 2019 by Irish Traffic Surveys, on behalf of CS Consulting. This survey was conducted between 07:00 and 19:00, at 6 No. sites on North Wall Avenue, North Wall Quay, Mayor Street Upper, and Castleforbes Road. The surveyed traffic flows were then scaled up using TII growth factors to obtain background traffic flows for the baseline year of 2020.

The following existing junction sites were surveyed (see **Figure 12.7**):

J1. Castleforbes Road / Mayor Street Upper
(existing 4-arm signal-controlled junction, including Luas);

J2. North Wall Avenue / Gibson Hotel Access / Luas Stop / Exo Construction Site Access / Mayor Street Upper
(modelled as existing 6-arm signal-controlled junction, including Luas);

J3. North Wall Quay / Castleforbes Road
(existing 3-arm priority-controlled junction);

J4. North Wall Quay / North Wall Avenue
(existing 3-arm signal-controlled junction);

J5. East Wall Road / Port Access / Tom Clarke Bridge / North Wall Quay
(existing 4-arm priority-controlled roundabout);

J6. Castleforbes Road / Planned Development Access (east) / Underground Car Park (west)
(partially existing staggered 4-arm priority-controlled junction)

Figure 12.7: Surveyed road junction sites (map data & imagery: OSM Contributors, Google)

Including Luas movements, the weekday peak hour background traffic flows across all survey sites were found to occur between 07:15 and 08:15 (AM peak hour) and between 17:15 and 18:15 (PM peak hour).

Junction No.	Traffic Type	2019 Survey		2020 Baseline	
		AM Peak	PM Peak	AM Peak	PM Peak
1	General	129	67	131	68
	Luas	16	19	16	19
2	General	66	53	67	53
	Luas	15	17	15	17
3	General	948	943	963	958
4	General	919	927	934	942
5	General	3022	2473	3071	2513
6	General	101	60	103	61

Table 12.5: Total Peak Hour Traffic at Surveyed Junctions

Existing Street Network Operation

Junction Approach Arm (only those permitting general vehicular traffic to enter junction)	Degree of Saturation (%)		Maximum Queue (PCU)		Mean Delay per PCU (seconds)		Practical Reserve Capacity (%)	
	AM	PM	AM	PM	AM	PM	AM	PM
Existing Junction 1 (Castleforbes Road / Mayor Street Upper)								
Castleforbes Rd (north)	7	4	1	0	6	6	1283	2184
Mayor St Upper (east)	18	5	1	0	42	25	403	1864
Castleforbes Rd (north)	3	1	0	0	3	5	2503	6619
Mayor St Upper (east)	8	6	0	0	44	41	1026	1373
Existing Junction 2 (North Wall Avenue / Gibson Hotel / 3Arena & Exo Site / Mayor Street Upper)								
North Wall Ave (north)	4	2	0	0	12	27	2425	4073
3Arena & Exo Site (east)	0	1	0	0	0	29	n/a	14627
North Wall Ave (south)	2	5	0	0	0	27	3742	1688
Existing Junction 3 (North Wall Quay / Castleforbes Road)								
North Wall Quay (west)	14	14	0	0	0	0	630	556
Castleforbes Rd (north)	12	10	0	0	1	0	671	787
North Wall Quay (east)	27	23	3	1	0	0	236	287
Existing Junction 4 (North Wall Quay / North Wall Avenue)								
North Wall Quay (west)	45	54	6	8	58	56	353	489
North Wall Ave (north)	34	28	1	1	54	45	168	227
North Wall Quay (east)	45	41	6	6	59	53	321	489
Existing Junction 6 (Castleforbes Road / City Block 9 / Project Wave access)								
Castleforbes Rd (north)	3	2	0	0	0	0	2905	4163
City Block 9 (east)	-	-	-	-	-	-	-	-
Castleforbes Rd (south)	3	1	0	0	0	0	3022	11471
Project Wave (west)	0	2	0	0	0	0	39004	5551

Table 12.6: Assessment results for Baseline Year 2020

Table 12.6 shows the TRANSYT modelling results for the baseline year 2020. These show that the 5 No. existing junctions that were surveyed and modelled currently operate well within their effective capacities on all approaches during the AM and PM peak hour periods. Queues on all junction approaches are negligible and mean vehicle delays are generally low.

12.3.5 Transport Infrastructure Objectives

Roads Proposals

The *North Lotts and Grand Canal Dock Planning Scheme 2014* includes the provision of new north-south access roads through Blocks 2 and 7 of the North Lotts and Grand Canal Dock Strategic Development Zone; these will connect Sheriff Street Upper, Mayor Street Upper, and

North Wall Quay. Previously granted applications for development within these blocks (refs. DSDZ3367/15 and DSDZ3368/15) incorporated these planned roads.

The *Dublin City Development Plan 2016–2022* also provides for a new road bridge across the mouth of the river Dodder, connecting Sir John Rogerson's Quay directly to Ringsend.

Pedestrian Proposals

The *Dublin City Development Plan 2016–2022* includes as specific objectives the provision of 2 No. new pedestrian and cyclist bridges across the river Liffey between the existing Samuel Beckett and Tom Clarke bridges; these would connect North Wall Quay to Sir John Rogerson's Quay. One of these proposed bridges would follow the line of Castleforbes Road, providing additional convenient pedestrian and cyclist access between the subject development site and the south quays.

Cycle Network Proposals

The Greater Dublin Area Cycle Network Plan provides for the consolidation of existing cycling infrastructure in the vicinity of the development site: an east-west primary cycle route (No. 5) is proposed along North Wall Quay, connecting to a north-south primary cycle route (No. NO1) along Guild Street. In addition, new secondary cycle routes are proposed to run along East Wall Road, New Wapping Street, and East Road. No further information is available at present regarding the delivery timeframe or detailed design for these proposed cycle network improvements.

Public Transport Proposals – BusConnects

The NTA BusConnects project, which is currently undergoing public consultation processes, proposes to improve dedicated bus facilities and to reorganise the Dublin Bus network in order to improve its flexibility and performance. Radial Core Bus Corridors shall be created, primarily along the routes of the existing Quality Bus Corridors; bus lanes and cycle facilities are to be improved along these corridors, which will reduce bus journey times and improve cyclist safety. In addition, it is proposed to create new Orbital Bus Corridors, which shall link the radial corridors around the city. Core Bus Corridor No. 16 is proposed to run along North Wall Quay and Sir John Rogerson's Quay; the existing preferred route drawings for this route do not require any changes to the development site boundary.

Public Transport Proposals – MetroLink

The TII/NTA MetroLink project, which is now entering a second phase of public consultation, provides for the construction of a metro line between Dublin city and Swords by the year 2027, much of which shall be underground. It is proposed to locate future MetroLink stations at Tara Street, within 25 minutes' walk of the development site, and at O'Connell Street, within a 30-minute walk and connected to the development site by the Luas network. The development shall therefore benefit in future from the availability of a further high-frequency direct rail connection to Dublin Airport.

12.4 Characteristics of the Proposed Development

12.4.1 Development Schedule

The subject development comprises a total of 1,005 No. apartments, 1,894 sq m GFA of commercial office space, a childcare facility with a total GFA of 450 sq m, a gym/spa with a GFA of 1,529 sq m, restaurant/café/bar units with a combined GFA of 1,964 sq m, and other minor ancillary uses. 905 No. apartments shall be privately owned and 100 No. apartments shall be assigned to Part V social housing.

12.4.2 Site Access Arrangements

Vehicular access to the proposed development shall be via a priority-controlled junction on North Wall Avenue, at the eastern boundary of the development site (see **Figure 12.3**). This 4-way junction shall also serve the permitted development currently under construction on the eastern side of North Wall Avenue.

The western arm of this access junction has a carriageway width of 7.0m, allowing two-way traffic flows into and out of the development. An unobstructed sight distance in excess of 25m in either direction along North Wall Avenue is achieved for vehicles exiting the development, as measured from a set-back of 2.4m from the public road edge, in accordance with the requirements of the *Design Manual for Urban Roads and Streets*. The existing kerb radii at the development access junction are restricted to 3.0m, which shall discourage high vehicle speeds on entrance or exit to/from the development.

The development access is ramped up to the level of the existing footpath, ensuring ease of pedestrian movement across the access and emphasising pedestrian priority. The development access leads directly to a ramp serving the development basement; this ramp begins at the back of the existing footpath.

Pedestrian and cyclist access to the open areas at the centre of the development shall be possible from North Wall Avenue, Mayor Street Upper, Castleforbes Road, and North Wall Quay, ensuring full north-south and east-west permeability of the development site. Direct pedestrian accesses to all development buildings shall also be provided on North Wall Avenue and on Mayor Street Upper. Segregated paths throughout the site shall provide safe movement for both pedestrians and cyclists.

12.4.3 Car Parking

The proposed development shall include a total of 176 No. internal car parking spaces located at basement level -3, all of which shall be allocated for the use of residents. This equates to a mean average of 0.18 car parking spaces per residential unit. The car parking provision for the proposed development does not exceed the maximum quantum permitted by the Local Authority development plan.

12.4.4 Bicycle Parking

The proposed development shall include a total of 1,777 No. bicycle parking spaces. These comprise 1,693 No. secure bicycle parking spaces for residents at lower ground floor level (basement level -1), accessed via internal lifts, and 84 No. publicly accessible bicycle parking spaces at surface level, dispersed at convenient locations throughout the development. The bicycle parking provision for the proposed development exceeds the minimum requirement of the Local Authority development plan.

12.5 Potential Impact of the Proposed Development

12.5.1 Construction Stage Impacts

Junction performance assessment has not been conducted for the construction phase of the development.

As an indicative estimate, development traffic during the construction phase is likely to reach at most 80 vehicle movements per day at its peak (a maximum of approx. 16PCU/hr in each peak hour period, including both arrivals and departures). Consequently, the impact of construction traffic on the operation of the surrounding road network shall be less significant than the impact of operational traffic related to the subject development (presented in **paragraph 12.5.2**).

During the construction phase, the subject development is therefore likely to result in a short-term slight adverse impact on the operational efficiency of the 5 No. existing junctions assessed, in comparison to the Baseline Scenario. This impact should be considered fully reversible, as it shall be confined to the duration of construction activity on the subject site.

Management of Construction Activities

The lead contractor appointed for the construction of the development shall be required to prepare a *Construction Management Plan (CMP)* that shall include a plan for the scheduling and management of construction traffic.

Construction Traffic

As an indicative estimate, development traffic during the construction phase is likely to reach at most 80 vehicle movements per day at its peak (a maximum of approx. 16PCU/hr in each peak hour period, including both arrivals and departures).

12.5.2 Operational Stage Impacts

Junction Approach Arm (only those permitting general vehicular traffic to enter junction)	Degree of Saturation (%)		Maximum Queue (PCU)		Mean Delay per PCU (seconds)		Practical Reserve Capacity (%)	
	AM	PM	AM	PM	AM	PM	AM	PM
Existing Junction 1 (Castleforbes Road / Mayor Street Upper)								
Castleforbes Rd (north)	16	11	2	1	6	4	463	713
Mayor St Upper (east)	31	23	1	0	50	38	190	299
Castleforbes Rd (north)	9	14	1	1	3	4	899	522
Mayor St Upper (east)	11	21	1	1	46	56	753	333
Existing Junction 2 (North Wall Avenue / Gibson Hotel / 3Arena & Exo Site / Mayor Street Upper)								
North Wall Ave (north)	6	2	1	0	10	10	1396	5136
3Arena & Exo Site (east)	0	6	0	0	0	53	n/a	1373
North Wall Ave (south)	3	5	0	0	1	4	2672	1614
Existing Junction 3 (North Wall Quay / Castleforbes Road)								
North Wall Quay (west)	21	18	0	0	0	0	491	436
Castleforbes Rd (north)	22	62	0	2	1	7	300	45
North Wall Quay (east)	42	31	12	5	2	1	113	188
Existing Junction 4 (North Wall Quay / North Wall Avenue)								
North Wall Quay (west)	57	75	8	11	65	59	168	321
North Wall Ave (north)	43	58	1	2	63	84	110	55
North Wall Quay (east)	61	50	9	7	67	64	145	195
Existing Junction 6 (Castleforbes Road / City Block 9 / Project Wave access)								
Castleforbes Rd (north)	17	11	1	0	0	0	426	729
City Block 9 (east)	3	39	0	0	0	3	2876	130
Castleforbes Rd (south)	18	4	0	0	0	0	412	2050
Project Wave (west)	10	31	0	0	0	2	829	190

Table 12.7: Assessment results for Design Year 2038 (Do-Nothing Scenario)

Table 12.7 shows the TRANSYT modelling results for the design year 2038 under the Do-Nothing Scenario (without the subject development). Traffic flows modelled under this scenario include existing background traffic, scaled up to 2038 levels using standard TII growth factors, as well as predicted traffic flows generated by the permitted and planned developments previously described.

These results show that the 5 No. existing junctions that were surveyed and modelled shall continue to operate well within their effective capacities on all approaches during the AM and PM peak hour periods past the year 2038. Queues and delays on all junction approaches shall remain at levels similar to those currently existing.

Table 12.8 shows the TRANSYT modelling results for the design year 2038. under the Do-Something Scenario (with the subject development in place). Traffic flows modelled under this

scenario are those of the Do-Nothing Scenario, with the addition of the predicted traffic flows generated by the subject development.

These results show that the 5 No. existing junctions that were surveyed and modelled shall continue to operate well within their effective capacities on all approaches during the AM and PM peak hour periods past the year 2038, with the subject development in place. In the design year, the addition of vehicular traffic generated by the subject development shall result in a maximum increase of 1 Passenger Car Unit in any junction approach queue length, and a maximum increase of 17 seconds in mean vehicle delay on any junction approach.

During the operational phase, the subject development is therefore likely to result in a long-term slight adverse impact on the operational efficiency of the 5 No. existing junctions assessed, in comparison to the Do-Nothing Scenario. 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, traffic signalling redesign, or changes in general traffic flow restrictions) have the potential to improve the operational efficiency of these junctions generally, as well as to reduce vehicle trips to/from the subject development.

Junction Approach Arm (only those permitting general vehicular traffic to enter junction)	**Degree of Saturation (%)**		**Maximum Queue (PCU)**		**Mean Delay per PCU (seconds)**		**Practical Reserve Capacity (%)**	
	AM	PM	AM	PM	AM	PM	AM	PM
Existing Junction 1 (Castleforbes Road / Mayor Street Upper)								
Castleforbes Rd (north)	17	11	2	1	7	4	441	688
Mayor St Upper (east)	37	25	1	1	48	55	146	261
Castleforbes Rd (north)	9	15	1	2	4	4	860	507
Mayor St Upper (east)	8	15	1	1	43	51	985	506
Existing Junction 2 (North Wall Avenue / Gibson Hotel / 3Arena & Exo Site / Mayor Street Upper)								
North Wall Ave (north)	7	5	1	1	10	10	1143	1741
3Arena & Exo Site (east)	0	6	0	0	0	53	n/a	1373
North Wall Ave (south)	7	9	1	1	6	6	1211	952
Existing Junction 3 (North Wall Quay / Castleforbes Road)								
North Wall Quay (west)	21	19	0	0	0	0	483	421
Castleforbes Rd (north)	23	63	0	2	1	7	295	43
North Wall Quay (east)	43	33	13	6	2	1	110	176
Existing Junction 4 (North Wall Quay / North Wall Avenue)								
North Wall Quay (west)	59	78	9	12	58	58	185	176
North Wall Ave (north)	63	69	2	3	76	87	43	30
North Wall Quay (east)	63	59	9	7	79	81	79	72
Existing Junction 6 (Castleforbes Road / City Block 9 / Project Wave access)								
Castleforbes Rd (north)	17	11	1	0	0	0	424	724
City Block 9 (east)	3	39	0	0	0	3	2875	130
Castleforbes Rd (south)	18	4	0	0	0	0	412	2050

Project Wave (west)	10	31	0	0	0	2	828	190
Future Junction 7 (North Wall Avenue / Adjacent permitted development / Subject site)								
North Wall Ave (north)	5	8	0	0	0	0	1833	1067
Adjacent dev. (east)	1	7	0	0	0	0	11069	1133
North Wall Ave (south)	5	5	0	0	0	0	1761	1742
Subject site (west)	14	13	0	0	1	1	522	589

Table 12.8: Assessment results for Design Year 2038 (Do-Something Scenario)

12.6 Mitigation & Monitoring Measures

12.6.1 Construction Stage

Mitigation

The lead contractor appointed for the construction of the development shall be required to prepare a *Construction Management Plan (CMP)* that shall include a plan for the scheduling and management of construction traffic. This *CMP* shall outline measures to be taken to mitigate the impact of construction traffic on the surrounding road network.

Monitoring

The lead contractor appointed for the construction of the development shall be required to prepare a *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.

12.6.2 Operational Stage

Mitigation

As described in the accompanying Traffic Impact Assessment report, the development shall incorporate several design elements intended to mitigate the impact of the development on the operation of the surrounding road network. 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); and
- a high provision of secure bicycle parking, which shall serve to encourage bicycle journeys by both residents and visitors.

As described in the accompanying *Mobility Management Plan (MMP) Framework* document, the development site is situated in proximity to existing high-quality bus, rail, and light rail services through Dublin City, as well as proposed future transport infrastructure. The site

benefits from a location close to numerous amenities and centres of employment and is within approximately 20 minutes' walk of O'Connell Bridge, at the heart of the city centre.

As also described in the *MMP Framework*, a Mobility Management Coordinator shall be appointed for the proposed development, with the remit to implement and oversee an ongoing Mobility Management Plan (MMP). This shall assist residents and their visitors in making the most of sustainable transport opportunities and in avoiding single-occupant car journeys.

Monitoring

As described in the accompanying MMP Framework document, a Mobility Management Coordinator shall be appointed for the proposed development, with the remit to implement and oversee an ongoing Mobility Management Plan (MMP). In conjunction with this, the Mobility Management Coordinator shall be responsible for monitoring the travel habits of development occupants and visitors.

An MMP is a dynamic process whereby a package of measures and campaigns is identified, piloted, and then monitored on an ongoing basis. The MMP 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 Mobility Management Coordinator shall gather data on travel patterns, for instance by conducting periodic travel surveys of development occupants.

12.7 Residual Impacts

In terms of traffic and transport considerations, the residual impact of the subject development is equivalent to the operational impact described in **paragraph 12.5.2**.

12.7.1 Construction Phase

The development's construction phase shall have no residual impact in terms of traffic and transport.

12.8 Interactions

The vehicular traffic flows that shall be generated by the subject development may result in corresponding changes to air quality and noise levels in the vicinity of the surrounding road network. The natures and extents of these changes are examined in the relevant Chapters of this EIAR document.

12.9 References

- Dublin City Council (2016): *Dublin City Development Plan 2016–2022;*
- Dublin City Council (2014): *North Lotts and Grand Canal Dock Planning Scheme 2014;*
- Department of Housing, Planning and Local Government (2018): *Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities);*
- National transport Authority (2013): *Greater Dublin Area Cycle Network Plan;*
- Trip Rate Information Computer System (TRICS);
- Transport Infrastructure Ireland (2011): *Project Appraisal Guidelines;*
- Transport Infrastructure Ireland (2014): *Traffic and Transport Assessment Guidelines;*
- The Chartered Institution of Highways and Transportation (1994): *Guidelines for Traffic Impact Assessments; and*
- Environmental Protection Agency (2017): *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.*

13.0 MATERIAL ASSETS – SITE SERVICES

13.1 Introduction

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 twenty years. Robert holds an undergraduate degree in Civil & Environmental Engineering, a postgraduate Diploma in Environmental Engineering and has a master's degree in Industrial Engineering.

The elements relating to power, gas and telecoms was prepared by Cian Dowling of Axiseng. Cian is a Chartered Engineering with Engineers Ireland and has been practicing as a consulting engineer for twenty years.

13.2 Methodology

13.2.1 Source of Information

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);
- *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)* (EPA 2015); and
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*, (Dept Housing 2018).

The draft guidelines have also been reviewed and have formed the basis for the development of this chapter.

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*; and
- *Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA).*

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; and
- All available information concerning the development including development plans.

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, and maintaining "high status" where the status already exists; and
  - 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:

  - *European Communities (Quality of Salmonid Waters) Regulations 1988* (S.I. No. 293 of 1988);
  - *Local Government (Water Pollution) Acts 1977 – 1990*; and
  - *Water Quality Standards for Phosphorus Regulations 1998* (S.I. No. 258 of 1998).

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 new regulations supersede previous water quality regulations (both EU and national). This project must still be 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 management plan will be cognisant of 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.

- *European Communities (Quality of Salmonid Waters) Regulations 1988* (S.I. No. 293 of 1988)

The Salmonid Regulations set water quality standards for salmonid waters, with identification of salmonid waters, water quality standards, and frequencies of sampling and methods of analysis and inspection.

- *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.

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.

13.2.2 Gas

Gas Networks Ireland plans are included in Appendix 13A.1 showing the location of gas distribution pipes in the vicinity of the site.

Existing underground gas lines are shown bounding the site on all sides with the exception of North wall avenue.

The gas utilities shown to the site have been disconnected and removed from site.

13.2.3 Power

An ESB Networks plan is included in Appendix 13A.2 showing the location of existing electrical services in the vicinity of the site.

Existing LV / MV / 38 KV & Higher underground cable routes are shown bounding the site on all sides.

The existing power supplies shown to the site have been disconnected and removed from site.

13.2.4 Telecoms

Due to the central location of the site, there is existing telecoms connectivity surrounding the site.

13.3 Characteristics of the Proposed Development

This sub 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.

13.3.1 Gas

A new gas supply will be required for the proposed development. It is envisaged that this new supply will serve the proposed office building, retail units, amenity spaces, and residential units where requirdd

The new connection would be taken from the existing Gas Networks Ireland network installation. The gas pipe will then run below ground and terminate in dedicated gas meter rooms at basement level.

13.3.2 Power

A new MV power supply will be brought on to the site to serve the new development. ESB Networks shall determine the route based on load analysis and MV planners' reports.
The proposed power supply will serve the new substations in accordance with ESB guidelines, which will then supply the office building, residential blocks and retail units.

13.3.3 Telecoms

The existing telecoms network surrounding the site will be extended to service the proposed development.

13.3.4 Surface Water Drainage

Dublin City Council's drainage records indicate:

- A 225mm diameter stormwater sewer and a 225-375mm diameter concrete stormwater sewer to the south, flowing east to west on North Wall Quay connecting with a 1090mmx920mm brick stormwater sewer, flowing north to south on Castleforbes Road, which flows into River Liffey;

- A 225mm diameter concrete stormwater sewer to the north, flowing east to west on Mayor Street Upper into the 1090mmx920mm brick stormwater sewer; and

- A 450mm diameter vitrified clay combined sewer to the south, flowing east to west on North Wall Quay, into a pumping station on Castleforbes Road, which a 150mm diameter cast iron is place on Castleforbes Road towards a 225mm diameter vitrified clay foul sewer on Mayor Street Upper.

Previous granted planning application (DSDZ3780/17) also indicates 2No. 225mm diameter storm water sewer flowing south to north on North Wall Avenue and a small section of 225mm diameter storm water sewer flowing north to south at the junction between North Wall Avenue.

13.3.5 Foul Drainage

Dublin City Council's drainage records indicate:

- A 450mm diameter vitrified clay combined sewer to the south, flowing east to west on North Wall Quay, into a pumping station on Castleforbes Road, which a 150mm diameter cast iron is place on Castleforbes Road towards a 225mm diameter vitrified clay foul sewer on Mayor Street Upper;

- Discussions with Irish Water & Dublin city Council indicates that the pumping station on Castleforbes Road is not current in operation; and

- A 375mm diameter concrete foul sewer to the north, flowing east to west on Mayor Street Upper, connects into a 1420mm concrete on Castleforbes Road, which is also direct to the pump station on Castleforbes Road.

Previous granted planning application (DSDZ3780/17) also indicates a 300mm diameter foul sewer flowing south to north on North Wall Avenue.

As required a Pre-Connection Enquiry was lodged with Irish Water to allow an assessment of the local & regional infrastructure to accommodate the proposed development. Irish Water have indicated their requirements and noted that a formal connection agreement will be required to be entered into the services to be made available, refer to the Engineering Services Report for a copy of same. As required a Pre-Connection Enquiry was lodged with Irish Water indicating their requirements before a for connection agreement, refer to the Engineering Services Report for a copy of same.

13.3.6 Water Supply

Record drawings reviewed from Irish Water indicate the following services in the area:

- To the north an existing 225mm (2008) HPPE main;
- The east a 300mm (2017) Ductile Iron main;
- To the south a 6”(1900) maim / 300mm (2010) DI main / 600mm (2010) DI main; and
- To the west a 315mm (2018) PE main.

All the noted existing water infrastructure is in the public control of Irish Water. As required a *Pre-Connection Enquiry* was lodged with Irish Water to allow an assessment of the local & regional infrastructure to accommodate the proposed development. Irish Water have indicated their requirements and noted that a formal connection agreement will be required to be entered into the services to be made available, refer to the *Engineering Services Report* for a copy of same. As required a *Pre-Connection Enquiry* was lodged with Irish Water indicating their requirements before a for connection agreement, refer to the Engineering Services Report for a copy of same.

13.4 Potential Impact of the Proposed Development

13.4.1 Construction Phase

This sub 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. The principle risks associated with the Construction Phase are:

Gas Supply

The Contractor will not require a new gas supply connection for the site.

Power Supply

The Contractor will apply for a new temporary power supply for the site. This will likely require a temporary ESB networks supply which will be removed upon connection of the permanent power supply to the site.

Telecoms Supply

The Contractor will apply for a new temporary telecom supply for the works. This will be minimal in nature and will be removed when the works are completed.

Water Supply

The Contractor will require a separate water supply connection for the works.

Surface Water

Surface water run-off will occur from hardstanding and roof structures during the construction period. Surface water run-off from construction activities has the potential to be contaminated:

- Suspended solids arising from ground disturbance and excavation;
- Hydrocarbons from accidental spillage from construction plant and storage;
- Concrete/cementitious products: arising from construction materials;
- Water removed from surface excavations as a result of rainfall or groundwater seepage;
- Vehicle wheel wash water;
- Runoff from exposed work areas and excavated material storage areas;
- Leakage of temporary foul water services; and
- Solid (municipal) wastes being disposed or blown into watercourses or drainage systems.

Foul Water

The Contractor's operations will result in the generation of effluent and sanitary waste from facilities provided for the construction staff on site.

13.4.2 Operational Phase

Potential operational phase impacts on the water infrastructure are noted below:

Gas

The Completed gas system will consist of gas meters which will be controlled by GNI and will serve a private gas network system. As such the ongoing maintenance will be carried out by the maintenance company operating for the management firm.

Power

The Completed power distribution system will consist of ESB Networks substations and private distribution rooms. The substations will be controlled by ESB Networks. All substations will be constructed to ESB Networks standards and will be handed over to ESB upon completion.

Telecoms

A new arrangement of telecoms distribution will be provided throughout the development. This will allow for multiple providers to be connected to the site.

Water Supply

The potable water network will not be vested to Irish Water. As such all maintenance works that be required will be undertaken by a suitably qualified contractor. The potential issues would be the accidental damaging of the water infrastructure leading to leak and potentially a loss of supply.

The proposed development is to consist commercial & retail space of 4307sq m gross floor area in addition to 1005No. apartments.

Based on Irish Water guidelines, the water demand will be shall be:

- For the commercial space:
  - ⇒ 4307sq m ÷ 7.5 sq m/person = 574 persons
  - ⇒ 574 persons x 100l/person/day = 57,400 l/day = 57.40 m^3/day
  - ⇒ 0.664 l/s Average water demand;
  - ⇒ 1.993 l/s Peak water demand (5 times average water demand for a population between 1,001 and 5,000).

- For the apartments:

  ⇒ 1005 X 405 l/day/unit = 407,025 l/day: 407.03 m^3/day

  ⇒ 4.71 l/s Average water demand;

  ⇒ 14.13 l/s Peak water demand (3 times average water demand for a population between 1,001 and 5,000).

  Overall potable demand:

  ⇒ Average water demand: 5.374 l/sec (4.71 + 0.664)

  ⇒ Peak water demand: 16.123 l/sec (14.13 + 1.993)

A Pre-Connection Enquiry has been submitted to Irish Water based on the water demand for an initial proposed number of 1005 No. apartment units and 55,538 sq m retail unit ((The proposed development is to consist commercial & retail space of 4307 sq m gross floor area in addition to 1005 No. apartments)) and we have received a response. See the Engineering Services Report which accompanies this submission for details of same.

Surface Water

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:

- Urban Runoff: routine urban runoff generally contains a variety of contaminants. These arise from the degradation of urban surfaces and vehicles, vehicle exhaust combustion by products, soil erosion and aerial deposition. The primary contaminants known to occur in routine road runoff include hydrocarbons, particulate matter and heavy metals; and

- Accidental Spillage: spillages arising from accidents involving goods transportation or fuel tank leakage are potentially the most serious source of contaminants to a watercourse.

Foul Water

The Completed foul system will not no offered to be vested to Irish Water. As such the ongoing maintenance will be carried out by the maintenance company operating for the management firm. Potential issues could be blockages of the drain and sewers due to unsuitable material being placed in same.

The proposed development is to consist commercial & retail space of 4307sq m gross floor area in addition to 1005 No. apartments.

- For the commercial space:

  ⇒ 4307sq m ÷ 7.5 sq m/person = 574 persons

  ⇒ 574 persons x 100l/person/day = 57,440 l/day = 57.44 m^3/day

  ⇒ 0.665 l/s Average effluent generation;

  ⇒ 1.994 l/s Peak effluent generation (5 times average for a population between 1,001 and 5,000).

- For the apartments:

  ⇒ 1005 X 446 l/day/unit = 44,8230 l/day: 448.23 m^3/day

  ⇒ 5.18 l/s Average effluent generation;

  ⇒ 15.56 l/s Peak effluent generation (3 times average for a population between 1,001 and 5,000).

  Overall effluent generation:

  ⇒ Average: 5.845 l/sec (5.18 + 0.665)

  ⇒ Peak: 17.554 l/sec (15.56 + 1.994)

Therefore, the proposed development will generate wastewater in order of 505.67 m^3/day, which equates to:

⇒ 6.51 l/sec Average flow; and

⇒ 19.548 l/sec Peak Flow.

A Pre-Connection Enquiry has been submitted to Irish Water based on the water demand for an initial proposed number of 1005 No. apartment units and 55,538 sq m retail unit ((The proposed development is to consist commercial & retail space of 4307 sq m gross floor area in addition to 1005 No. apartments)) and we have received a response. See the Engineering Services Report which accompanies this submission for details of same.

13.4.3 'Do Nothing Scenario'

Gas

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the gas supply would remain as is.

Power

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the power supply would remain as is.

Telecoms

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the telecoms supply would remain as is.

Water '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 and therefore the hydrology environment and the drainage systems and water supply would remain as is. However, as the proposed development will provide separate foul & storm water systems and the storm water system will have a fixed discharge rate for all storm water events. This will allow a reduced flow from the site during extreme storm events, thereby increasing the hydraulic capacity in the public drainage network.

13.5 Ameliorative, Remedial or Reductive Measures

The main potential impacts are associated with the Construction Phase of the proposed development. Mitigation measures relating to impacts outlined in the previous section are outlined below:

13.5.1 Construction Phase

Gas Supply

The Contractor will not require a new gas supply connection for the site.

Power Supply

The Contractor will apply for a new temporary power supply for the site. This will likely require a temporary ESB networks supply which will be removed upon connection of the permanent power supply to the site. This will be installed in accordance with ESB standards for temporary power supplies.

Telecoms Supply

The Contractor will apply for a new temporary telecom supply for the works. This will be minimal in nature and will be removed when the works are completed.

Water Construction Phase

- 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.

- All batching and mixing activities will be located in areas away from watercourses and drains.

- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards and manufacturer's guidance.

- 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.

- Spills of concrete, cement, grout or similar materials will not be hosed into drains.

- Rainwater that accumulates on site will be discharged to the DCC sewer system.

- The Contractor will comply with the following guidance documents:

    - CIRIA – *Guideline Document C532 Control of Water Pollution from Construction Sites* (CIRIA, 2001); and

    - CIRIA – *Guideline Document C624 Development and Flood Risk - guidance for the construction industry* (CIRIA, 2004).

- 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 program 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.

The Contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water and or Dublin City Council, in addition temporary pumping of ground water to facilitate the proposed basement construction will be licensed by Dublin City Council and the water levels monitored as outline sin the basement impact assessment.

13.5.2 Operational Phase

Gas

The Completed gas system will consist of gas meters which will be controlled by GNI and will serve a private gas network system. As such the ongoing maintenance will be carried out by the maintenance company operating for the management firm.

Power

The Completed power distribution system will consist of ESB Networks substations and private distribution rooms. The substations will be controlled by ESB Networks. All substations will be constructed to ESB Networks standards and will be handed over to ESB upon completion.

Telecoms

A new arrangement of telecoms distribution will be provided throughout the development. This will allow for multiple providers to be connected to the site.

Water Operational Phase

- Incidental surface run-off from underground basement car parks, compactor units and waste / service yard areas will be discharged into the foul drainage system. Grit / petrol / oil separators will be provided in all of the above areas to improve the quality of water discharging.

- 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 2 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.

- SuDS proposals will improve the quality and reduce the quantity of surface water discharging into the receiving system.

- Removal of the surface water from the existing combined sewers will reduce the hydraulic loading on the existing sewerage network and Waste Water Treatment Plant (WWTP) at Ringsend.

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

13.5.3 'Do Nothing Scenario'

Gas

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the gas supply would remain as is.

Power

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the power supply would remain as is.

Telecoms

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the telecoms supply would remain as is.

Water '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 and therefore the hydrology environment and the drainage systems and water supply would remain as is. However, as the proposed development will provide separate foul & storm water systems and the storm water system will have a fixed discharge rate for all storm water events. This will allow a reduced flow from the site during extreme storm events, thereby increasing the hydraulic capacity in the public drainage network.

13.6 Predicted Impact of the Proposed Development

13.6.1 Construction Phase

Gas Supply

The Contractor will not require a new gas supply connection for the site.

Power Supply

The Contractor will apply for a new temporary power supply for the site. This will likely require a temporary ESB networks supply which will be removed upon connection of the permanent power supply to the site. This will be installed in accordance with ESB standards for temporary power supplies.

Telecoms Supply

The Contractor will apply for a new temporary telecom supply for the works. This will be minimal in nature and will be removed when the works are completed.

Surface Water

Due to the absence of natural watercourses and surface water sewers in the vicinity of the site, it is expected that surface water runoff during construction would be discharged to Irish Water's combined sewerage network, subject to the conditions of a discharge licence from Irish Water. While the combined sewerage network normally conveys flow to the Ringsend Wastewater Treatment Works, Combined Sewer Overflows (CSOs) on the network present a residual risk that untreated surface water runoff from the construction site would enter the Liffey Estuary.

Surface water runoff during construction activities may contain increased silt levels or become polluted from construction activities. Waterborne silt can arise from dewatering excavations, exposed ground, stockpiles and site roads. Construction materials such as concrete and cement are alkaline and corrosive and can cause pollution in watercourses. The development will require the removal of topsoil and earthworks. Such works could potentially cause deoxygenation of water in the receiving watercourses, the gills of fish to become obstructed With waterborne silt and aquatic plants and invertebrates to be smothered by settled silt, limiting exposure to sunlight and oxygen.

Heavy siltation or grit in the surface water runoff would lead to maintenance issues for the receiving gravity sewerage network and at Mayor Street Pumping Station. In the absence of mitigation measures, these potential impacts are considered to be adverse, significant and temporary. Mitigation measures described below are available to control and manage these risks.

Foul Water

During construction it is envisaged that the contractor will put in place temporary drainage facilities to manage water within excavations. Water entering areas of excavation may be collected and discharged to the sewerage system following treatment (such as silt traps and interceptors) and at a flow rate subject to the conditions of a discharge licence from Irish Water. During the construction phase, welfare facilities for construction personnel will be located on site.

Wastewater effluent from these facilities will be discharged to the sewerage system at a location and at a flow rate subject to the conditions of a discharge licence from Irish Water. Discharge from the excavated areas could potentially lead to siltation, surcharge and flooding within the sewerage system. Effluent from the welfare facilities could potentially lead to pollution of watercourses and flooding within the sewerage system. In the absence of mitigation measures, these potential impacts are considered to be adverse, significant and temporary. Compliance with the conditions of the discharge licence will effectively mitigate potential risks to the sewerage system.

Water Supply

During the construction phase, welfare facilities for construction personnel will be located on site. These welfare facilities will lead to an increase in demand for potable water. Supply from the public watermains will be subject to the conditions of a connection agreement with Irish Water. The increase in demand for potable water could potentially lead to a drop-in pressure in the existing mains and a resulting reduction in service to existing customers. In the absence of mitigation measures, these potential impacts are considered to be adverse, not significant and temporary. Compliance with the conditions of the connection application will effectively mitigate potential risks to the public watermains network.

13.6.2 Operational Phase

Gas

The Completed gas system will consist of gas meters which will be controlled by GNI and will serve a private gas network system. As such the ongoing maintenance will be carried out by the maintenance company operating for the management firm.

Power

The Completed power distribution system will consist of ESB Networks substations and private distribution rooms. The substations will be controlled by ESB Networks. All substations will be constructed to ESB Networks standards and will be handed over to ESB upon completion.

Telecoms

A new arrangement of telecoms distribution will be provided throughout the development. This will allow for multiple providers to be connected to the site.

Surface Water

The provision of petrol/ oil interceptors and grease trays where required will ensure improved quality of surface water run-off from the development to the existing system. The provision of flow control with storm attenuation will ensure a reduced quantity of surface water discharging to the existing surface water sewerage system, therefore reducing the impact on the receiving system.

Foul Water

No significant impact is expected to occur to the sewerage systems as a result of the proposed development. Any increase in discharge will be compensated by a reduction in the expected surface water runoff into the combined sewers from the redevelopment. The proposed layout and loading were vetted by Irish Water who deemed the local network, subject to up-grades could accept the increased volumes. Any required up-grades off site will be undertaken by

Irish Water and their designated contractors. As noted in Irish Waters Pre-Connection Enquiry response contributions towards up-grades deemed required by Irish Water will form part of the connection agreement should planning permission be secured.

Water Supply

The development will result in additional demands on the public water network however the installation of low flow devices will minimise the impact of the development on the existing water supply network. The proposed layout and loading were vetted by Irish Water who deemed the local network, subject to up-grades could provide the increased volumes. As with all new development of the nature proposed, water saving devices and water metres to Irish Water requirements are proposed to be installed in the development.

13.6.3 'Do Nothing' Scenario

Gas

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the gas supply would remain as is.

Power

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the power supply would remain as is.

Telecoms

Under the "Do Nothing Scenario" there would be no change in the current site and therefore the telecoms supply would remain as is.

Water '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 and therefore the hydrology environment and the drainage systems and water supply would remain as is. However, as the proposed development will provide separate foul & storm water systems and the storm water system will have a fixed discharge rate for all storm water events. This will allow a reduced flow from the site during extreme storm events, thereby increasing the hydraulic capacity in the public drainage network.

13.7 Monitoring

Water Monitoring

Ongoing monitoring of the water quality during construction is proposed. It is not foreseen that any monitoring will be required on completion of the proposed development.

13.8 Reinstatement

All exterior works to be reinstated as per utility/Local Authority requirements.

13.9 Interactions

The main interactions relating to Services are water, air quality and population and human health. During the Construction Phase, the availability of water supplies to the Site and during the connection of the water supply and wastewater services has the potential to impact on the local surface water. There is also implications for the local population if these services are disrupted during the Construction Phase. The development and installation of the Services during construction has the potential to impact on the local air quality.

During the Operational Phase the water supply and wastewater services will have a potential interaction with the available water supply and the potential emissions to the water cycle.

Surface Water

The design team has been in regular contact with each other throughout the design process to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development.

Foul Water Drainage

The design team has been in regular contact with each other throughout the design process to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development.

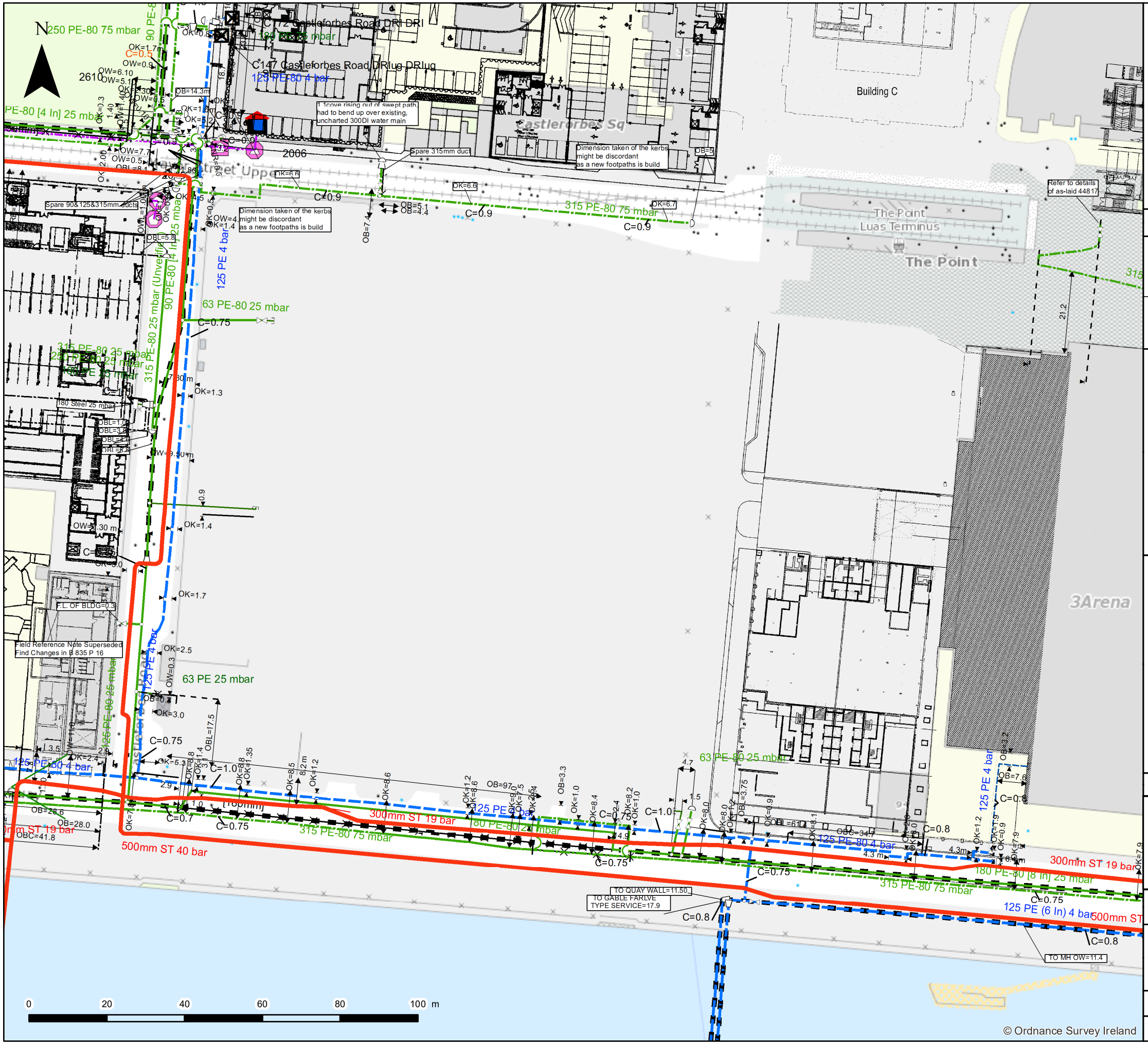
Water Supply

The design team has been in regular contact with each other throughout the design process to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development.

13.10 References

- *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 2015)
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*, (Dept Housing 2018).
- National Roads Authority (NRA) *Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*.
- *Good practice guidelines on the control of water pollution from construction sites developed* by the Construction Industry Research and Information Association (CIRIA).
- 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
- All available information concerning the development including development plans.
- *Water Framework Directive* 2000/60/EC
- *European Communities (Quality of Salmonid Waters) Regulations 1988* (S.I. No. 293 of 1988)
- *Local Government (Water Pollution) Acts 1977 – 1990*
- *Water Quality Standards for Phosphorus Regulations 1998* (S.I. No. 258 of 1998)

APPENDIX A13.1 - GAS NETWORKS IRELAND PLANS



Important Safety Notice: Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe. Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 10m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1850 427 747.

All work in the vicinity of the gas network must be completed in accordance with the current edition of the Health and Safety Authority publication, 'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (1890 289 389) or can be downloaded at www.hsa.ie.

Legal Notice: Gas Networks Ireland (GNI) and its affiliates, accept no responsibility for the accuracy of any information contained in this document including data concerning location and technical designation of the gas distribution and transmission network (the"Information"). The Information should not be relied on for accurate distance or depth of cover measurements.

Any representations and warranties, express or implied, are excluded to the fullest extent permitted by law. No liability shall be accepted for any loss or damage including, without limitation,direct, indirect or consequential loss, arising out of or in connection with the use or re-use of the Information.

- Aurora Telecom Duct
- Aurora Telecom Sub Duct
- Aurora Telecom Inserted Gas Pipe

Aurora TELECOM

Aurora Telecom Queries - 01-8926166 (Office Hours)
Aurora_Network_Queries@gasnetworks.ie
Aurora Telecom Emergency Only 1850 427399 / 01 2030120

- Transmission Pipe (High Pressure)
- Transmission Pipe (Construction Issue)
- Distribution Pipe (Medium Pressure)
- Distribution Pipe (Low Pressure)
- Service Pipe (Medium Pressure)
- Service Pipe (Low Pressure)
- Strategic Pipe (Medium Pressure)
- Strategic Pipe (Low Pressure)
- Inserted
- Abandoned Pipe

C=?	Cover (depth in metres)		Pressure Monitor
CP	CP Test Point		Protection (Slabbing)
	End Cap		Protection (Sleeve)
	Hot Tap		Reducer
	Installation		Service Terminator
	Valve		Tee
	Mains Verification**		Transition

** Please contact GNI on 1850-427747 for specific information

DIAL BEFORE YOU DIG 1850 427 747
In Emergency call 1850 20 50 50 Gas Networks Ireland

Gas Networks Ireland

GAS NETWORK INFORMATION

Description:

Location: 717813,734508

Plot Date: 06/11/2019 15:38	Scale: 1000 @ A3
Plotted By: 364	Ref ID: *364_06112019153841*

APPENDIX A13.2 - ESB NETWORKS PLAN

ESB Networks

TITLE: 20190215-031_A3

COLOUR CODE:

- BLACK - 38KV & HIGHER VOLTAGE OVERHEAD LINES
- GREEN - MV(10KV/20KV) OVERHEAD LINES
- BLUE - LV (400V/230V) OVERHEAD LINES
- CYAN - 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
- RED - MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

DATE: 15-Feb-2019

** SCALE: 1:2000

** SCALE WHEN PRINTED ON AN A3 PAGE
XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM

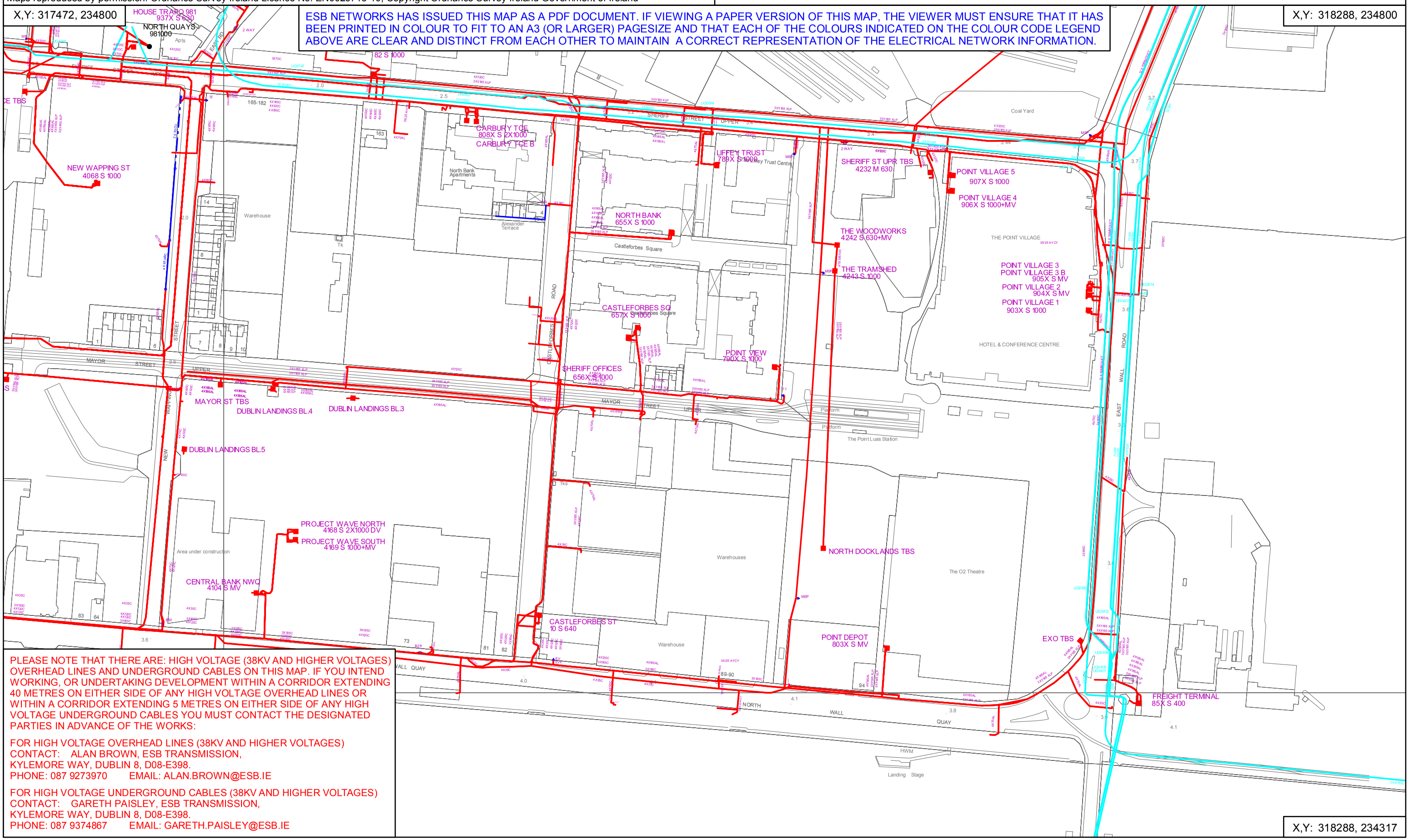
WARNING

THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1850 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING: (A) UP-TO-DATE MAP RECORDS; (B) CABLE LOCATER EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES; (C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO 'HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

X,Y: 317472, 234800

X,Y: 318288, 234800

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A3 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.



PLEASE NOTE THAT THERE ARE: HIGH VOLTAGE (38KV AND HIGHER VOLTAGES) OVERHEAD LINES AND UNDERGROUND CABLES ON THIS MAP. IF YOU INTEND WORKING, OR UNDERTAKING DEVELOPMENT WITHIN A CORRIDOR EXTENDING 40 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE OVERHEAD LINES OR WITHIN A CORRIDOR EXTENDING 5 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE UNDERGROUND CABLES YOU MUST CONTACT THE DESIGNATED PARTIES IN ADVANCE OF THE WORKS:

FOR HIGH VOLTAGE OVERHEAD LINES (38KV AND HIGHER VOLTAGES)
CONTACT: ALAN BROWN, ESB TRANSMISSION,
KYLEMORE WAY, DUBLIN 8, D08-E398.
PHONE: 087 9273970 EMAIL: ALAN.BROWN@ESB.IE

FOR HIGH VOLTAGE UNDERGROUND CABLES (38KV AND HIGHER VOLTAGES)
CONTACT: GARETH PAISLEY, ESB TRANSMISSION,
KYLEMORE WAY, DUBLIN 8, D08-E398.
PHONE: 087 9374867 EMAIL: GARETH.PAISLEY@ESB.IE

X,Y: 318288, 234317

14.0 CULTURAL HERITAGE INCL. ARCHAEOLOGY

14.1 Introduction

14.1.1 GENERAL

The following chapter details an archaeological assessment undertaken in advance of a proposed residential development at Project Waterfront, Dublin Docklands, Dublin 1 (Figure 14.1, ITM 717791/ 734547). This assessment has been carried out to ascertain the potential impact of the proposed development on the archaeological and cultural heritage resource that may exist within the area. The assessment was undertaken by Faith Bailey Jacqui Anderson of IAC Archaeology.

This study determines, as far as reasonably possible from existing records, the nature of the cultural heritage resource within the area of the proposed development using appropriate methods of study. Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets (CIfA 2012). In order to compile a complete baseline, a site inspection is carried out to complement the results of the desk-based assessment. This leads to the following:

- Determining the presence of known archaeological/ architectural heritage sites that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme; and
- Suggested mitigation measures based upon the results of the above research.

The study involved detailed interrogation of the archaeological and historical background of the development site. This included information from the Record of Monuments and Places of Dublin, the County Development Plan, the topographical files of the National Museum of Ireland and cartographic and documentary records. Aerial photographs of the study area held by the Ordnance Survey were also consulted. Field inspection has been carried out in an attempt to identify any known cultural heritage sites and previously unrecorded features, structures and portable finds within the proposed development.

An impact assessment and a mitigation strategy have been prepared. The impact assessment is undertaken to outline potential adverse impacts that the proposed development may have on the cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset such adverse impacts.

14.1.2 PROPOSED DEVELOPMENT

The scheme is defined in the statutory notices as follows:

1. Construction of 1,005 No. residential units (with balconies and winter gardens on all elevations) arranged in 3 No. blocks ranging in height from 8 No. storeys to 45 No. storeys over a triple-level basement (including mezzanine plant level), the former comprising: Block A (8-14 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 116 No. 1-bed; and 92 No. 2-bed; with landscaped terraces at Level 1 (south east elevation), Level 8 (south west elevation), Level 11 (south west elevation) and Level 14 (roof level)); Block B (8-41 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 172 No. 1-bed; and 247 No. 2-bed; with landscaped terraces at Level 5 (south west elevation), Level 8 (north west elevation and south west elevation), Level 11 (north elevation), Level 12 (west elevation), Level 13 (east elevation), Level 14 (east elevation), and at Level 41 (roof level)); and Block C (11-45 No. storeys (including roof level terrace and extended access core); with an apartment mix of: 207 No. 1-bed; 168 No. 2-bed; and 3 No. 3-bed units; with landscaped terraces at Level 11 (north elevation), Level 24 (south, west and east elevation), Level 32 (south, west and east elevation), and Level 45 (roof level), incorporating a public viewing deck at Levels 44 and 45).

2. Provision of ancillary residential amenities and support facilities including: a residential study area (321 sq m), a gym/spa reception (52 sq m), a residents' games room (91 sq m), a residents' common room (110 sq m), a residents-only social space (193 sq m), a management office (96 sq m), a security office (50 sq m), concierge spaces (GFA of 369 sq m) all located at ground floor level; a residents' games room (122 sq m) located at Level 1 of Block B; a residents' common room (86 sq m) located at Level 14 of Block B; a residents' wellness club and common room (408 sq m) located at Level 24 of Block C;

3. Construction of a triple level basement, comprising two levels of basement and a mezzanine plant level (total basement area 22,499 sq m), accommodating: waste storage areas (659 sq m), plant rooms (4,228 sq m), maintenance / management offices (GFA of 92 sq m), residents' courier / parcel rooms (GFA of 210 sq m), residents' laundry rooms (GFA of 138 sq m), ancillary residential storage (GFA of 291 sq m), residents' WCs (65 sq m), a residents' gym / spa (1,529 sq m) and ancillary gym storage room (100 sq m), residents' screening rooms (240 sq m), a residents' indoor plant cultivation room (356 sq m), 176 No. car parking spaces, 10 No. motorcycle parking spaces and 1,693 No. bicycle parking spaces, with vehicular access provided by ramp from North Wall Avenue.

4. Provision of 4,307 sq m of "other uses" as defined by the *Planning and Development (Housing) and Residential Tenancies Act 2016,* comprising: a childcare facility (450 sq m), a restaurant (110 sq m), an indoor Farmers' Market/foodhall (299 sq m), and 3 No. café units (110 sq m, 167 sq m and 261 sq m, respectively), all located at ground floor level; a restaurant (609 sq m) located at Level 32 of Block C; office use (1,894 sq m) from Levels 41 to 43 inclusive at Block C; and a public bar / function room (407 sq m) located at Level 44 of Block C.

5. Provision of 84 No. surface-level bicycle parking spaces, a pocket park, an external market area, a winter garden/seating area, and new pedestrian lanes from North Wall Quay, North Wall Avenue and Mayor Street Upper to the centre of the site.

6. All enabling and site development works, landscaping (including living walls), lighting, services and connections, waste management, interim site hoarding, and all other ancillary works above and below ground including the use of existing secant piling permitted under Reg. Ref. DSDZ3779/17 and DSDZ3780/17 (as amended by DSDZ3042/19).

14.1.3 DEFINITIONS

In order to assess, distil and present the findings of this assessment, the following definitions apply. 'Cultural Heritage' where used generically, is an over-arching term applied to describe any combination of archaeological and cultural heritage features, where:

- the term 'archaeological heritage' is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places); and
- the term 'cultural heritage', where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations. This designation can also accompany sites of archaeological or architectural significance.

14.2 Methodology

Research for this report was undertaken in two phases. The first phase comprised a paper survey of all available archaeological, historical, and cartographic sources. The second phase involved a field inspection of the site.

14.2.1 PAPER STUDY

The paper survey component of this chapter reviewed the following;

- Record of Monuments and Places for County Dublin;
- Sites and Monuments Record for County Dublin;
- National Monuments in State Care Database;
- Preservation Orders List;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the study area;
- Dublin City Development Plan 2016–2022;
- North Lotts & Grand Canal Dock SDZ Planning Scheme 2014;

- Aerial photographs;
- Excavations Bulletin (1970–2019); and
- The Dublin City Industrial Heritage Record.

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result, these are omitted from the Record of Monuments and Places. SMR sites are also listed on a website maintained by the Department of Culture, Heritage and the Gaeltacht (DoCHG) – www.archaeology.ie.

National Monuments in State Care Database is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

The Minister for the DoCHG may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Preservation Orders List contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

The topographical files of the National Museum of Ireland are the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape.:

- Bernard De Gomme, The city and suburbs of Dublin from Kilmainham to Ringsend, 1673;
- Thomas Phillip, An exact survey of city of Dublin, and part of the harbour, 1685;
- Charles Brooking, A map of the city and suburbs of Dublin, 1728;
- John Rocque, A Survey of the City, Harbour, Bay and Environs of Dublin on the same Scale as those of London, Paris & Rome, 1757;
- William Faden, A plan of the City of Dublin, 1797;
- William Wilson, Modern plan of the City and Environs of Dublin, 1798;
- John Taylor, Map of the environs of Dublin, extending 10 to 14 miles from the castle, 1816;
- William Duncan, Map of the County of Dublin, 1821;
- John Cooke, Royal map of Dublin, 1822; and
- Ordnance Survey maps of County Dublin 1843–1909.

Documentary sources were consulted to gain background information on the archaeological, architectural and cultural heritage landscape of the proposed development area.

Development Plans contain a catalogue of all the Protected Structures and archaeological sites within the county. The Dublin City Development Plan (2016–2022) and North Lotts & Grand Canal Dock SDZ Planning Scheme 2014 were consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed development area.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey, Google Earth, and Bing Maps.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970–2019.

The Dublin City Industrial Heritage Record (DCIHR) makes recommendations for sites to be added to the list of Protected Structures in the life of the City Development Plan and is maintained by Dublin City Council. It is a policy of Dublin City Council to implement the relevant recommendations of the Dublin City Industrial Heritage Record (Policy FC68)

14.2.2 FIELD INSPECTION

Field inspection is necessary to determine the extent and nature of archaeological and historical remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

The archaeological field inspection entailed:

- Walking the proposed development and its immediate environs;
- Noting and recording the terrain type and land usage;
- Noting and recording the presence of features of archaeological or historical significance;
- Verifying the extent and condition of any recorded sites; and
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin.

14.2.3 CONSULTATION

Following the initial research, a number of statutory and voluntary bodies were consulted to gain further insight into the cultural background of the background environment, receiving environment and study area, as follows:

- Department of Culture, Heritage and the Gaeltacht (DoCHG) – the Heritage Service, National Monuments: Record of Monuments and Places; Sites and Monuments Record; Monuments in State Care Database and Preservation Orders;
- National Museum of Ireland, Irish Antiquities Division: topographical files of Ireland;
- Dublin City Council: Planning Section; and
- Trinity College Dublin, Map Library: Historical and Ordnance Survey Maps.

14.2.4 TYPES OF IMPACT

Impact definitions as per draft EPA guidelines (pg 23, 2017)

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 or emerging trends.

Significant

An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

Very Significant

An effect which, by its character, magnitude, duration or intensity alters the majority of a sensitive aspect of the environment.

Profound

An effect that obliterates sensitive characteristics

14.2.5 GUIDANCE AND LEGISLATION

The following legislation, standards and guidelines were consulted as part of the assessment:

- *National Monuments Acts, 1930-2014*;
- *The Planning and Development (Strategic Infrastructure) Bill, 2006*;
- *Planning and Development Act, 2000;*
- *Heritage Act, 1995*;
- Environmental Protection Agency (EPA) 2015 *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)* (Draft Sept. 2015). Dublin, Government Publications Office;

- *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EIAR) (EPA 2017). Dublin: Government Publications Office;
- *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, 2003); and
- *Frameworks and Principles for the Protection of the Archaeological Heritage, 1999*, (formerly) Department of Arts, Heritage, Gaeltacht and Islands;

14.3 Description of Receiving Environment

14.3.1 Archaeological and Historical Background

The proposed development area is bounded by North Wall Quay to the south, North Wall Avenue to the east, and Mayor Street Upper to the north in Dublin 1 (Figure 14.1). The southern limit of the site is located adjacent to the zone of archaeological potential for Dublin City, which is a recorded monument (DU018-020). The zone extends along North Wall Quay which contains one sub-constraint, the quay itself (DU018-020564).

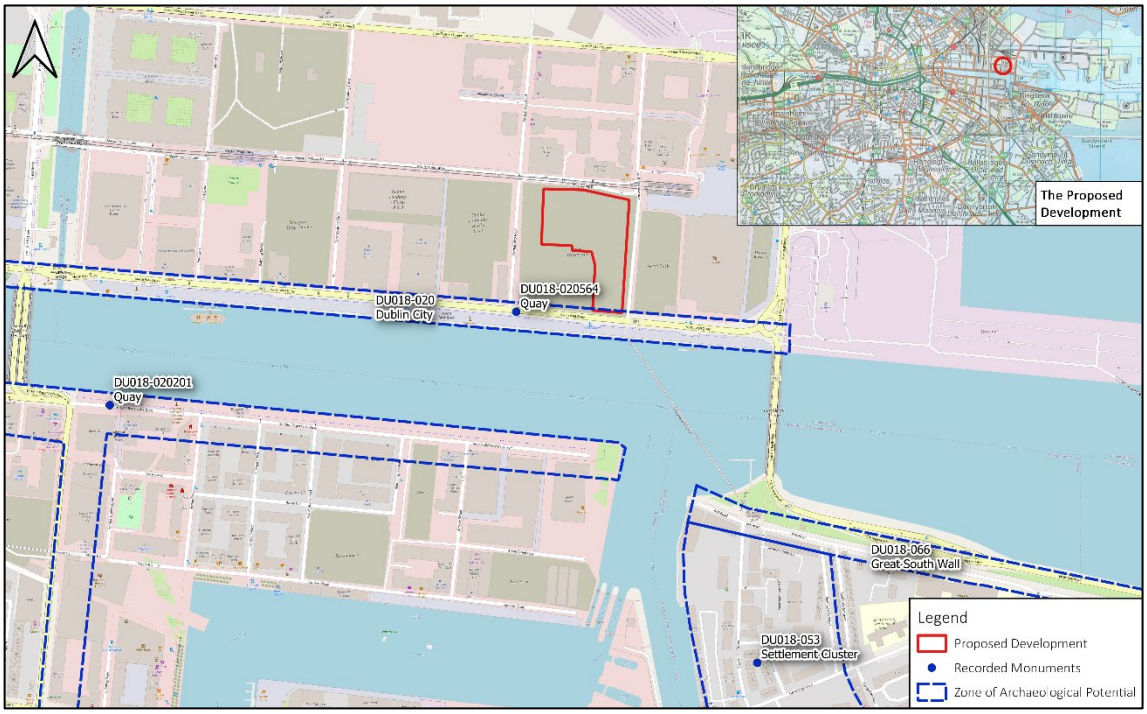


Figure 14.1: Site location showing recorded monuments.

Prehistoric Period

While recently there has been discussion of the possibility of a human presence in the southwest of Ireland as early as the Upper Palaeolithic (Dowd and Carden 2016), the Mesolithic period (8000–4000 BC) is the earliest time from which there is clear and widespread evidence for prehistoric activity in Ireland. During this period people hunted, foraged and gathered food and appear to have had a mobile lifestyle.

Evidence for settlement during this period is rare. However, due to the proximity of the River Liffey and former estuarine area (now reclaimed), there is potential for remains dating to this period to be preserved beneath the level of the reclamation deposits. This was illustrated in 2004 by the discovery of Mesolithic fish traps during the development of the Spencer Dock area, c. 490m to the west of the proposed development area (Licence 03E0654, Bennett 2004:0565).

The fish traps were found to be late Mesolithic in date and during the excavations the Mesolithic shore line was identified 5m below the current ground level and 30m north of the current edge of the River Liffey. This area may represent the northern bank of the river or an estuarine island. The traps were set in estuarine silts and preserved under a later accumulation of silts. The silts had been sealed by post-medieval reclamation deposits. The fish traps were constructed almost exclusively of hazel, and while fragmentary, were in a relatively good state of preservation, with tool marks in evidence.

Radiocarbon dates from five wood samples returned a date range of between 6100–5720BC, suggesting that these are presently the earliest fish traps recorded in Ireland and the UK. A further trap, consisting of the remains of a wattle fence, was found higher up in the silts, which returned a Middle Neolithic date. This formed part of a larger fish trap structure, likely an ebb weir (McQuade 2008, 8-11; Licence 06E0668, Bennett 2007:494).

A programme of archaeological monitoring c. 320m to the north-northwest revealed possible further evidence of prehistoric fish traps under post-medieval reclamation layers (Licence 09E0375, Bennett 2011:200). No other recorded prehistoric sites or artefacts have been identified within the receiving environment.

Early Medieval Period (AD500–1100)

Settlement across County Dublin advanced during the early medieval period when the area now known as County Dublin straddled the ancient kingdoms of *Brega* (north of the River Tolka) and *Laigin* (south of the Tolka). The early cartographic representations of Dublin city indicate the position of the estuary shoreline prior to the commencement of reclamation works. On the northern side of the Liffey it is possible that Amiens Street (formerly the North Strand), represents this former shoreline (De Courcy 1996, 270); whilst the southern shoreline would have included a complex marshy delta at the mouth of the River Dodder. De Courcy also argues that this is likely to have been the position of the shore line as far back as AD850 (ibid. xxvii).

The name Dublin (*Dubhlinn*), meaning 'black pool', is generally taken to refer to the pool or pond that was located directly southeast of the site of the present Dublin Castle. However, this name has been suggested as referring to an early Christian monastic settlement south of the black pool and Clarke (1990, 58) believes that this interpretation of *Dubhlinn* would

explain why the town has two names – *Dubhlinn* (for the enclosed ecclesiastical area) and *Baile Ath Cliath* – a secular settlement that was developed to guard over the 'ford of the hurdles'.

The Vikings had established themselves in Dublin by the middle of the 9th century and by the 10th century Dublin had become a recognised urban centre. One of the first Viking landing points was marked by a standing stone or pillar stone ('The Long Stone'), which was erected according to Norse custom (De Courcy 1996, 235). The Long Stone stood just above the high-tide shoreline at the confluence of the Liffey and the Steine on the southern side of the River Liffey (DU018-020129). Today this is thought to be on the northern side of Trinity College.

The first Viking settlement within Dublin consisted of a longphort, which was a semi-permanent Viking encampment, then developed over the next 60 years into a commercial centre that was an important market place for slaves and luxury goods. The precise location of this initial settlement has remained somewhat elusive. It has been suggested that it was located next to the River Poddle and the Liffey, close to the current Dublin Castle. However, extensive archaeological investigations within these areas are yet to unearth any ninth century Viking material (Bradley 1992, 43).

The only area to produce a large amount of ninth century artefacts is the Kilmainham area where a large number of artefacts were discovered during the construction of Heuston Station over 150 years ago; c. 4km west-southwest of the development area. Although the artefacts that were discovered were not excavated under scientific conditions, it is thought that these finds represent a large cemetery that must have been associated with the ninth century longphort, which was in all probability located close by. However, this first phase of settlement only lasted until AD902, when the Annals of Ulster record that the Vikings were driven away from Dublin.

There are no early medieval sites recorded in the receiving environment of the proposed development area. During this period the area was located within the estuary of the River Liffey, with settlement occurring further to the west.

Medieval Period (AD1100–1600)

After the Anglo-Norman invasion of Ireland in 1169, the medieval town of Dublin enjoyed a period of prosperity and development, which continued until the beginning of the 14th century. The Anglo-Norman administration was responsible for reinforcing the town walls with defensive towers. Further improvements to the defences involved erecting a number of gates on the built-up streets outside the walls and supplementing the defensive gates already in place along the town wall itself. The boundary of the medieval town is located c. 2.1km to the west-southwest of the proposed development area.

Approximately 225m south of the proposed development area is the settlement known as Ringsend (DU018-053). It takes its name from a dry spit of land formed by the easternmost channel of the River Dodder delta at its confluence with the River Liffey. This is *An Rinn* in Irish, meaning 'the point' (De Courcy 1996, 325). It is possible that the area was first utilised as a settlement during the 14th century, being mentioned briefly in records in 1488. The primary function of the settlement was as a fishing community. During the 16th and 17th centuries there was fierce competition between Ringsend and the fishermen of Clontarf, encouraged by the overlords who were the King family of Clontarf and the Fitzwilliams of Merrion and

Thorncastle (De Courcy 1996, 325). As a result, Ringsend was subject to some development; however, the fishing industry was to fade away during the 18th century.

Post-Medieval Period (AD1600-1900)

The proposed development area continued to occupy an estuarine location until the 18th century. The North Lotts Scheme was authorised by Dublin's City Assembly in 1682. This scheme proposed to reclaim a large area of land submerged beneath the tidal waters of the Liffey and Tolka to the east of the city. The land was divided into 152 lots and the money raised from the distribution of these lots by lottery would be used to contain the river. The scheme was then abandoned in 1686 due to constant flooding (turtlebunbury.com).
Custom House Quay (DU018-020564) was initially embanked by the Ballast Office between 1715 and 1725. The North Lotts Scheme was resurrected in 1717, this time with 132 lots. The City Assembly planned to use the rent of the lots to improve the retaining walls and roads in the reclaimed area. Brooking's map indicates the area was still subject to tidal flooding in 1728 but the retaining wall from Amiens Street to East Wall Road had finally been built by 1743. The north embankment of the Liffey was built to match the earlier quay walls of Sir John Rogerson's Quay (DU018-020201), which were completed by 1728.

The City Assembly approved a project to embank the South Bull sands from Ringsend into Dublin Bay in 1715 to improve shelter for shipping in the harbour (DU018-066, DU019-029001/2). The initial embankment consisted of 'The Piles', three rows of piles braced together and sheeted along the two outer rows with woven wattle hurdle to form a casing, filled with shingle and stones to a height of 1.5m, from the present Pigeon House Harbour to the present Poolbeg Lighthouse in 1731 (DU019-029001). A later double stone wall, the Ballast Office wall (DU019-029002), was constructed in 1759 connecting 'The Piles' to Ringsend (DU018-053). The 11-14m space between the two walls was filled with sand. The construction of Poolbeg Lighthouse in 1761 led to the replacement of 'The Piles' with a stone wall of large granite blocks and by 1795 the Great South Wall/South Bull Wall (DU018-066, DU019-029001/2) was complete, making it the largest sea wall in the world at that time (archiseek.ie; dublincity.ie).

The first residents of the North Wall area were artisans employed by James Gandon on the Custom House project, which began in 1781 (turtlebunbury.com). The area gradually shifted towards more industrial use in the 19th century with the establishment of vinegar works, vitriol works, and chemical works within the lotts. This was facilitated by the establishment of the Midland Great Western Railway and the opening of the Liffey Branch Railway Terminus c. 480 to the west of the proposed development. The success of the port led to the construction of the Point Depot in 1878 as another terminus for the railway c. 80m to the east of the proposed development.

Archaeological works within the study area of the proposed development have identified the remnants of 19th century residential, industrial, and religious activity. These comprise the quay walls to the immediate south, limestone walls of Castle Forbes and a former patent slip in Dublin Port, c. 180m to the north and c. 190m to the east respectively. The foundations of a stone church have also been recorded c. 285m to the northwest (Licence 12E0126, Bennett 2012:211; Licence 17E0058, Bennett 2017:565; Licence 05E0080, Bennett 2005:477).

14.3.2 SUMMARY OF PREVIOUS ARCHAEOLOGICAL EXCAVATIONS

It should be noted that archaeological monitoring of excavations associated with a permitted basement within the proposed development area is currently ongoing (October 2020) (Planning Ref.: DSDZ3042/19). This work is being carried out under the supervision of Muireann Ni Cheallachain of IAC Archaeology, under licence 19E0436, as issued by the DoCHG. To date, no features of archaeological significance have been identified.

A review of the Excavations Bulletin (1970–2019) has shown that a large number of archaeological investigations have been carried out in the area surrounding the proposed development, many of which encountered evidence of post-medieval reclamation layers and/or structures. Three investigations encountered evidence of prehistoric fishing activity preserved underneath reclamation layers to the west of the proposed development.

The line of the North Wall Quay (DU018-020564) was exposed during works associated with the Liffey Services Tunnel on North Wall Quay, c. 20m to the south (Licence 06E0926, Bennett 2007:491). The 18th century quay wall was also exposed in two stretches during monitoring works to the immediate south of the proposed development area along North Wall Quay in 2012 (Licence 12E0126, Bennett 2012:211). Four north-south walls associated with 19th century structures were also uncovered at this time. A similar wall was identified during monitoring parallel to Hanover Quay in 2005 and 2006, c. 305m to the south-southwest (Licence 05E1045, Bennett 2005:445, 2006:624). This resulted in the discovery of a substantial stone wall that was found to be 5m deep and ran parallel to the Hanover Quay wall. It is probable that this dates to the construction of the docks.

Monitoring for the North Docklands Sewerage Scheme was carried out between 2017 and 2018 (Licence 17E0058, Bennett 2017:565). This identified and recorded the remains of two 19th century masonry structures of historical significance before removing them. The first comprised a limestone wall representing the remnants of the foundation courses of a structure, Castle Forbes, depicted on the corner of Castleforbes Road and Sheriff Street Upper c. 180m to the north of the proposed development area. The second structure consisted of another limestone wall associated with a former patent slip structure within Dublin Port c. 140m to the east.

The foundations of a large stone church dating to the late 18th/19th century were exposed c. 285m to the northwest of the proposed development area, overlying a reclamation layer containing late post-medieval pottery (Licence 05E0080, Bennett 2005:477). This church is depicted on the 1906 OS map and is marked St Barnabas' Church.

The remains of 19th/20th century industrial structures comprising red-brick and limestone were revealed during the excavation of test-pits, c. 500m to the west at Spencer Dock (Licence 03E0654, Bennett 2003:0576). Later monitoring and excavation at the site of Building C, Spencer Dock, identified three principal phases of activity dating from the late Mesolithic to the post-medieval (Licence 03E0654, Bennett 2004:0565). The remains of wooden fish traps, stake rows, and miscellaneous pieces of worked wood dating to the Late Mesolithic period were preserved in waterlogged silts. The remnants of a 19th century windmill were also uncovered.

An excavation at Spencer Dock uncovered two fish traps constructed of wood and several pieces of worked wood within the estuarine silt (Licence 06E0668, Bennett 2007:494). The traps were dated to the late Mesolithic and middle Neolithic periods. Possible further

evidence of prehistoric activity was recovered under post-medieval reclamation layers c. 100m to the north-northwest (Licence 09E0375, Bennett 2011:200). This consisted of two clusters of horizontal brushwoods, some with worked ends, and may be interpreted as fish traps, though they did not retain their original form.

The investigations tabulated below have identified post-medieval reclamation deposits, occasionally containing medieval or post-medieval pottery sherds, and/or the remnants of post-medieval structures throughout the landscape surrounding the proposed development area (Table 14.1).

Licence No.	Reference	Distance from Development
19E0598	Bailey 2020a	c. 30m northwest
19E0597	Bailey 2020b	c. 30m northwest
04E0271	Bennett 2004:0519	c. 150m south
17E0405	Coughlan and Teahan forthcoming	c. 156m east
15E0371	Bennett 2015:059	c. 240m south-southwest
00E0744	Bennett 2000:0338	c. 255m southeast
00E0744 ext.	Bennett 2001:415	c. 255m southeast
00E0669	Bennett 2000:0337	c. 285m southeast
16E0143	Bennett 2017:523	c. 305m south
07E0167	Bennett 2008:408	c. 320m west
07E0167	Bennett 2007:489	c. 320m west
08E915	Bennett 2009:AD5	c. 355m west
05E0617	Bennett 2006:642	c. 375m southwest
15E0372	Bennett 2015:060	c. 390m southwest
15E0372	Bennett 2016:086	c. 390m southwest
06E0682	Bennett 2006:639	c. 460m northwest
06E0668	Bennett 2006:634	c. 470m west
06E0668	Bennett 2007:493	c. 500m west

Table 14.1: Investigations that Encountered Post-Medieval Reclamation Deposits

The 13 licences tabulated below did not identify any archaeological features or deposits within the study area of the proposed development (Table 14.2).

Licence No.	Reference	Distance from Development
17E0504	Bennett 2018:644	c. 20m east
06E0327	Bennett 2006:640	c. 105m north
16E0495, 16D0070, and 16R0175	Bennett 2016:499	c. 105m south
07D061 and 07R249	Bennett 2008:412	c. 155m south
03D027 and 03R046	Brady and Bangerter 2003	c. 160m south-southeast
07E0636	Bennett 2007:492	c. 160m west
15E0330	Bennett 2015:218	c. 170m north-northwest
15E0502	Bennett 2015:225	c. 200m south
16E0363	Bennett 2017:107	c. 270m west
03E0797	Bennett 2004:0638	c. 305m southeast
16E0500	Bennett 2017:109	c. 315m northeast
15E0372	Bennett 2017:111	c. 390m southwest
15E0372	Bennett 2018:180	c. 390m southwest
16E0212 and 16E0212 ext.	Bennett 2016:397	c. 500m east

Table 14.2: Investigations of No Archaeological Significance

14.3.3 CARTOGRAPHIC SOURCES

Bernard De Gomme, The city and suburbs of Dublin from Kilmainham to Ringsend, 1673

Despite the early date of this map, it shows the proposed development area situated within the tidal plains of the Rivers Liffey and Tolka, to the east of the Strand Road (modern Amiens Street) and northwest of Ringsend.

Thomas Phillips, An exact survey of city of Dublin, and part of the harbour, 1685 (Figure 14.2)

This map shows a similar landscape to De Gomme's, the proposed development area is situated in an area annotated as 'strand' that is enclosed by the route of the Liffey to the south and River Tolka to the north, as both rivers flow into the sea. An island, annotated as 'Clantarf Hand' (Clontarf Island), is marked to the northeast of the site. Ringsend (DU018-053) is depicted to the southeast of the proposed development area; however, the south quays (DU018-020201) have not yet been reclaimed.

Charles Brooking, A map of the city and suburbs of Dublin, 1728

Brooking map indicates that the area between the Strand (Amiens Street) and the modern East Wall Road has been walled in, however it is still 'over flow'd by ye tide'. The south quays have been reclaimed connecting Ringsend (DU018-053) to Dublin and Sir John Rogerson's Quay (DU018-020201) has been established to the south on the south bank of the Liffey.

John Rocque, A Survey of the City, Harbour, Bay and Environs of Dublin on the same Scale as those of London, Paris & Rome, 1757 (Figure 14.3)

By the time of this map, it appears that the reclaimed area has been divided into lots and roads as part of the North Lotts Scheme. The proposed development area is situated to the immediate south of Mayor Street, east of Fish Street, west of empty lots, and north of the North Wall (DU018-020). The East Quay is depicted c. 150m to the east and there are no features depicted within the proposed development. An area annotated as Armory's Ground is depicted bordering the lots c. 1.2km to the west. Several of the lots appears to still be subject to minor flooding, which may be why there is minimal development within the North Lotts at this time. Clontarf Island is annotated as such c. 660m to the northeast of the site and an Island House is depicted on its southern end. The south quays (DU018-020201) are annotated as the 'horse road to Ringsend' on this map and a bath for men and a bridge are shown at the settlement (DU018-053).

Figure 14.2: Extracts from Phillips' map (1685) and Rocque's map (1757) showing the proposed development area.

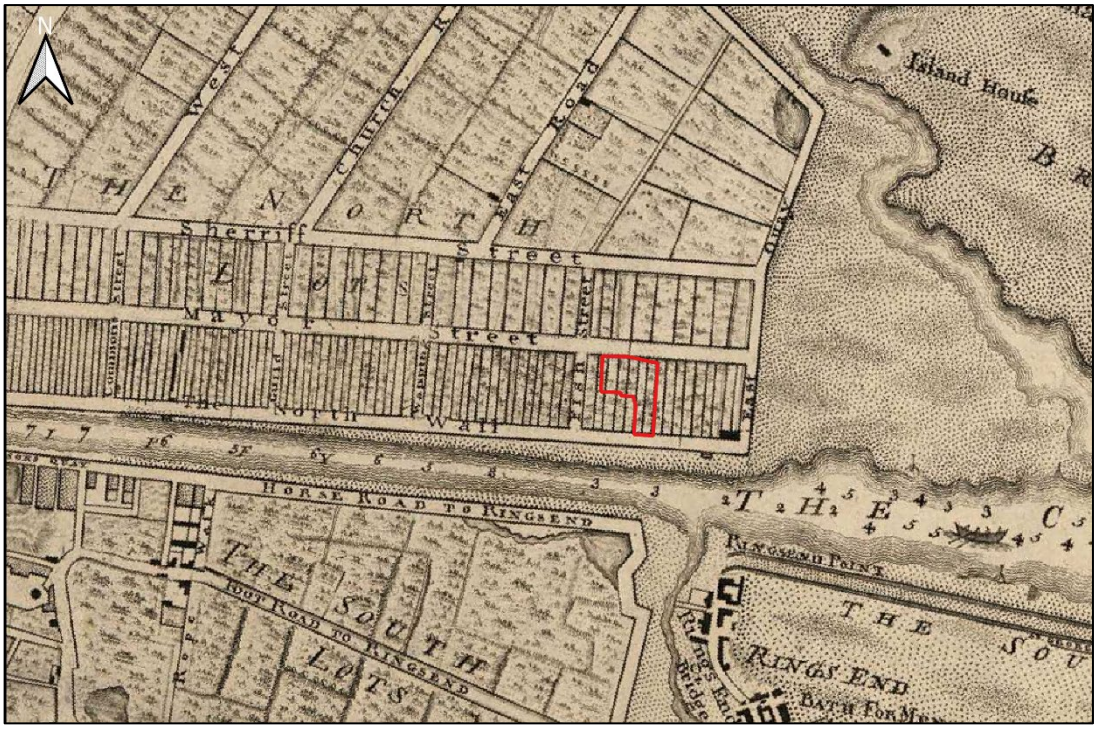


Figure 14.3: Extracts from Rocque's map (1757), showing the proposed development area.

William Faden, A plan of the City of Dublin, 1797

Faden's map is not as detailed as Rocque's and the majority of the features depicted on the previous map are not drawn. The Grand Canal Docks and Harbour, opened in 1796, are depicted c. 400m to the south. The only other changes of note in the wider area are the establishment of the Royal Canal, c. 595m to the west and the replacement of the Armory's Ground with the Custom House and a dock.

William Wilson, Modern plan of the City and Environs of Dublin, 1798 (Figure 14.4)

The proposed development area is depicted within a flooded area within on Wilson's map. Baths and a wharf are depicted along the East Wall, c. 100m east and c. 235m northeast of the proposed development. The house on Clontarf Island is no longer depicted.

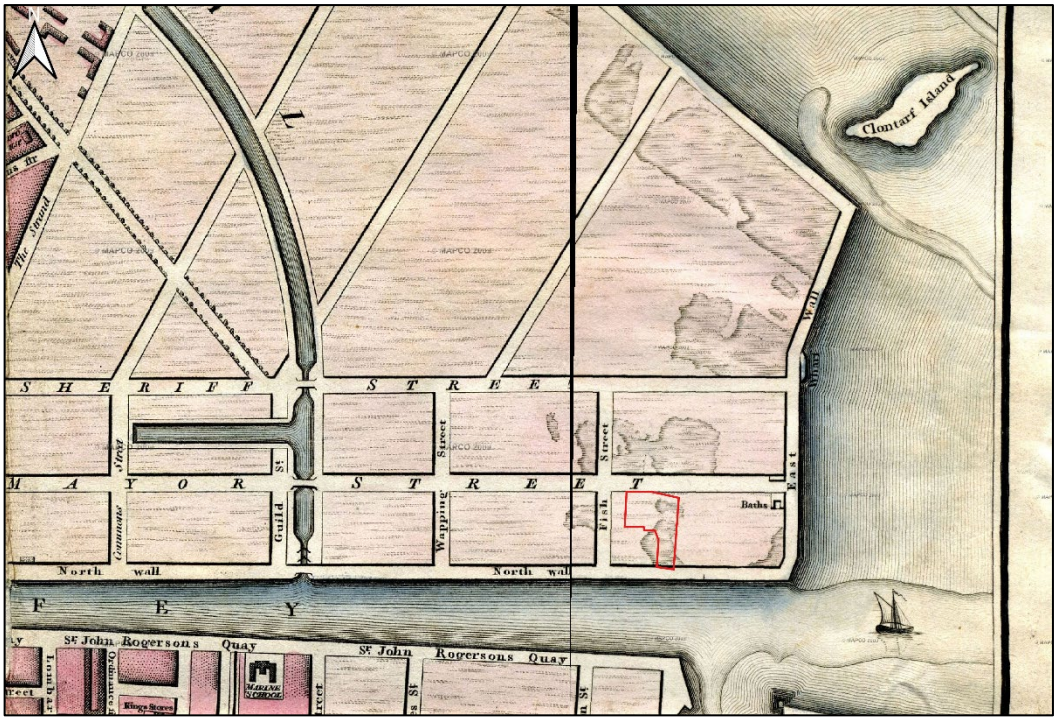


Figure 14.4: Extract from Wilson (1798) showing the proposed development area.

John Taylor, Map of the environs of Dublin, extending 10 to 14 miles from the castle, 1816

This map does not provide great detail; however, it illustrates buildings along the quayside in the North Wall area, one of which is a windmill at North Wall c. 490m to the west of the development. A quay has been constructed to the immediate east of the Customs House and dock and there is some development along Sir John Rogerson's Quay (DU018-020201).

William Duncan, Map of the County of Dublin, 1821 (Figure 14.5)

By the time of this map the lot containing the baths to the east are named 'Shalloways Baths' and the wharf from Wilson's map is no longer depicted nor is the windmill from Taylor's. A possible structure is depicted partially within the proposed development area at its southern extent along the quay.

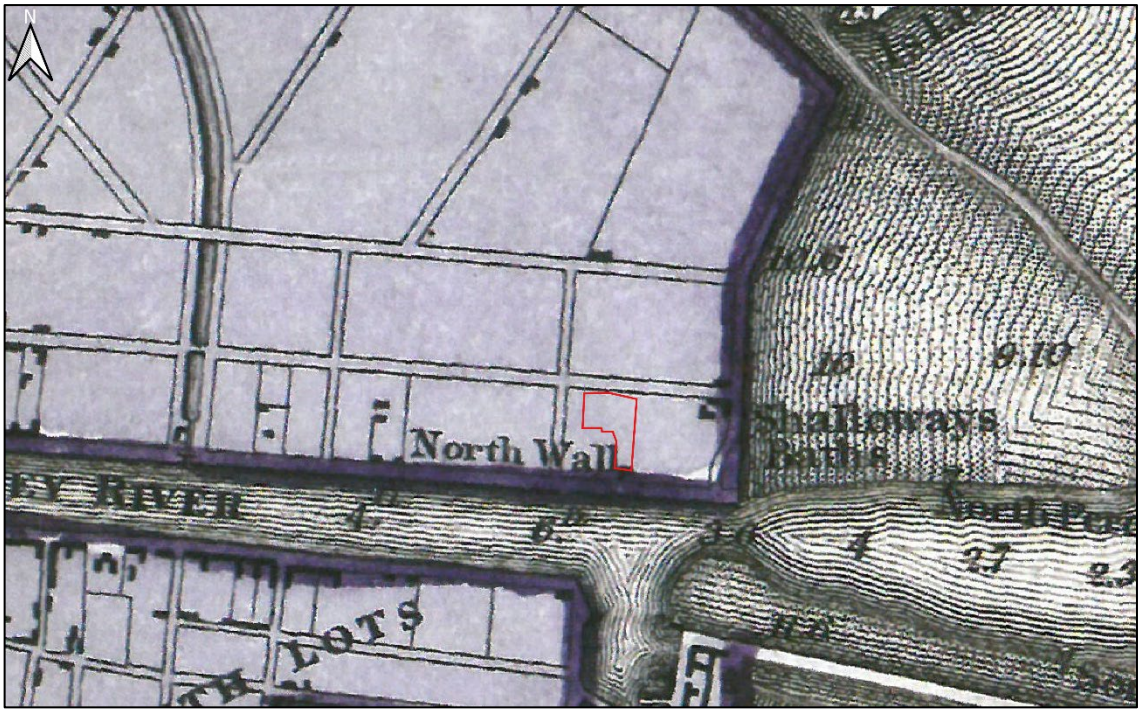


Figure 14.4: Extract from Duncan (1821) showing the proposed development area.

John Cooke, Royal map of Dublin, 1822

The lot containing the proposed development area has been subdivided. The structure depicted to the north from Duncan's map is annotated as Castle Forbes on Cooke's map. A bottle works, lime works and vinegar works are depicted in the surrounding environs of the North Wall. A ballast office and slip are depicted at East Wall to the east of the proposed development area. The King's Stores are marked at Sir John Rogerson's Quay (DU018-020201).

Ordnance Survey Map, 1843, scale 1:10,560

This is the first accurate historic mapping coverage of the area containing the proposed development and it is shown as being situated within two lots. There has been further development in the wider area and Fort William is depicted to the immediate east of Castle Forbes c. 190m to the north. The lime works to the west has been transformed into a vitriol works and the bottle works to the northeast into a glass works. A lighthouse is marked at the ballast offices and a patent slip is annotated off the East Wall. The King's Stores have been replaced by the Queen's Timber Yard.

Ordnance Survey Map, 1847, scale 1:1,056 (Figure 14.6)

This map shows the proposed development area in greater detail than the previous edition. The gardens of Castle Forbes and Fort Williams are clearly depicted to the north and a scavenging depot is annotated beside the Queen's Timber Yard to the south.

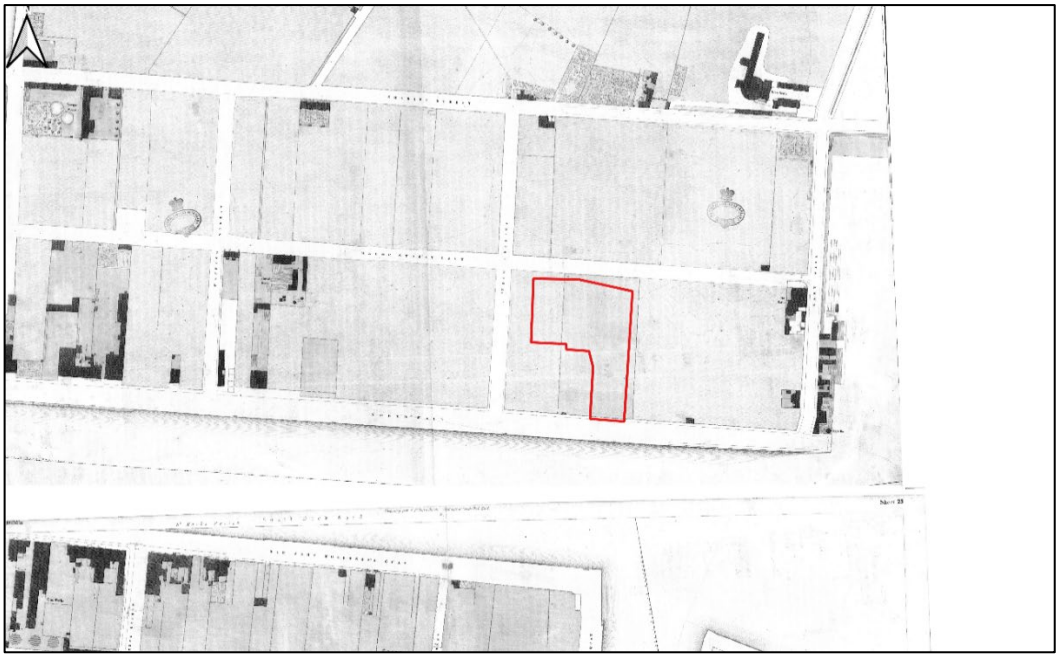


Figure 14.6: Extract from historic OS map (1847) showing the proposed development area.

Ordnance Survey Map, 1864, scale 1:1,056 (Figure 14.7)

This is the first map to depict significant development within the proposed development area. The proposed development area has buildings fronting on to North Wall Quay at the south and Mayor Street East to the north. Structures can be seen all along the western boundary of the adjacent site, fronting on to Fish Street including a number of large sheds, with the saw mill to the rear of these. The saw mill partially extends into the proposed development area. The small structure from the 1843 OS map is no longer extant and a drinking fountain is annotated to the southwest of the site. The Midland Great Western Railway lies c. 500m to the west, parallel to the Grand Canal. There has been further industrialisation within Sir John Rogerson's Quay to the south.

Figure 14.7: Extract from historic OS map (1864) showing the proposed development area.

Ordnance Survey Map, 1871-5, scale 1:10,560 (Figure 14.8)

By the time of this map further structures have been constructed within the proposed development area, particularly along the northern boundary. There has been significant residential and industrial development within the wider environs of the site, including an oil stores and saw mills to the immediate north.

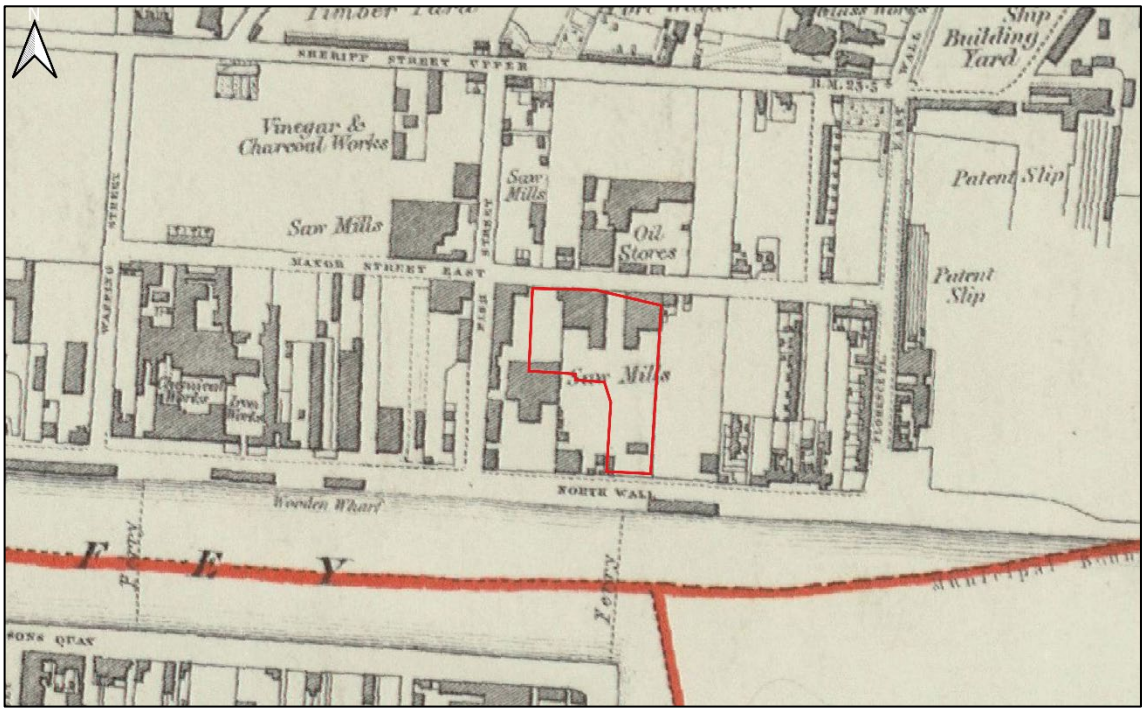


Figure 14.8: Extract from historic OS map (1871-5) showing the proposed development area.

Ordnance Survey Map, 1886, scale 1:1,056 (Figure 14.9)

The proposed development area is still situated within two lots on this map. The eastern plot has been cleared of the majority of its structures apart from a small number fronting onto North Wall. The saw mill is depicted greater detail to the immediate west, with a chimney, crane, tramway and weighing machine shown. A slate and tile yard and cattle yard are depicted in the lot to the west. Fort Williams has been removed and a bottle works now occupies the former Castle Forbes garden. The Great Southern and Western Railway (North Wall Extension) is depicted for the first time connecting to a goods station, the Point Depot, c. 80m to the east. The Great Northern Railway (East Wall Junction Branch) is depicted c. 340m to the west connecting to the London and North Western Railway Station. The development of the railway has resulted in the removal of several structures and the realignment of streets in the wider area.

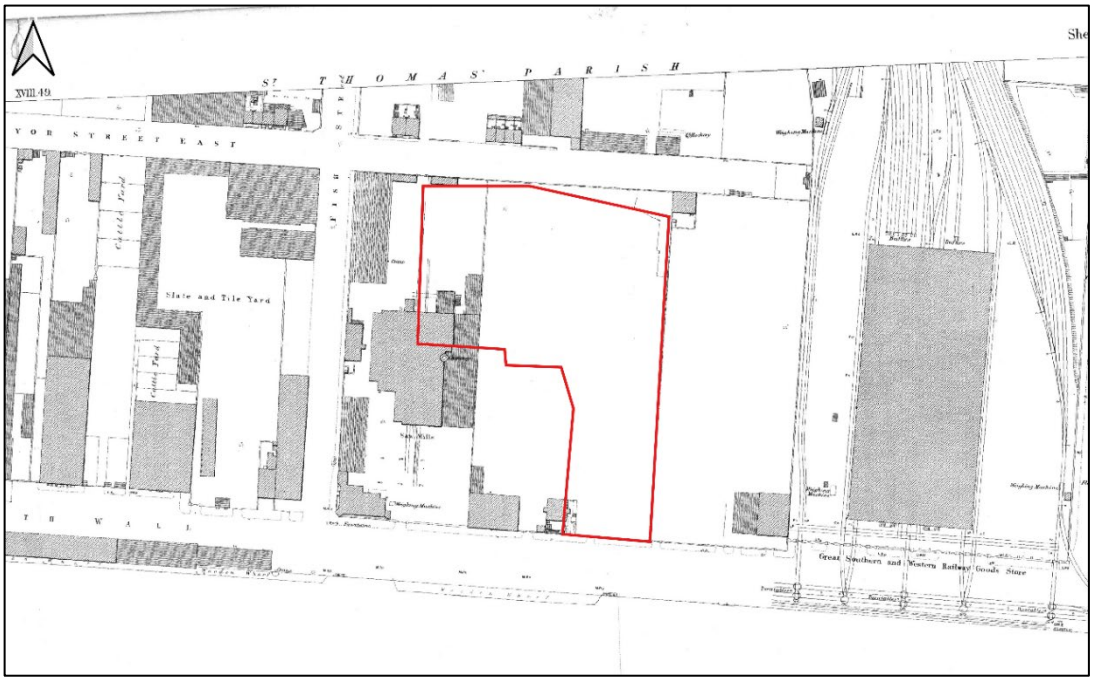


Figure 14.9: Extract from historic OS map (1886) showing the proposed development area.

Ordnance Survey Map, 1909, scale 1:2,500 (Figure 14.10)

By this time there has been further development within the site. Two timber yards are marked to the immediate north and south of the saw mill to the west. Structures and cattle pens occupy the southern end of the proposed development area, with a timber yard annotated to the north of this. A coal yard borders the proposed development area to the immediate east. The London and North Western Railway Station to the west has been renamed to the North Wall Station. Clontarf Island is no longer depicted and this area is now marked as mud, sand, and shingle.

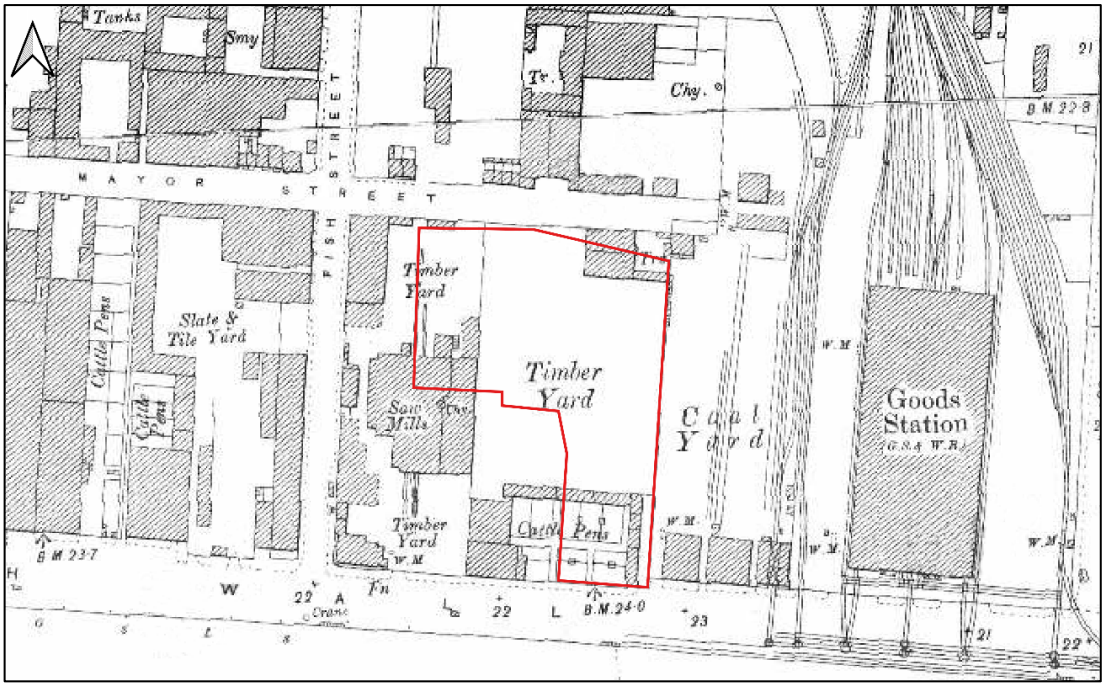


Figure 14.10: Extract from historic OS map (1906-9) showing the proposed development area.

Ordnance Survey Map, 1935-8, scale 1:10,560 (Figure 14.11)

The saw mill and cattle pens are no longer annotated; however, the structures are still depicted. The timber yard to the north of the cattle pen is still annotated, with further timber yards marked to the north of the site. The coal yard to the east and the slate and tile yard and cattle pens to the west are no longer marked. Fish Street to the west has been renamed Castleforbes Road and Castle Forbes is no longer depicted to the north.

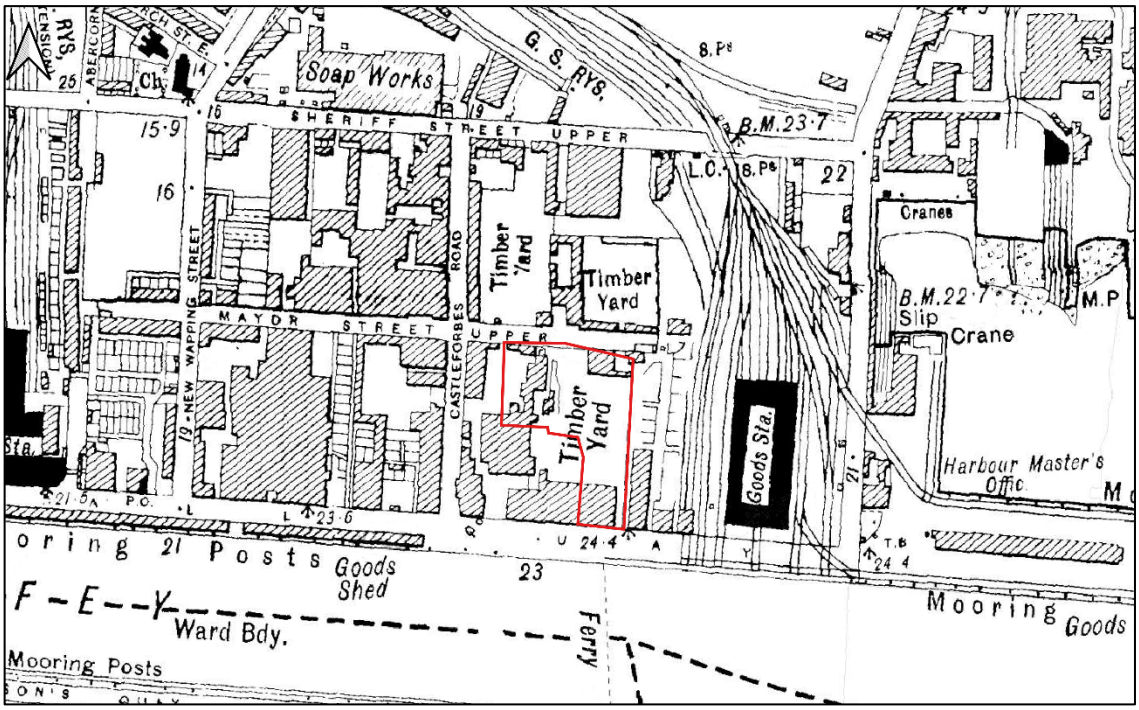


Figure 14.11: Extract from historic OS map (1935-8) showing the proposed development area.

14.3.4 DEVELOPMENT PLAN

The Dublin City Development Plan (2016–2022) recognises the statutory protection afforded to all RMP sites under the National Monuments Legislation (1930–2014). The development plan lists a number of aims and objectives in relation to archaeological heritage (Appendix 14.A.3). It is a policy of the Development Plan to promote the in-situ preservation of archaeology as the preferred option where development would have an impact on buried artefacts. Where other alternatives are acceptable or exceptional circumstances are determined by the relevant statutory agencies. Where preservation in-situ is not feasible, sites of archaeological interest shall be subject to archaeological investigations and recording according to best practice, in advance of redevelopment.

There are four recorded monuments within a 250m of the proposed development (Appendix 14.A.1, Table 14.3). The closest is the zone of archaeological potential for the historic town of Dublin (DU018-020) which is immediately adjacent to the proposed development area (Figure 14.1).

RMP No.	Location	Classification	Distance from Development
DU018-020	Dublin City	Historic town	To the immediate south
DU018-020564	North Wall Quay	Quay	c. 30m south
DU018-020201	Sir John Rogerson's Quay	Quay	c. 150m south
DU018-066	Great South Wall	Building	c. 230m southeast

Table 14.3: Recorded Archaeological Sites

14.3.5 Dublin City Industrial Heritage Record

A review of the DCIHR has shown that there are two sites listed within the record that are located within the proposed development area. These consist of the site of the Saw Mill, noted within the cartographic analysis and the site of a Packing Case factory. The survey notes that there are no upstanding remains associated with either site. A further 18 sites are included in the survey within 250m of the proposed development area (Table 14.4).

Site.	Location	Distance from Development	Upstanding remains
Packing Case Factory	North Wall Quay	0m	No
Saw Mill	North Wall Quay/ Castleforbes Rd	0m	No
Goods shed	North Wall Quay	c. 180m west	No
Iron Works	North Wall Quay	c. 165m WSW	No
Chemical Works	North Wall Quay/ New Wapping St	c. 200m west	No
Iron Works	North Wall Quay/ New Wapping St	c. 240m WSW	No
Tramway	Mayor St Upper	c. 95m west	No
Timber yard	Mayor St Upper	c. 235m west	No
Temple Press	Mayor St Upper	c. 150m WNW	No
Smithy	Castleforbes Rd	c. 80m northwest	No
Bonded store	Sheriff St Upper	c. 225m northwest	No
Soapworks	Sheriff St Upper	c. 235m northwest	No
Dublin Granaries	Sheriff St Upper	c. 205m north	No
Corn store	Sheriff St Upper	c. 140m north	No
Level crossing, signal box, footbridge	Sheriff St Upper	c. 195m northeast	No
Section of railway	East Wall Rd	c. 110m ENE	Yes
Goods Shed	East Wall Rd/ North Wall Quay	c. 65m east	Yes
Harbour Master's Office	East Wall Rd	c. 210m east	No
Light house	North Wall Quay	c. 220m east	No
Light house	North Wall Quay	c. 210m east	No

Table 14.4 (Above): DCIHR sites.

14.3.6 CULTURAL HERITAGE

The term 'cultural heritage' can be used as an over-arching term that can be applied to both archaeology and architecture. However, it also refers to more ephemeral aspects of the environment, which are often recorded in folk law or tradition or possibly date to a more recent period. No specific cultural heritage sites have been identified during the course of this assessment that relate to the proposed development area.

14.3.7 AERIAL PHOTOGRAPHY

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995–2013), Google Earth (2003–2019), and Bing Maps has been carried out as part of this assessment. This revealed that modern buildings were situated within the proposed development area, which are visible in the 1995 coverage. These were removed between 2017 and 2018 and only a concrete slab remained within the site.

14.3.8 FIELD INSPECTION

The field inspection sought to assess the site, its previous and current land use, the topography and any additional information relevant to the report. During the course of the field investigation the proposed development site and its surrounding environs were inspected (Figure 14.1).

Prior to the commencement of ground works associated with the permitted basement permission on site, which is being monitored by IAC Archaeology, the proposed development area was in use as a construction compound for an adjacent development (Plate 14.1). The site was surrounded by modern hoarding and covered with a concrete slab. No remains survive that relate to the post medieval industrial buildings that once occupied the site.

Figure: 14.12: Proposed development area, facing east.

14.3.9 TOPOGRAPHICAL FILES

Information on artefact finds from the study area in County Dublin has been recorded by the National Museum of Ireland since the late 18th century. Location information relating to these finds is important in establishing prehistoric and historic activity in the study area. There are two recorded stray finds from the vicinity of the proposed development area, a horse-shoe (NMI Ref. 2006:88) from Sir John Rogerson's Quay and an iron knife-shaped object (NMI Ref. 1954:168) retrieved from East Wall Road.

14.3.10 CONCLUSIONS

The proposed development area is situated within a brownfield site bordered by the North Wall Quay to the south, Mayor Street Upper to the north, and North Wall Avenue to the east. The zone of archaeological potential for Dublin City (DU018-020) is located adjacent to the southern section of the proposed development. There are a further three recorded monuments within 250m of the site, including Sir John Rogerson's Quay (DU018-020201), the Great South Wall (DU018-066) and North Wall Quay (DU018-020564).

Archaeological monitoring of excavations associated with a permitted basement within the proposed development area is currently ongoing (October 2020) (Planning Ref.: DSDZ3042/19). This work is being carried out under the supervision of Muireann Ni Cheallachain of IAC Archaeology, under licence 19E0436, as issued by the DoCHG. To date, no features of archaeological significance have been identified.

A review of the Excavations Bulletin (1970–2019) revealed that a large number of previous investigations have taken place within the study area of the proposed development, many of which encountered evidence of post-medieval reclamation layers and/or structures. Three investigations encountered evidence of prehistoric fishing activity preserved underneath reclamation layers to the west of the proposed development.

An analysis of the cartographic sources has shown that the proposed development area was situated within the flood plains of the River Liffey to the east of Amiens Street (then known as the Strand) until the 18th century when it was reclaimed as part of the North Lotts Scheme. Initial development was slow in this area; however, the establishment of the Grand Canal, docks, and railways led to the industrialisation of the docklands in the later 18th and early 19th century. A number of structures associated with a saw mill, cattle pens, and timber yards were built within the proposed development area during the late 19th and early 20th century, although none survive today. The aerial photographic coverage of the site and the site inspection failed to identify any previously unknown archaeological and cultural heritage features within the site. All post medieval structures have been removed and the site was covered by a concrete slab until the commencement of enabling works.

14.4 Description of Potential Impacts

14.4.1 Construction Phase Impact

Archaeology

Archaeological monitoring of excavations associated with a permitted basement within the proposed development area is currently ongoing (October 2020) (Planning Ref.: DSDZ3042/19) under licence 19E0436. As such, any archaeological remains that may be present will be identified and mitigated as part of the existing permission. Therefore, no negative impacts are predicted upon the archaeological resource as a result of the construction of the development.

Cultural Heritage

No potential negative impacts upon the cultural heritage resource are predicted as a result of the construction of the proposed development.

14.4.2 Operational Phase Impact

No negative impacts during operation are predicted upon the archaeological and cultural heritage resource.

14.4.3 Do Nothing Impact

If the proposed development were not to proceed, there would be no negative impact on the archaeological or cultural heritage resource.

14.4.4 Worst Case Impact

No worst-case impacts have been identified, as any archaeological remains will be mitigated for as part of the existing permitted development on site.

14.5 Mitigation Measures

14.5.1 Archaeology

No mitigation is required in relation to the archaeological resource.

14.5.2 Cultural Heritage

No mitigation is required in relation to the cultural heritage resource.

14.6 MONITORING

None required.

14.7 Cumulative Impacts

No cumulative impacts are predicted upon the archaeological or cultural heritage resource.

14.8 Residual Impacts

There will be no residual impacts upon the archaeological or cultural heritage resource.

14.9 References

14.9.1 BIBLIOGRAPHY

- Bailey, F. 2020a *Archaeological Monitoring at City Block 3 Residential Dublin 1- Final Report*. Licence Number: 19E0597. Unpublished report prepared by IAC Archaeology.
- Bailey, F. 2020b *Archaeological Monitoring at City Block 3 Commercial Dublin 1-Final Report*. Licence Number: 19E0598. Unpublished report prepared by IAC Archaeology.
- Bennett, I. (ed.) 1987–2010 *Excavations: Summary Accounts of Archaeological Excavations in Ireland*. Bray. Wordwell.
- Bradley, J 1992 *The topographical development of Scandinavian Dublin*. In F. H. A. Aalen and K. Whelan (eds). Dublin City and County: from Prehistory to Present. Dublin: Geography Publications.
- Brady, N. and Bangerter, R. 2003 *Underwater Archaeological Assessment South Link Bridge, Grand Canal Basin, Ringsend, Co. Dublin*. 03D027, 03R046.
- Chartered Institute for Archaeologists 2014a *Standards & Guidance for Field Evaluation.*
- Chartered Institute for Archaeologists 2014b *Standards & Guidance for Archaeological Excavation.*
- Chartered Institute for Archaeologists 2014c *Standards & Guidance for an Archaeological Watching Brief (Monitoring)*.
- Clarke, H. (ed.) 1990 *Medieval Dublin: the making of a Metropolis*. Dublin.
- Coughlan, T. and Teahan, N. forthcoming. *Archaeological Monitoring at EXO, Point Village, Dublin 1.* Licence Number: 17E0405. Unpublished report prepared by IAC Archaeology.
- De Courcy, J. W. 1996 *The Liffey in Dublin*. Dublin.

- Department of Arts, Heritage, Gaeltacht and the Islands. 1999a *Framework and Principles for the Protection of the Archaeological Heritage.* Dublin. Government Publications Office.

- Department of Arts, Heritage, Gaeltacht and the Islands. 1999b *Policy and Guidelines on Archaeological Excavation*. Dublin. Government Publications Office.

- Dowd, M. and Carden, R. 2016 *First evidence of a Late Upper Palaeolithic human presence in Ireland.* Quaternary Science Reviews 139, 158–63.

- *Dublin City Development Plan, 2016–2022.*

- Environmental Protection Agency. 2015 *Draft Advice Notes on Current Practice (in the preparation of Environmental Impact Statements).* Dublin. Government Publications Office.

- Environmental Protection Agency. 2017 *Draft Guidelines on the Information to be Contained in Environmental Impact Statements.* Dublin. Government Publications Office.

- McQuade, M. 2008 *Gone Fishin'.* Archaeology Ireland, 22 (1), 8–11.

- National Monuments Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Sites and Monuments Record, County Dublin.

- National Museum of Ireland. Topographical Files, County Dublin.

14.9.2 CARTOGRAPHIC SOURCES

- Bernard De Gomme, *The city and suburbs of Dublin from Kilmainham to Ringsend*..., 1673

- Thomas Phillips, *An exact survey of city of Dublin, and part of the harbour*, 1685

- Charles Brooking, *A map of the city and suburbs of Dublin*, 1728

- John Rocque, *A Survey of the City, Harbour, Bay and Environs of Dublin on the same Scale as those of London*, Paris & Rome, 1757

- William Faden*, A plan of the City of Dublin*, 1797

- William Wilson, *Modern plan of the City and Environs of Dublin*, 1798

- John Taylor, *Map of the environs of Dublin, extending 10 to 14 miles from the castle*, 1816

- William Duncan, *Map of the County of Dublin*, 1821

- John Cooke, *Royal map of Dublin*, 1822
- Ordnance Survey maps of County Dublin, 1843–1938

14.9.3 WEB REFERENCES

- www.excavations.ie – Summary of archaeological excavation from 1970-2019.
- www.archaeology.ie – DoCHG website listing all SMR/RMP sites.
- www.heritagemaps.ie – The Heritage Council web-based spatial data viewer which focuses on the built, cultural and natural heritage.
- www.googleearth.com – Satellite imagery of the proposed development area.
- www.bingmaps.com – Satellite imagery of the proposed development area.
- www.logainm.ie –Placenames Database of Ireland launched by Fiontar agus Scoil na Gaelige and the DoCHG.
- www.turtlebunbury.com – The Docklands – The North Wall.
- www.dublincity.ie – The Great South Wall and Poolbeg Lighthouse, Ringsend.
- www.archiseek.com – Database on Irish architecture.

APPENDIX 14.A.1 SMR/RMP SITES WITHIN THE SURROUNDING AREA

SMR NO.	DU018-020564
RMP STATUS	RMP
TOWNLAND	Dublin North City
PARISH	St. Thomas
BARONY	Dublin
I.T.M.	717709, 734435
CLASSIFICATION	North Quay wall
DIST. FROM DEVELOPMENT	c. 30m south
DESCRIPTION	First embanked by the Ballast Office in 1715-25. In 1786 Gandon proposed that the quay be altered to lie parallel to the Custom House and this change was accepted by the Ballast Board. In 1797 the quay extended west from the narrow swing-bridge at the entrance to the Old Dock to a line roughly 40m west of Custom House building. There was access to it from Lower Abbey St. but access to the river frontage to Bachelors walk would not become available until 1814 when Eden Quay was completed. It appears that all or part of Custom House Quay was enclosed for security, such as iron railings and a stone parapet wall.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-020
RMP STATUS	RMP
TOWNLAND	Various
PARISH	Various
BARONY	Various
I.T.M.	Various
CLASSIFICATION	Historic Town
DIST. FROM DEVELOPMENT	To the immediate south.
DESCRIPTION	Zone of archaeological potential surrounding the historic settlement of Dublin.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-020201
RMP STATUS	RMP
TOWNLAND	Dublin South City
PARISH	St. Marks
BARONY	Dublin
I.T.M.	717208/734319
CLASSIFICATION	South Quay Wall

DIST. FROM DEVELOPMENT	c. 150m south
DESCRIPTION	In 1713 Sir John Rogerson was granted a fee farm estate of the 'strand betwixt Lazy Hill and Ringsend'. He began work which included the building of a river wall near Creighton Street to the bridge at Ringsend and the incidental deepening of the channel of the Liffey in the reach of the river – possibly the most significant and largest private development in the history of the Liffey. He had begun building the double walled quay in 1716 and in 1718 he is said to have built the Fountain Tavern – the first building on the new quay. Brooking shows the wall completed in 1728. In 1770 – 1773 the Hibernian Marine School was built on the Quay on a site between Cardiffs lane and Lime Street. It was flanked to the east by one of Mathew Cardiffs shipyards and to the west by Burnetts Marine Hotel.
REFERENCE	www.archaeology.ie/ SMR file

SMR NO.	DU018-066
RMP STATUS	RMP
TOWNLAND	Ringsend
PARISH	Donnybrook
BARONY	Dublin
I.T.M.	718504/734063
CLASSIFICATION	Great South Wall – Sea Wall
DIST. FROM DEVELOPMENT	c. 225m southeast
DESCRIPTION	De Courcy describes the construction of a sea wall below Ringsend in 1715. Construction commenced with the piling of the south side of the channel to raise the south bank. The wall eventually formed a defined south side to the channel of the Liffey from Corn Exchange Place to the Poolbeg lighthouse.
REFERENCE	www.archaeology.ie/ SMR file/ De Courcy 1996, 374-8

APPENDIX 14.A.2 LEGISLATION PROTECTING THE ARCHAEOLOGICAL RESOURCE

PROTECTION OF CULTURAL HERITAGE

The cultural heritage in Ireland is safeguarded through national and international policy designed to secure the protection of the cultural heritage resource to the fullest possible extent (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 35). This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention), ratified by Ireland in 1997.

THE ARCHAEOLOGICAL RESOURCE

The National Monuments Act 1930 to 2014 and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of archaeological remains, which includes all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes. A National Monument is described as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto' (National Monuments Act 1930 Section 2). A number of mechanisms under the National Monuments Act are applied to secure the protection of archaeological monuments. These include the Register of Historic Monuments, the Record of Monuments and Places, and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites.

OWNERSHIP AND GUARDIANSHIP OF NATIONAL MONUMENTS

The Minister may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

REGISTER OF HISTORIC MONUMENTS

Section 5 of the 1987 Act requires the Minister to establish and maintain a Register of Historic Monuments. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. Any interference with sites recorded on the register is illegal without the permission of the Minister. Two months' notice in writing is required prior to any work being undertaken on or in the vicinity of a registered monument. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

PRESERVATION ORDERS AND TEMPORARY PRESERVATION ORDERS

Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

RECORD OF MONUMENTS AND PLACES

Section 12(1) of the 1994 Act requires the Minister for Arts, Heritage, Gaeltacht and the Islands (now the Minister for the Department of Culture, Heritage and the Gaeltacht) to establish and maintain a record of monuments and places where the Minister believes that such monuments exist. The record comprises a list of monuments and relevant places and a map/s showing each monument and relevant place in respect of each county in the state. All sites recorded on the Record of Monuments and Places receive statutory protection under the National Monuments Act 1994. All recorded monuments on the proposed development site are represented on the accompanying maps.

Section 12(3) of the 1994 Act provides that 'where the owner or occupier (other than the Minister for Arts, Heritage, Gaeltacht and the Islands) of a monument or place included in the Record, or any other person, proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such a monument or place, he or she shall give notice in writing to the Minister of Arts, Heritage, Gaeltacht and the Islands to carry out work and shall not, except in case of urgent necessity and with the consent of the Minister, commence the work until two months after giving of notice'.

Under the National Monuments (Amendment) Act 2004, anyone who demolishes or in any way interferes with a recorded site is liable to a fine not exceeding €3,000 or imprisonment for up to 6 months. On summary conviction and on conviction of indictment, a fine not exceeding €10,000 or imprisonment for up to 5 years is the penalty. In addition, they are liable for costs for the repair of the damage caused.

In addition to this, under the European Communities (Environmental Impact Assessment) Regulations 1989, Environmental Impact Statements (EIS) are required for various classes and sizes of development project to assess the impact the proposed development will have on the existing environment, which includes the cultural, archaeological and built heritage resources. These document's recommendations are typically incorporated into the conditions under which the proposed development must proceed, and thus offer an additional layer of protection for monuments which have not been listed on the RMP.

THE PLANNING AND DEVELOPMENT ACT 2000

Under planning legislation, each local authority is obliged to draw up a Development Plan setting out their aims and policies with regard to the growth of the area over a five-year period. They cover a range of issues including archaeology and built heritage, setting out their policies and objectives with regard to the protection and enhancement of both. These policies can vary from county to county. The Planning and Development Act 2000 recognises that proper planning and sustainable development includes the protection of the archaeological heritage. Conditions relating to archaeology may be attached to individual planning permissions.

DUBLIN CITY COUNCIL DEVELOPMENT PLAN 2016-2022

It is the policy of Dublin City Council

CHC9: To protect and preserve National Monuments.

1. To protect archaeological material in situ by ensuring that only minimal impact on archaeological layers is allowed, by way of the re-use of buildings, light buildings, foundation design or the omission of basements in the Zones of Archaeological Interest.
2. That where preservation in situ is not feasible, sites of archaeological interest shall be subject to 'preservation by record' according to best practice in advance of re-development.
3. That sites within Zones of Archaeological Interest will be subject to consultation with the City Archaeologist and archaeological assessment prior to a planning application being lodged.
4. That the National Monuments Service will be consulted in assessing proposals for development which relate to Monuments and Zones of Archaeological Interest.
5. To preserve known burial grounds and disused historic graveyards, where appropriate, to ensure that human remain are re-interred, except where otherwise agreed with the National Museum of Ireland.
6. That in evaluating proposals for development in the vicinity of the surviving sections of the city wall that due recognition be given to their national significance and their special character.
7. To have regard to the Shipwreck inventory maintained by the DAHG. Proposed developments that may have potential to impact on riverine, inter-tidal and sub-tidal environments shall be subject to an underwater archaeological assessment in advance of works.
8. To have regard to DAHG policy documents and guidelines relating to archaeology.

It is an Objective of Dublin City Council:

CHCO10:

1. To implement the archaeological actions of the Dublin City Heritage Plan 2002-6 in light of the Dublin City Heritage Plan Review 2012.
2. To prepare and implement conservation plans for National Monuments and Monuments in DCC care (City Walls, St Luke's Church, St James's Graveyard, St. Thomas's Abbey, St Canice's Graveyard etc).
3. To maintain, develop and promote the Dublin City Archaeological Archive (DCAA) at Pearse Street Library and Archives.
4. To ensure the public dissemination of the findings of licensed archaeological activity in Dublin through the Dublin County Archaeology GIS.
5. To develop a long-term management plan to promote the conservation, management and interpretation of archaeological sites and monuments and to identify areas for strategic research.
6. To have regard to the city's industrial heritage and Dublin City Industrial Heritage Record (DCIHR) in the preparation of Local Area Plans (LAPs) and the assessment of planning applications and to publish the DCIHR online. To review the DCIHR in accordance with Ministerial recommendations arising from the national Inventory of Architectural Heritage (NIAH) survey of Dublin City and in accordance with the Strategic Approach set out in Section 11.1.4 of this Chapter
7. To promote awareness of, and access to, the city's archaeological inheritance and foster high-quality public archaeology.
8. To promote archaeological best practice in Dublin city.
9. To promote the awareness of the international significance of Viking Dublin and to support post-excavation research into the Wood Quay excavations 1962-81.

10. To develop a strategy for the former Civic Museum collection and for other collections of civic interest and importance.
11. To investigate the potential for the erection of Columbarium Walls.
12. To support the implementation of the Kilmainham Mill Conservation Plan.
13. Dublin City Council will seek to work with Diageo to undertake a more comprehensive industrial heritage survey of the constituent historic buildings within the Guinness Brewery complex at Saint James's Gate.
14. To implement and promote The Dublin Principles (ICOMOS, 2011) as guiding principles to assist in the documentation, protection, conservation and appreciation of industrial heritage as part of the heritage of Dublin and Ireland.
15. To continue to implement actions of the Saint Luke's Conservation Plan on the basis of funds available to conserve the monument, recover the graveyard, provide visitor access, improve visual amenity and secure an appropriate new use.

APPENDIX 14.A.3 IMPACT ASSESSMENT AND THE CULTURAL HERITAGE RESOURCE

POTENTIAL IMPACTS ON ARCHAEOLOGICAL AND HISTORICAL REMAINS

Impacts are defined as 'the degree of change in an environment resulting from a development' (Environmental Protection Agency 2017). They are described as profound, significant or slight impacts on archaeological remains. They may be negative, positive or neutral, direct, indirect or cumulative, temporary or permanent.

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological and historical resources potentially affected. Development can affect the archaeological and historical resource of a given landscape in a number of ways.

- Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of archaeological remains and deposits, or physical loss to the setting of historic monuments and to the physical coherence of the landscape.

- Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation.

- Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits.

- Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments and historic landscape elements as well as their visual amenity value.

- Landscape measures such as tree planting can damage sub-surface archaeological features, due to topsoil stripping and through the root action of trees and shrubs as they grow.

- Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluviums or peat deposits.

- Disruption due to construction also offers in general the potential for adversely affecting archaeological remains. This can include machinery, site offices, and service trenches.

Although not widely appreciated, positive impacts can accrue from developments. These can include positive resource management policies, improved maintenance and access to archaeological monuments, and the increased level of knowledge of a site or historic landscape as a result of archaeological assessment and fieldwork.

PREDICTED IMPACTS

The severity of a given level of land-take or visual intrusion varies with the type of monument, site or landscape features and its existing environment. Severity of impact can be judged taking the following into account:

- The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost;
- Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected;
- Assessment of the levels of noise, visual and hydrological impacts, either in general or site-specific terms, as may be provided by other specialists.

APPENDIX 14.A.4 MITIGATION MEASURES AND THE CULTURAL HERITAGE RESOURCE

POTENTIAL MITIGATION STRATEGIES FOR CULTURAL HERITAGE REMAINS

Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative effects.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved in situ.

DEFINITION OF MITIGATION STRATEGIES

ARCHAEOLOGICAL RESOURCE

The ideal mitigation for all archaeological sites is preservation in situ. This is not always a practical solution, however. Therefore, a series of recommendations are offered to provide ameliorative measures where avoidance and preservation in situ are not possible.

Archaeological Test Trenching can be defined as 'a limited programme of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land, inter-tidal zone or underwater. If such archaeological remains are present field evaluation defines their character, extent, quality and preservation, and enables an assessment of their worth in a local, regional, national or international context as appropriate' (CIfA 2014a).

Full Archaeological Excavation can be defined as 'a programme of controlled, intrusive fieldwork with defined research objectives which examines, records and interprets archaeological deposits, features and structures and, as appropriate, retrieves artefacts, ecofacts and other remains within a specified area or site on land, inter-tidal zone or underwater. The records made and objects gathered during fieldwork are studied and the results of that study published in detail appropriate to the project design' (CIfA 2014b).

Archaeological Monitoring can be defined as 'a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive (CIfA 2014c).

Underwater Archaeological Assessment consists of a programme of works carried out by a specialist underwater archaeologist, which can involve wade surveys, metal detection surveys and the

excavation of test pits within the sea or riverbed. These assessments are able to access and assess the potential of an underwater environment to a much higher degree than terrestrial based assessments.

15.0 INTERACTIONS

15.1 Introduction

Tom Phillips + Associates has prepared this Chapter of the *EIAR*. It deals with likely interactions between effects predicted as a result of the proposed development.

In addition to the requirement under the *Planning and Development Regulations, 2001 – 2020*, to describe the likely significant effects of the proposed development on particular aspects of the environment, it is also required to consider the interaction of those effects.

As such, these are assessed below.

This section addresses the intra-project significant effects (i.e. those occurring between environmental topics within the project). Inter-project effects (i.e. those which are likely to occur as a result of the likely impacts of the proposed development interacting with the impacts of other projects in the locality) have also been considered.

We have established a range of planned / permitted projects have the potential to interact to with either the construction or operational phases of the development. These are identified in Table 3.1 of this *EIAR.*

Further detail relevant to the interaction of impacts may be found in the earlier chapters of the *EIAR*.

15.2 Inter-Relationships/ Interactions

It is noted that all aspects of the environment are likely to interact to some extent and to various degrees of complexity. The likely significant interactions between factors arising from the proposed development are set out in the matrix provided as Table 15.1 below.

Table 15.1: Matrix of Interactions Between Environmental Factors

	Population & Human Health	Biodiversity	Land and Soils	Water & Hydrology	Air Quality/ Climate	Noise & Vibration	Traffic	Waste	Site Services	Archaeology, & Cultural Heritage	Townscape, Landscape and visual
Population & Human Health					✓	✓	✓	✓	✓		✓
Biodiversity			✓	✓	✓	✓		✓			✓
Land and Soils				✓	✓			✓		✓	
Water & Hydrology									✓		
Air Quality/ Climate							✓		✓		
Noise & Vibration							✓				
Traffic								✓			
Waste											
Site Services											
Archaeology & Cultural Heritage											
Townscape, Landscape & Visual											

15.2.1 Interactions between Population & Human Health and Air Quality and Climate

Interactions between air quality and human beings are outlined in Chapter 5 and Chapter 9. An adverse impact to air quality during either the construction or operational phases has the potential to cause health impacts and dust nuisance issues.

The dust mitigation measures that will be put in place on-site during construction will ensure that the impact of the development complies with all ambient air quality legislative limits and therefore the predicted impact is short-term and imperceptible with respect to air impacts on human health during the construction phase.

In relation to interactions between air quality and human health during the operational phase, the results of the quantitative assessment conducted to assess the air quality and climate impacts from changes in traffic flows during the operational phase of the assessment demonstrate that the impacts will be long-term and imperceptible.

Results show that concentrations of ambient air pollutants with the proposed development in place will be compliant with all ambient air quality limit values which are based on the protection of human health.

15.2.2 Interactions between Population & Human Health and Noise & Vibration

There is the potential for noise and vibration arising from the subject scheme to interact with other aspects of the environment, particularly traffic, population and human health. In order to neutralise the potential for significant effects on the surrounding population, a series of mitigation measures are outlined in Chapter 5, 10 and 12.

Those mitigation measures include the use of construction plant and equipment which comply with EU noise emission limits, the use of noise attenuating materials in lorries, skips and chutes, limiting high noise/vibration generating activities and minimising their duration, and adherence to British Standard BS 5228 guidance on minimising noise emissions.

At operational stage, potential adverse vibration effects within the development itself will be avoided by ensuring that any relevant items of plant are fitted with correctly specified and installed anti-vibration mounts.

It is considered that the implementation of the mitigation measures briefly outlined above and described in full within Chapter 10 and 12 will neutralise the potential for significant effects on the surrounding population.

15.2.3 Interactions between Population & Human Health and Townscape Landscape & Visual Impact

Interactions between Population & Human Health and Landscape and Visual Impact are outlined in Chapter 5 and the *EIAR Volume 2 - Heritage, Townscape, Landscape and Visual Impact Assessment - EIAR Volume 2*.

During construction stage, potential visual impacts are related to temporary works, site

activity, and vehicular movement within and around the subject site. Vehicular movement may increase in the immediate area, and temporary vertical elements such as cranes, scaffolding, site fencing/hoarding, gates, plant and machinery etc., will be required and put in place.

All construction impacts on the population arising from visual impact will vary from moderate and neutral to significant and negative, depending on one's location, the stage of construction, and the intensity of site activity at the time. These effects will be of short-term duration.

At operation stage, the designed scheme seeks to harmonise and integrate the development within the existing landscape and the broader urban environment.

The impact on population arising from visual impact is outlined in the *EIAR Volume 2 - Heritage, Townscape, Landscape and Visual Impact Assessment* for each selected view.

15.2.4 Interactions between Population & Human Health and Traffic

Interactions between Population & Human Health and Traffic are outlined in Chapter 5 and Chapter 12.

During the construction & demolition stage of the project the potential impacts to population and human health will primarily be from onsite (plant and vehicle movement) and the increase in offsite plant and traffic movements.

An *Outline Construction Management Plan* has been prepared by PJ Hegarty & Sons, dated January 2021, as part of the planning application which incorporates a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the development.

Provided the proposed mitigation measures and management procedures are incorporated during the construction phase, the impact on human health of the local receiving environment will be moderate, neutral in terms of quality and shot term.

Following completion of the development, potential impacts will occur due to the increase in traffic movements from residential and commercial traffic using the internal roads and parking of the development and the surrounding routes for ingress and egress.

Impacts and the increase in traffic numbers are included in section 12.5 of Chapter 12.

Mitigation measures have been identified to off-set the additional local demand that the proposed residential development at the subject site could potentially generate as a result of the forecast increase in vehicle movements by residents.
The implementation of the mitigation measures outlined within Chapter 12 will ensure that the residual effect on the local receiving environment is both managed and minimised.

The overall impact to human health from the increase in traffic movement from the proposed development is neutral, not significant and long-term.

15.2.5 Interactions between Population & Human Health and Waste

The potential impacts on human beings in relation to the generation of waste during the construction and operational phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin.

A carefully planned approach to waste management and adherence to the project specific *C&DWMP and OWMP*, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects will be long-term, imperceptible and neutral.

15.2.6 Interactions between Biodiversity and Water & Hydrology

Biodiversity interactions with Water and Hydrology arise during the construction phase and the operational phase.

Surface water from the site will be discharged to the existing municipal surface water network. Environmental protection measures outlined in the *Outline Construction Management Plan*, prepared by PJ Hegarty & Sons will be implemented during the construction phase in order to manage potential water quality impacts as a result of water and hydrology.

Surface water drainage systems for the operational site has been designed to improve both quality and flow rate post-redevelopment, and SuDS methods will be implemented.

15.2.7 Interactions between Biodiversity and Air Quality

Interactions between Biodiversity and Air Quality are outlined in Chapter 6 and Chapter 9.

The construction and operation of the proposed development has the potential to generate emissions to atmosphere which have the potential to impact on sensitive flora, fauna and water environments.

However, the effect of these emissions will not be significant during either the construction or operational phases of the development. Mitigation measures implemented during the construction phase will ensure that the deposition of dust is minimised and therefore the predicted impact from air (including dust) emissions on ecology and water environments during construction will be short-term and not significant.

In the operational phase, the impacts will not exceed the air quality criteria set down for ecologically sensitive sites as outlined in Transport Infrastructure Ireland guidance and, therefore, the proposed development will have a long-term and imperceptible impact on the South Dublin Bay Special Area of Conservation.

15.2.8 Interactions between Biodiversity and Noise & Vibration

Biodiversity interactions with Noise and Vibrations arise during the construction phase with the demolition of the existing buildings and excavation works.

Noise and Vibration interactions are relatively minor in this instance, given the ecological context of the site. Measures outlined in the *Outline Construction Management Plan* (enclosed in Appendix 11A.1) will adequately address any potential biodiversity impacts.

15.2.9 Interactions between Biodiversity and Townscape, Landscape & Visual Impact

Interactions between Biodiversity and Landscape and Visual Impact are outlined in Chapter 6 and the *EIAR Volume 2 - Heritage, Townscape, Landscape and Visual Impact Assessment.*

During the operational phase, measures which are outlined in the landscaping plans including biodiversity enhancement measures will result in a positive, slight and long-term impact.

15.2.10 Interactions between Biodiversity and Waste

Biodiversity interacts with Waste Management arise during the construction phase when soil and demolition wastes are being transported from the site.

Measures outlined in the *Outline Construction Management Plan* will be implemented in order to manage potential environmental impacts as a result of waste. During the operational phase, foul waste will be treated at Ringsend WWTP prior to discharge.

It is considered that the implementation of measures outlined in the *Outline Construction Management Plan* will neutralise the potential for significant effects on Biodiversity arising from the production of waste on site.

15.2.11 Interactions between Land & Soils and Biodiversity

Biodiversity interacts with Land & Soils during the construction phase. When there is excavation and movement of soils, it is recommended that works be undertaken by appropriately trained contractors so that risks associated with the presence of asbestos in the soils on site are managed correctly. An asbestos management plan should be put in place to manage the risks to construction workers from asbestos identified in soils on the site.

15.2.12 Interactions between Land & Soils and Hydrology

Interactions between Land & Soils and Hydrology are outlined in Chapter 7 and Chapter 8.

Interactions with Water and Hydrology arise during the construction phase and the operational phase. Surface water from the site will be discharged to existing surface water sewers.

A site-specific *Outline Construction Management Plan* will manage site water during the construction phase.

Surface water drainage from the operational site will be designed in accordance with Greater Dublin Strategic Drainage Study (GDSDS), and SuDS methods will be used to manage drainage.

The design team has been in regular contact with each other throughout the design process to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development.

15.2.13 Interactions between Land & Soils and Air & Climate

Interactions between Land & Soils with Air and Climate arise during the construction phase when dust may be generated. Assessment and mitigation for this is outlined in Chapter 7 and 9. It is considered that the implementation of the mitigation measures described within Chapter 9 will neutralise the potential for significant effects on Air Quality in the area.

15.2.14 Interactions between Land & Soils and Waste

Interactions with Waste Management arise during the construction phase when soil and subsoils and demolition wastes are being transported from the site. These waste materials will require appropriate transport and disposal.

During the construction phase excavated soil, stone, gravel and clay (c. 600,00 tonnes) will be generated from the excavations required to facilitate site levelling, construction of the basement, construction of new foundations, the installation of underground services and attenuation tank. It is anticipated that none will be reused on site and the majority of this material will require removal from site for offsite reuse, recovery, recycling and/or disposal.

Adherence to the mitigation measures in Chapter 11 and the requirements of the *C&DWMP*, will ensure the effect is long-term, imperceptible and neutral.

15.2.15 Interactions between Air Quality and Traffic

Interactions between Air Quality and Traffic are outlined in Chapter 9 and Chapter 12.

Traffic data for the local road links affected by the proposed development and nearby developments for the opening and design years was provided for both the Do Nothing and Do Something Scenarios.

This information has been used as an input for the air quality and climate assessment of the operational phase of the proposed development. The results of this assessment predict that the impacts to air quality and climate from a change in traffic flows as a result of the proposed development will be long-term and imperceptible.

15.2.16 Interactions between Traffic and Noise & Vibration

The vehicular traffic flows that shall be generated by the subject development may result in corresponding changes to noise levels in the vicinity of the surrounding road network.

Changes in traffic noise on the wider road network as a result of the operation of the Project have been predicted based on traffic data from the traffic and transport team for the 'do min' and 'do something' situations in the year of opening and for a future year of 2037. The results are presented in Table 10.9 below.

Changes in noise from traffic increases as a result of the Project are predicted to be less than 1 dB on all roads and therefore below the 3 dB criterion and are therefore not considered significant.

15.2.17 Interactions between Waste and Traffic

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the development. The increase in vehicle movements as a result of waste generated during the construction phase will be temporary in duration.

There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase and has been addressed in Chapter 12 Material Assets – Traffic. Provided the mitigation measures detailed in Chapter 12 and the requirements of the OWMP are adhered to, the effects should be short to long-term, slightly adverse.

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, traffic signalling redesign, or changes in general traffic flow restrictions) have the potential to improve the operational efficiency generally, as well as to reduce vehicle trips to/from the subject development.

15.2.18 Interactions between Archaeology & Cultural Heritage and Land & Soils

Excavation works are proposed on site to provide for the basement levels. However, given the level of development that has taken place within the proposed development area, it is highly likely that any previously unknown archaeological deposits, which may have been located within the site, have since been removed. No potential negative impacts upon the archaeological resource are predicted as a result of the construction of the proposed development.

15.2.18 Interactions between Site Services and Water Hydrology, Air and Population & Human Health

The main interactions relating to Services are water, air quality and population and human health. During the Construction Phase, the availability of water supplies to the Site and during

the connection of the water supply and wastewater services has the potential to impact on the local surface water. There is also implications for the local population if these services are disrupted during the Construction Phase. The development and installation of the Services during construction has the potential to impact on the local air quality.

During the Operational Phase the water supply and wastewater services will have a potential interaction with the available water supply and the potential emissions to the water cycle

16.0 MITIGATION MEASURES

The chapters contained within this EIAR have been ordered in a grouped format by their relevant topic. This chapter summarises all mitigation measures proposed in order to provide a comprehensive overview of the full range of mitigation measures discussed within each chapter.

For clarity, the *EPA Guidelines (2017)* define mitigation measures as those *"measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements".*

16.1 Population and Human Health

16.1.1 Construction Phase

Regarding population, housing, employment, economy, and social services and amenity, no negative impacts have been identified in relation to the provision of a Strategic Housing Development at a site zoned for such development and as such, no mitigation measures are required.

Regarding traffic, a *Construction Traffic Management Plan* will be prepared to encourage sustainable travel modes for construction workers and outline an appropriate control and routing strategy for HGVs accessing the site.

Regarding Health and Safety, during the construction phase, there is a requirement for adherence to the legal duties under the *Construction Regulations (Safety, Health and Welfare at Work (Construction) Regulations 2013*[1]).

Strict security measures will also be implemented to deal with all access to the site. These measures will require all vehicles and personnel visiting the site to be logged in and out.

Regarding Covid-19, precautions will be implemented on site in accordance with the Construction Industry Federation approved document. Management will keep up to date with the latest updates and ensure these are implemented on site.

16.1.2 Operational Phase

Regarding population, housing, employment, economy, and social services and amenity, no negative impacts have been identified in relation to the provision of a Strategic Housing Development at a site zoned for such development and as such, no mitigation measures are required.

Regarding Traffic, the design approach to access and layout ensures a high degree of sustainability by maximising pedestrian spaces and providing significant cycling infrastructure. In order to ensure that sustainable transport means are encouraged, a *Mobility Management*

[1] Health and Safety Authority (2017) http://www.hsa.ie/eng/Your_Industry/Construction/Construction_Duty_Holders/

Plan will be prepared. In particular, use of high-capacity traffic infrastructure proximate to the site will be encouraged.

Regarding Health and Safety, at operational phase, proposed mitigation measures such as the provision of CCTV, the development of a building management plan and operational management plan are envisioned to reduce any potential security / anti-social behaviour issues.

16.1.2 Monitoring

The lead contractor appointed for the construction of the development shall be required to prepare a *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.

Covid-19 will be considered when preparing method statements and when carrying out the works on site. All works will be monitored by the Site Covid Compliance Officers and Safety Officers.

Monitoring typical levels of noise and vibration during critical periods and at sensitive locations.

16.2 Biodiversity

The following mitigation measures will be implemented as part of the proposed project in order to minimise the potential effects on the existing ecology as discussed above.

16.2.1 Operational Phase

Mitigation Measures for Designated Sites

- In accordance with good practice, construction methods would minimise environmental effects on site. These standard measures would be implemented to prevent significant impacts from contamination, pollution and suspended sediment entering the River Liffey from surface water networks and dust during the construction phase.

- Overall, the removal of contaminated fill material, subsoils and treatment of the contaminated groundwater during the dewatering construction works would improve the environmental quality of the area. There is not anticipated to be a direct adverse environmental impact of the construction works on the soil / geological or groundwater on-site or on surrounding off-site environmental receptors (including designated sites), due to the implementation of the detailed dewatering plan.

Mitigation Measures for Birds

- All vegetation clearance would take place outside the bird breeding season, which runs from approximately March to August (inclusive). If any areas of vegetation cannot be cleared outside this period, a breeding bird check would be required no more than 24 hours before the vegetation is due to be removed. If nests are present or signs of nest making activity, then vegetation would remain in place until the young had fledged and verified that this had occurred by a suitably qualified ecologist.

Mitigation Measures for Bats

- In order to reduce the amount of light spill from construction lighting, any lighting which is not required during the night will be switched off.

16.2.2 Operational Phase

No operational impacts are predicted and therefore, no mitigation measures are required.

16.2.3 Monitoring

- Ecological monitoring would be carried out during the construction stage to ensure mitigation measures regarding water quality of the River Liffey are implemented properly.

- Surface water samples would be recovered from the Liffey upstream, adjacent to, and downstream of the site at regular intervals during the development works to monitor conditions for the potential of impacted groundwater discharging from the site to impact the quality of the River Liffey.

- Installation of monitoring well(s) outside the pile wall would provide information on any potential groundwater mounding / lowering.

- Treated water during enabling works and construction would require continual monitoring to check that water quality standards are in compliance with the requirements of the discharge license.

- Regular monitoring of the on-site treatment plant would be undertaken to ensure the discharge water is being adequately treated prior to discharge.

16.3 Land and Soils

16.3.1 Construction Phase

Prior to the start of redevelopment works, the Contractor should produce a *Construction Environmental Management Plan* (*CEMP*) 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.

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.

Excavation of Subsoil Layers

Subsoils should be excavated, stored and transported in accordance with the Contractor's *CEMP*. The *CEMP* should include details of the National Waste Collection Permit of haulage contractors along with the waste soil classification report. Waste Transfer Certificates issued from receiving waste facilities should also be logged and stored.

Imported Fill

If imported material is required, the source, quality and contamination status of the material should be confirmed by the Contractor and approved by a suitably qualified Environmental Consultant prior to importation and placement.

Construction Traffic

The Contractor should provide wheel wash facilities close to the site entrance to reduce the deposition of mud, soils and other substances on the surrounding road network.

Accidental Spills and Leaks

All refuelling and plant servicing should be undertaken in designated hard standing areas away from any water courses or site drains. Any fuel or chemicals should be stored in appropriate double skinned tanks/containers within bunded areas. The Contractor shall also provide spill kits to clean up any accidental spills and leaks.

Geological Environment

The proposed development will not impact on the underlying bedrock geology as the basement will be excavated into the overlying alluvial deposits and boulder clay.

16.3.2 Operational Phase

Based on the proposed activities of the development and the installation of a drainage system no mitigation measures have been identified.

16.3.3 Monitoring

The Contractor should include monitoring and auditing of the implementation of the *CEMP* to ensure appropriate mitigation measures are being applied during the construction stage of the development.

16.4 Landscape and Visual Impact

16.4.1 Construction Phase

The building site including a site compound with site offices, site security fencing, scaffolding and temporary works will be visible during the construction phase. The provision of site hoarding along the property boundaries will substantially address many potential effects of construction operations at ground level during the delivery stage.

Construction cranes (and of course, the emerging buildings) will become visible from neighbouring properties and also from a number of more distant vantage points as the development proceeds.

The cranes and site facilities are generally viewed as a temporary and unavoidable feature of construction, particularly in urban settings. Mitigation measures proposed during the construction stage of the development, revolve primarily around the implementation of appropriate site management procedures during the construction works – such as the control of lighting, storage of materials, placement of compounds, control of vehicular access, and effective dust and dirt control measures, etc.

The *Outline Construction Management Plan* for the project, which is submitted with this Application, sets out the basic measures to be employed in order to mitigate potential negative effects during construction. This is a working document which is refined and added to as the project proceeds.

16.4.2 Operational Phase

The designed scheme seeks to harmonise and integrate the development within the existing landscape and the broader urban environment whilst adhering to National Planning policy which seeks the densification and the provision of increased height on appropriate urban sites.

The design rationale and detail employed seeks to mitigate potential negative effects on the landscape character and visual amenity of the area by:

- Establishing an integrated relationship between the proposed development and surrounding buildings and the broader urban landscape beyond, incorporating aspects of current and emerging trends in built-form, scale, texturing, colour and materials;

- The insertion, positioning and detailed modelling of the buildings, in order to assist in the appropriate visual assimilation of their mass;

- Appropriate architectural detailing to assist in the integration of the external building facades – including the modulation of openings and fenestration;

- Rationalisation of all services elements and any other potential visual clutter and its incorporation internally within building envelopes (as far as practically possible);

- Simplification and rationalisation of the proposed roof lines with integrated communal gardens on the roofs of all buildings;

- Use of appropriate materials;

- The provision of significant additional public space;

- The provision of communal/public uses within the development; and

- Pedestrian and cycle facilities and linkage are proposed as an integral feature through the proposed scheme.

16.4.3 Monitoring

There is no monitoring associated with this aspect of the *Environmental Impact Assessment Report.*

16.5 Hydrology

16.5.1 Construction Phase

- 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.

- All batching and mixing activities will be located in areas away from watercourses and drains.

- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards and manufacturer's guidance.

- 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.

- Spills of concrete, cement, grout or similar materials will not be hosed into drains.

- Rainwater that accumulates on site will be discharged to the DCC sewer system.

- 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 industr*y (CIRIA, 2004).

- 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 program 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.

- The Contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water and or Dublin City Council, in addition temporary pumping of ground water to facilitate the proposed basement construction will be licensed by Dublin City Council and the water levels monitored as outlines in the basement impact assessment.

16.5.2 Operational Phase

- Incidental surface run-off from underground basement car parks, compactor units and waste / service yard areas will be discharged into the foul drainage system. Grit / petrol / oil separators will be provided in all of the above areas to improve the quality of water discharging.

- 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 2 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.

- SuDS proposals will improve the quality and reduce the quantity of surface water discharging into the receiving system.

- Removal of the surface water from the existing combined sewers will reduce the hydraulic loading on the existing sewerage network and Waste Water Treatment Plant (WWTP) at Ringsend.

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

16.5.3 Monitoring

Ongoing monitoring of the water quality during construction is proposed. It is not foreseen that any monitoring will be required on completion of the proposed development.

16.6 Air and Climate

16.6.1 Construction Phase

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Section 9.4.1 of this EIAR and as part of the *Outline Construction Management Plan*.

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.

- Display the head or regional office contact information.

- Develop and implement a *Dust Management Plan (DMP),* which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real time PM10 continuous monitoring and/or visual inspections.

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.

- Make the complaints log available to the local authority when asked.

- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.

- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter

emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.

- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

- Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks, and construction.

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.

- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.

- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.

- Avoid site runoff of water or mud Keep site fencing, barriers and scaffolding clean using wet methods.

- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.

- Cover, seed, or fence stockpiles to prevent wind whipping.

- Ensure all vehicles switch off engines when stationary - no idling vehicles.

- Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.

- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the

approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

- Produce a *Construction Logistics Plan* to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Avoid bonfires and burning of waste materials.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.

- Record all inspections of haul routes and any subsequent action in a site log book.

- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.

- Access gates to be located at least 10 m from receptors where possible.

At all times, the procedures within the plan will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

The assessment illustrates that there are potentially significant impacts associated with construction dust. Mitigation measures are therefore recommended. The uptake and correct implementation of these mitigation measures are designed to result in impacts being reduced to negligible.

The construction of the project will generate traffic on nearby roads. The assessment illustrates that the impact to air quality as a result of emissions from this traffic are negligible. On this basis no mitigation is required.

16.6.2 Operational Phase

No mitigation measures are required for the operational phase of the development.

The operation of the project will generate traffic on nearby roads. Stage 1 screening identified that there was the potential for significant impacts on North Wall Avenue. Stage 2 detailed modelling was therefore undertaken. The assessment illustrates that the impact to air quality as a result of emissions from this traffic are negligible. On this basis no mitigation is required.

Construction traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the proposed development. Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, based on the short-term nature and moderate scale of the works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the construction phase of the proposed development to ensure emissions are minimised. In particular, the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

16.6.3 Monitoring

Daily on-site and off-site inspections will be conducted, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary. Additionally, regular site inspections will be carried out to monitor compliance with the *DMP*, record inspection results, and make an inspection log available to the local authority when asked.

At operational phase, monitoring of the EPA's annual air quality reports will be conducted. Air quality monitoring programs have been undertaken in recent years by the EPA at a number of locations in Dublin city centre. The most recent annual report on air quality, *"Air Quality in Ireland 2019"* (EPA 2020), details the range and scope of monitoring undertaken throughout Ireland.

16.7 Noise and Vibration

16.7.1 Construction Phase

Initial modelling showed the potential for significant construction noise impacts at the nearest NSRs and therefore mitigation measures have been considered. Mitigation measures are available which will reduce impacts, including, where necessary, the generic measures listed below:

- Use of stationary equipment, e.g. compressors, generators and pumps fitted with properly lined and sealed acoustic covers or enclosures, which will be kept closed whenever the machines are in use;
- Fitting of mufflers or silencers of the type recommended by manufacturers;
- Shutting down of machines in intermittent periods between work, or throttling down to a minimum;
- Maintenance of plant in good working condition to minimise noise; and
- Siting noisy plant and equipment as far away as possible from NSRs, and use of barriers (eg site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever possible.

It is assumed that the majority of plant can be mitigated to some degree, either by choosing quieter models or through enclosure or partial enclosure. A reduction of 5 dB has been assumed to be achievable for most plant items, with a reduction of 10 dB assumed for generators. No reductions have been assumed for concrete trucks or hand-held welders.

Installation of site hoardings, security measures and signage etc along with later stages, such as landscaping and internal fit-out, are not considered to have the potential to cause significant noise impacts.

Enabling works such as diverting existing services and the installation of new services do not generally require large quantities of plant, are limited to the daytime, and progress at a reasonably rapid rate. Therefore, they are not considered to have potential to cause significant noise impacts and have been scoped out of further assessment. In the unlikely event the need for night working for enabling works arise during detailed design, an assessment of the magnitude and duration of works will be carried out to determine whether mitigation measures are appropriate.

The modelling assumes that all three blocks will be constructed simultaneously. The construction noise predictions have been made based on preliminary site layout drawings showing the locations of fixed plant items such as tower cranes, concrete placing booms and the placing boom pump unit. Handheld and mobile plant such as poker vibrators and circular saws have been distributed towards the edges of all of the three blocks to provide a reasonable worst-case estimate of noise levels for all receptors simultaneously, for the daytime concreting phase. No screening from buildings, site hoardings or other objects has been included, which is conservative.

Slip form and power floating works may be required at night. Slip form works have been modelled assuming that a single RC core is constructed at a time. Power floating will be carried out following a floor pour. It is expected to begin before the night-time period and normally be complete by 1am at the latest, although, by exception, may need to continue later as a result of cold, inclement weather. For the purpose of assessment, it is assumed that power floating continues until 1am. For each activity, several scenarios have been modelled to represent construction works taking place within the three blocks and a range of predicted noise levels presented in Section 10.2 of this EIAR.

16.7.2 Operational Phase

Residential

During detailed design, residential units will be designed to reduce external noise levels, to ensure adequate internal noise levels are achieved. Therefore, an assessment of noise effects on proposed residential units has not been included.

As for construction, changes in road traffic noise from the operation of the Project are assessed using CRTN, with noise changes of greater than 3 dB(A) identified as a significant effect.

Noise from building services has been assessed using the standards set out in the NG4 (2). This guidance sets out different noise standards depending on the local noise environment. Following the screening guidance for Quiet Areas, it was determined that the site is not located in a Quiet Area as it fails the criteria for being more than 7.5 km from a motorway. As a result of the urban nature of the site setting, it is considered unlikely that the nearest NSRs fall within areas of 'Low Background Noise'. Therefore, the standards set out in Table 10.6 of this EIAR have been adopted.

(2) EPA's "Guidance Note for Noise: Licence Applications, Survey and Assessments in Relation to Scheduled Activities (NG4)". 2016

Additional Traffic

Changes in road traffic noise from the operation of the Project are assessed using CRTN, with noise changes of greater than 3 dB(A) identified as a significant effect.

Noise from building services has been assessed using the standards set out in the NG4 (see Chapter 10.2.2 of this EIAR). This guidance sets out different noise standards depending on the local noise environment.

Following the screening guidance for Quiet Areas, it was determined that the subject site is not located in a Quiet Area as it fails the criteria for being more than 7.5 km from a motorway.

As a result of the urban nature of the site setting, it is considered unlikely that the nearest NSRs fall within areas of 'Low Background Noise'. Therefore, the standards set out in Table 10.6 have been adopted.

NG4 states that during the daytime and evening, rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all sensitive locations, with a penalty of 5 dB applied if audible tones or impulsive noise is present. During the night-time period, no tonal or impulsive noise should be clearly audible or measurable at any noise sensitive location.

Changes are predicted to be less than 3 dB during the day and night-time and therefore not significant.

Plant

The various plant areas within the proposed development have the potential to be significant noise sources.

Building services noise can cause disturbance principally at noise sensitive receptors located directly adjacent to them, particularly if they operate during the night.

Heating, ventilation, air conditioning and other plant associated with the proposed development that is to operate during night-time periods will be attenuated accordingly in the design of the proposed development.

To avoid significant noise impacts at adjacent existing receptors, building services plant will be designed to meet the noise standards from NG4 at the nearest NSRs (Noise Sensitive Receptors).

16.7.3 Monitoring

Noise from construction has been assessed at the nearest NSRs. BS 5228[3] sets out guidance on construction plant noise levels and on the threshold of significant noise effects on NSRs.

Thresholds for assessing potential noise impacts are based on the levels in Annex E of BS 5228, considered conservative for this urban setting. Before construction begins, noise monitoring

[3] BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites', BSI, 2014

may be carried out to confirm appropriate levels using the 'ABC' method. This would require a baseline survey to be carried out under typical conditions (which are unlikely to be present currently due to COVID-19 restrictions). The use of the 'ABC' method would be expected to result in lower impacts and could be used to inform detailed mitigation.

16.8 Waste

16.8.1 Construction Phase

A project specific *Outline Construction Management Plan* has been prepared in line with the requirements of the guidance document issued by the DoEHLG.

Adherence to the high-level strategy presented in this *CMP* will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development.

Prior to commencement of demolition, the contractor(s) will be required to refine/update the *CMP* or submit an addendum to *CMP* to DCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

CS Consulting have estimated that c. 600,000 tonnes of soils and stones will be generated from the excavations required to facilitate basement completion and construction of new foundations, the installation of underground services and attenuation tank.

It is anticipated that none will be reused on site and the majority of this material will require removal from site for offsite reuse, recovery, recycling and/or disposal.

The contractor(s) will endeavour to ensure that material is reused or recovered off-site insofar as is reasonably practicable or disposed of at authorized facility.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated;
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and

- Timber;

- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;

- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);

- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;

- All construction staff will be provided with training regarding the waste management procedures;

- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;

- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and

- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC *(Waste Directive) Regulations (2011)*. EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that article 27 will be used.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations and the *Litter Pollution Act 1997*, the *EMR Waste Management Plan (2015 - 2021).* It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

16.8.2 Operational Phase

Waste will be managed in accordance with all legal requirements, and in accordance with the waste hierarchy (see Figure 17.x below). By ensuring that different wastes are appropriately segregated, the aim will be to maximise the potential for reuse and recycling of materials and hence to minimise the amount of waste that needs to be disposed and, specifically, the amount that needs to be landfilled.

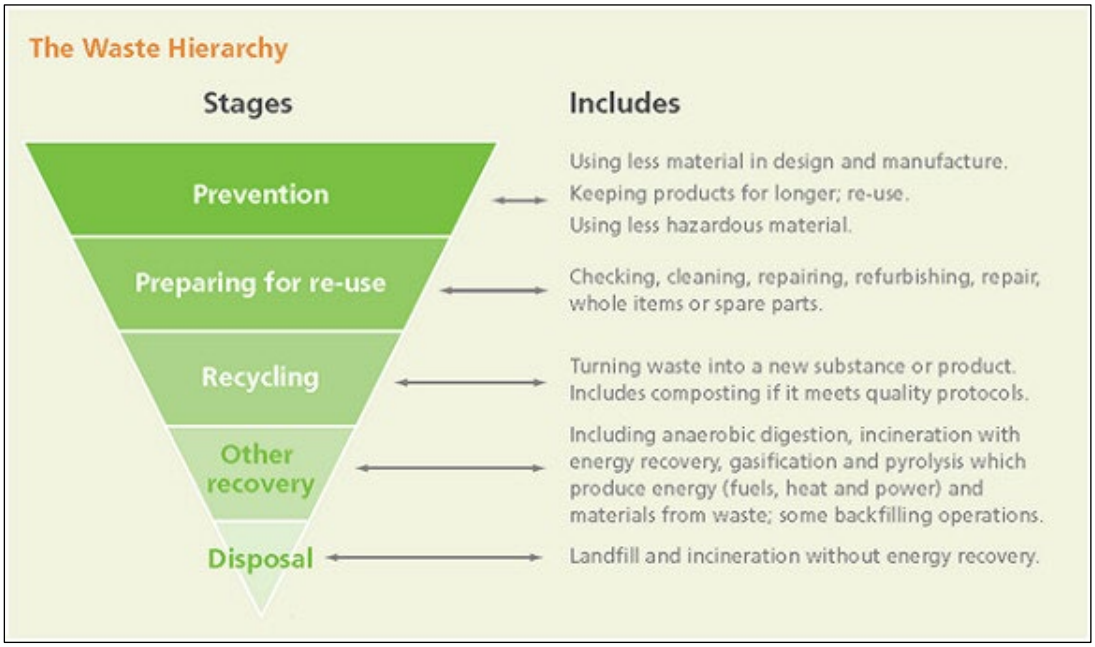


Figure 17.1: Waste Hierarchy. (Source: Defra, Guidance on applying the Waste Hierarchy, June 2011.)

It is expected that:

- Residents will take their waste to a centralised waste storage area on the basement floor – one store per block so that residents don't need to carry waste too far;
- Restaurants – similarly; and
- Office units – similarly.

The service management company will be responsible for managing the waste store(s) and arranging for the collection/treatment/disposal of the wastes by a licensed contractor.

16.8.3 Monitoring

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets.

The C&D WMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

The building's facilities management team will be responsible for monitoring compliance with various aspects of the OWMP. This will include the following:

- Checking the waste deposited in the bins to make sure it complies with the waste segregation requirements. If necessary, they will advise residents and occupants of units in a particular block about which wastes can be placed in each of the four main types of container;

- Checking on the permit of the waste collection contractor prior to contract award and periodically throughout the contract;

- Checking on the suitability of the vehicle and security of the waste as the waste is collected by the waste transporter;

- Ensuring that all wastes are being taken to appropriately licensed waste processing/disposal facilities; and

- Periodically checking the facilities to which the building's waste is taken to make sure it is being managed appropriately and as much as possible is being recycled.

In addition, records will be kept of the volumes of waste produced from operation of the building together with data regarding the proportion of waste that is recycled and disposed (landfilled and incinerated). Trends in these data will be analysed and the building's occupants will be advised accordingly – for example by means of notices in residents' communal areas. The aim will be for the building as a whole to meet the targets set by Dublin City Council to recycle at least 50% of all the waste generated. In addition, the target will be to reduce year on year the amount of waste generated (on a per capita basis) as well as increasing the percentage of waste recycled.

In order to help achieve these targets, the facilities management team will monitor any developments in local waste management services – specifically the introduction of any new recycling schemes. The four-bin system of waste collection will be periodically reviewed and revised if appropriate (e.g., through the collection of additional materials and/or introduction of a different segregation system).

16.9 Traffic and Transportation

16.9.1 Construction Stage

The lead contractor appointed for the construction of the development shall be required to prepare a *Construction Management Plan (CMP)* that shall include a plan for the scheduling and management of construction traffic. This *CMP* shall outline measures to be taken to mitigate the impact of construction traffic on the surrounding road network.

16.9.2 Operation Stage

As described in the accompanying *Traffic Impact Assessment*, the development shall incorporate several design elements intended to mitigate the impact of the development on the operation of the surrounding road network. 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); and

- a high provision of secure bicycle parking, which shall serve to encourage bicycle journeys by both residents and visitors.

As described in the accompanying *Mobility Management Plan* (*MMP*) *Framework* document, the development site is situated in proximity to existing high-quality bus, rail, and light rail services through Dublin City, as well as proposed future transport infrastructure. The site benefits from a location close to numerous amenities and centres of employment and is within approximately 20 minutes' walk of O'Connell Bridge, at the heart of the city centre.

As also described in the *MMP* Framework, a Mobility Management Coordinator shall be appointed for the proposed development, with the remit to implement and oversee an ongoing *Mobility Management Plan* (*MMP*). This shall assist residents and their visitors in making the most of sustainable transport opportunities and in avoiding single-occupant car journeys.

16.9.3 Monitoring

The lead contractor appointed for the construction of the development shall be required to prepare a *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.

As described in the accompanying *MMP Framework* document, a Mobility Management Coordinator shall be appointed for the proposed development, with the remit to implement and oversee an ongoing *Mobility Management Plan* (*MMP*). In conjunction with this, the Mobility Management Coordinator shall be responsible for monitoring the travel habits of development occupants and visitors.

An *MMP* is a dynamic process whereby a package of measures and campaigns is identified, piloted, and then monitored on an ongoing basis. The *MMP* 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 Mobility Management Coordinator shall gather data on travel patterns, for instance by conducting periodic travel surveys of development occupants.

16.10 Site Services

16.10.1 Construction Phase

The main potential impacts are associated with the Construction Phase of the proposed development.

Mitigation measures are outlined below:

Gas Supply

The Contractor will not require a new gas supply connection for the site.

Power Supply

The Contractor will apply for a new temporary power supply for the site. This will likely require a temporary ESB networks supply which will be removed upon connection of the permanent power supply to the site. This will be installed in accordance with ESB standards for temporary power supplies.

Telecoms Supply

The Contractor will apply for a new temporary telecom supply for the works. This will be minimal in nature and will be removed when the works are completed.

Water Construction Phase

- 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.
- All batching and mixing activities will be located in areas away from watercourses and drains.
- Protection measures will be put in place to ensure that all materials used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards and manufacturer's guidance.
- 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.
- Spills of concrete, cement, grout or similar materials will not be hosed into drains.
- Rainwater that accumulates on site will be discharged to the DCC sewer system.

- 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).
- 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.

The Contractor will make all necessary arrangements for a temporary water supply in agreement with Irish Water and or Dublin City Council, in addition temporary pumping of ground water to facilitate the proposed basement construction will be licensed by Dublin City Council and the water levels monitored as outline sin the basement impact assessment.

16.10.2 Operational Phase

Mitigation measures proposed in relation to the drainage and water infrastructure include the following:

Gas

- The Completed gas system will consist of gas meters which will be controlled by GNI and will serve a private gas network system. As such the ongoing maintenance will be carried out by the maintenance company operating for the management firm.

Power

- The Completed power distribution system will consist of ESB Networks substations and private distribution rooms. The substations will be controlled by ESB Networks. All substations will be constructed to ESB Networks standards and will be handed over to ESB upon completion.

Telecoms

- A new arrangement of telecoms distribution will be provided throughout the development. This will allow for multiple providers to be connected to the site.

Water Operational Phase

- Incidental surface run-off from underground basement car parks, compactor units and waste / service yard areas will be discharged into the foul drainage system. Grit / petrol / oil separators will be provided in all of the above areas to improve the quality of water discharging.

- 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 2 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.*

- SuDS proposals will improve the quality and reduce the quantity of surface water discharging into the receiving system.

- Removal of the surface water from the existing combined sewers will reduce the hydraulic loading on the existing sewerage network and Waste Water Treatment Plant (WWTP) at Ringsend.

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

16.10.3 Monitoring

Ongoing monitoring of the water quality during construction is proposed. It is not foreseen that any monitoring will be required on completion of the proposed development.

16.11 Cultural Heritage

16.11.1 Mitigation

Chapter 14 of this EIAR notes that, while no mitigation measures are required in relation to the archaeological and cultural heritage resources, there are best practice guidelines regarding the avoidance of damage and disturbance to said resources.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods.

Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved in situ.

16.11.2 Monitoring

None required.

17.0 DIFFICULTIES ENCOUNTERED

No significant difficulties, in terms of technical deficiencies or lack of sources of information, were encountered in compiling the specified information contained in the Statement.

References to published sources of information are acknowledged in the text. In addition, studies commissioned specifically for the purposes of this Environmental Impact Assessment Report are also referenced.

A list of all consultants involved in the compilation of information for this *EIAR* is provided in Chapter 1.

As the proposed development will not require the use of natural resources that are in short supply, nor will the development result in the emission of pollutants that will create nuisance or hazard, the matters referred to in Schedule 6(2)(c) of the *Planning and Development Regulations, 2001* (as amended) do not apply.

The full impact analysis was carried out by experienced consultants and the best available methods were employed to forecast environmental effects.