Intended for
Vantage Data Centers DUB11 Limited

Date
March 2023

Project Number
1620014883

VANTAGE DUBLIN DATA CENTER

VOLUME 1A: MAIN ENVIRONMENTAL IMPACT ASSESSMENT REPORT

RAMBOLL

Volume 1A: Main Environmental Impact Assessment Report

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PREFACE

1.1N1 A planning application was submitted by Vantage Data Centers DUB11 Limited (the 'Applicant') in November 2022 under application reference SD22A/0420 for the demolition of the two storey dwelling and associated outbuildings and farm structures; and the construction of 1 no. two storey data centre with plant at roof level and associated ancillary development on land within the townlands of Ballybane and Kilbride within Profile Park, Clondalkin, Dublin 22.

1.2N2 The application was accompanied by an Environmental Impact Assessment Report (the 'November 2022 EIAR') prepared by Ramboll UK Ltd ('Ramboll') and a team of technical specialists, which comprised the following documents:

- Non-Technical Summary (NTS);
- Volume 1: Main Environmental Impact Assessment Report;
- Volume 2: Landscape and Visual Impact Assessment (LVIA) and Cultural Heritage Assessment; and
- Volume 3: Technical Appendices.

1.3N3 On 12 January 2023 SDCC responded to the planning application requesting additional information (AI) to be submitted.

1.4N4 As a result, the design of the proposed development has evolved to respond to the items raised by SDCC.

1.5N5 As such, the Applicant will now submit a revised EIAR (the 'March 2023 Revised EIAR') to accompany the planning application previously submitted. Accordingly, the relevant design drawings and other supporting documents have been updated and have been used to inform the EIAR.

1.6N6 Where relevant updated environmental impact assessments have been undertaken to assess the potential impacts and likely effects of the proposed development, the outcome of which has been presented in the EIAR.

1.7N7 The structure of this March 2023 revised EIAR is consistent with the November 2022 EIAR. For the March 2023 revised EIAR track changed updates have been made to aid the reader in understanding what text, figures and tables of the November 2022 EIAR have been amended and/or replaced, where amendments to an original ES Chapter have been considered necessary as a result of the proposed amendments, these have been highlighted in the text as follows:

- Deleted text is shown as strikethrough red text (e.g. ~~proposed development~~);
- Replacement or new text is shown as underlined blue text (e.g. proposed development);
- All paragraphs where text has been amended within a paragraph, the whole paragraph has been reproduced showing the relevant correction. Such amended paragraphs are labelled with the addition of the letter A, i.e. 7.75A;
- Where the content of a table has changed, but it is considered useful to show a direct comparison with the original text, the Table title is identified by the addition of the letter A, i.e. Table 2.1A;
- Where a paragraph, figure image or table has been replaced in full, the new paragraph, Figure or Table title is identified by the addition of the letter R, i.e. Table 2.1R;
- Where additional paragraphs are inserted, they are indicated by the inclusion of a letter N, with consecutive numbers N1, N2, N3 etc. after the preceding paragraph number, i.e. 8.87N1. This avoids having to change all subsequent paragraph numbers; and
- Where it has been necessary to amend or replace or add Technical Appendices, the amended or replacement Technical Appendix is renumbered by the addition of the letter A or R respectively, i.e. Technical Appendix 7.1R.

1A INTRODUCTION

Introduction

1.8 This Environmental Impact Assessment Report (EIAR) has been prepared for Vantage Data Centers DUB11 Limited (the 'Applicant') – in accordance with the statutory procedures set out in the Planning and Development Act 2000 (as amended)[1] (the 'Act') and the Planning and Development Regulations 2001 (as amended)[2] (the 'Regulations') – to accompany an application (the 'application') seeking permission (also known as 'full permission') for a data centre building and associated development (the 'proposed development') on the Profile Park Site, Kilcarbery (the 'site'), situated within the jurisdiction of South Dublin County Council (SDCC).

1.9 The proposed development is not listed under Annex I of the EIA Directives[3,4] and the site is below the 15 hectare (ha) threshold under Part 2, Schedule 5 of the Regulations at 3.31 ha in size. However, the Applicant has recognised that the scale and nature of the proposed development has the potential for significant effects on the environment and therefore commissioned an environmental impact assessment (EIA) for the proposed development, the findings of which are presented within this EIAR.

1.10 The EIAR comprises the following:

- Non-Technical Summary (NTS);
- Volume 1: Main Environmental Impact Assessment Report (this document);
- Volume 2: Landscape and Visual Impact Assessment (LVIA) and Cultural Heritage Assessment; and
- Volume 3: Technical Appendices.

1.11 EIA is a formal process in which the likely significant effects of certain types of development projects on the environment are identified, assessed and reported upon. For certain types of development, the process must be followed in order for such effects to be taken into account before a decision is made on whether planning permission should be granted.

1.12 This EIAR presents the results of the EIA that has been undertaken of the proposed development. In accordance with the Regulations, the EIAR reports on the potential environmental impacts and likely significant environmental effects of the proposed development during the demolition and construction stage, and the operation stage.

1.13 The EIA has taken into account mitigation measures that are being proposed by the Applicant, including those measures that have been integrated into the planning and design of the proposed development (i.e. 'embedded mitigation') and 'additional mitigation' to prevent and, where prevention is not possible, reduce and/or mitigate likely significant adverse effects. It then evaluates the significance of the residual effects.

1.14 Further information on how the scope of the EIA was formulated and on the structure of this EIAR, is provided in Chapter 2: EIA Process and Methodology of this Volume.

1.15 SDCC is the 'relevant planning authority' for the purposes of the Regulations and will determine the application taking into account the likely significant environmental effects of the proposed development as determined through the EIA process.

1.16 This chapter provides a general description of the site, the relevant planning context, planning application details, as well as the content and structure of the EIAR. More detailed information on the application site is provided in the technical assessment chapters (6-15) of this Volume, as well as the landscape, visual and heritage assessments in Volume 2.

1.17 A description of the proposed development is provided in Chapter 4: Proposed Development Description and details of the demolition, and construction works are provided in Chapter 5: Demolition and Construction Environmental Management of this Volume.

Development Context

Site Location and Context

1.18 The site is located at Irish grid reference O 03911 30784, within Profile Park, as shown in Figure 1-1.

1.19 Geographically, the site is located in Profile Park, approximately 10 kilometres (km) to the south-west of Dublin city centre, within South Dublin County.

1.20 Profile Park largely comprises commercial and industrial development, with numerous data centres in the vicinity (Figure 1.2). The site's surrounding context predominantly comprises Profile Park and industrial development to the north, Grange Castle Golf Club to the east beyond which are residential properties, agricultural land and industrial development to the south and the permitted Vantage data center development to the west, beyond which is Bolands Car Garage and further data centers.

1.21 In terms of public transport, the closest railway station to the site is at Clondalkin/Fonthill approximately 2.8 km to the north-east from which frequent commuter services to/from Dublin city centre can be accessed. Citywest Campus Luas Tram Stop is approximately 3.5 km to the south-east of the site from which frequent tram services to Dublin city and beyond can be accessed.

1.22 Bus stops are located adjacent to the site's northern boundary as well as east and west along New Nagnor Road (R134) within 300 metres (m) of the site from which frequent routes operate between the site and Dublin city centre.

1.23 The pedestrian and cycle environment in the vicinity of the site is of a high standard, with wide, well-lit lengths of dedicated and segregated off-road cycle and pedestrian routes.

[1] Government of Ireland, 2000. Planning and Development Act 2000 (as amended). ISB. S.I. No. 30/2000.
[2] Government of Ireland, 2001-2022. Planning and Development Regulations 2001 (as amended). S.I. No. 600 of 2001. ISB.
[3] European Union, 2011. Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance Official Journal of the European Union. Document 32011L0092.
[4] European Union, 2014. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance. Official Journal of the European Union. Document 32014L0052.

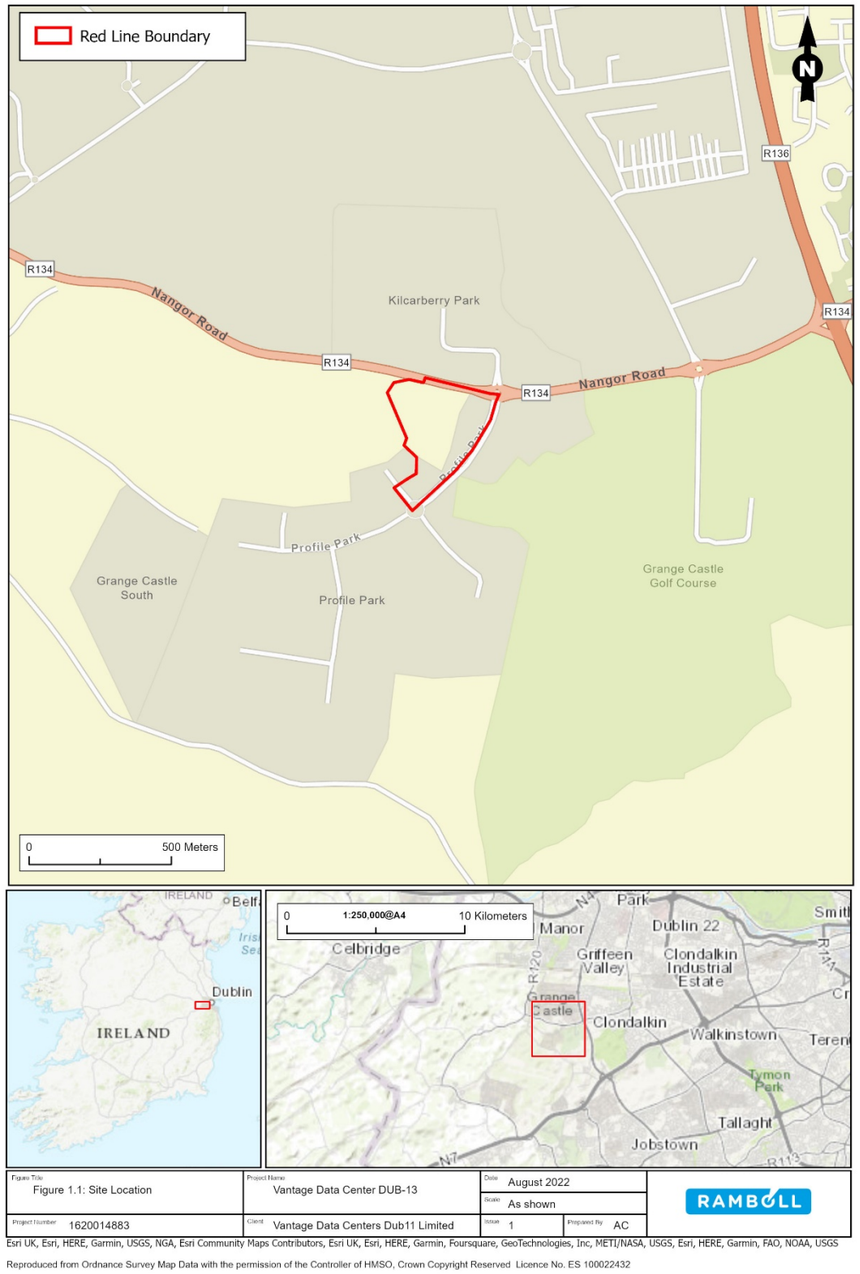


Figure 1-1: Site Location

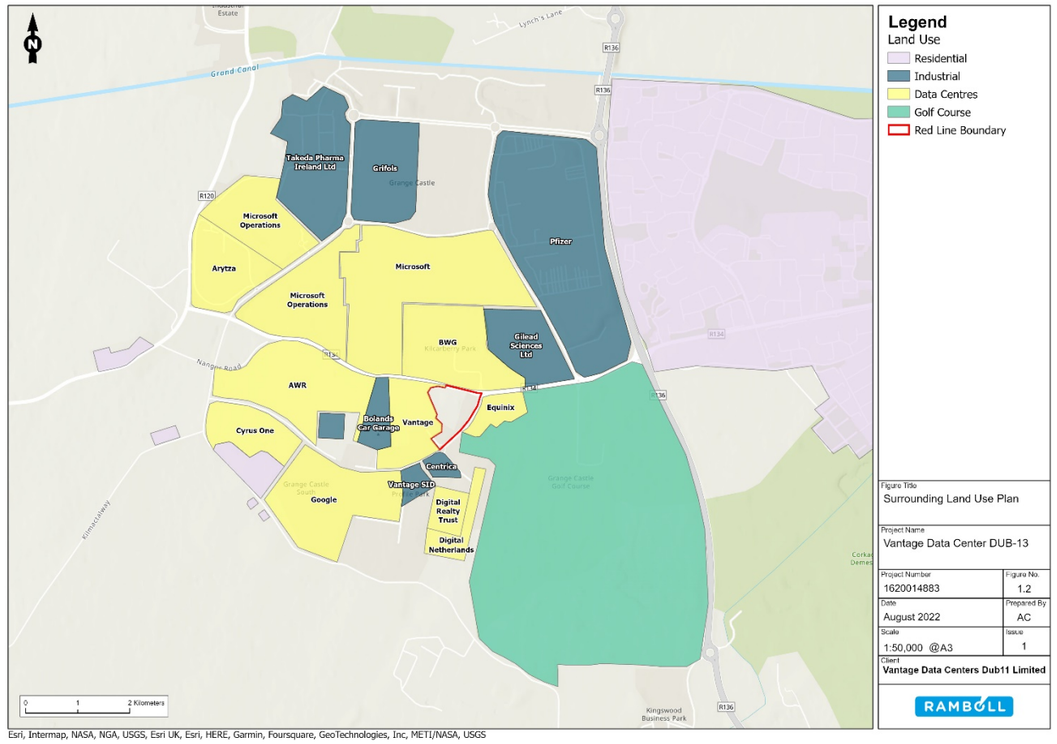


Figure 1-2: Surrounding Land Use Plan

Site Description

1.24 The site boundaries are defined by:

- New Nangor Road (R134) to the north;
- Falcon Avenue, Equinix and Grange Castle Golf Club to the east;
- Falcon Avenue to the south; and
- The permitted Vantage data centre development (planning reference SD21A/0241) to the west, currently agricultural fields.

1.25 The site is a triangular parcel of agricultural land, with a residential dwelling located in the north-west corner of the site, and an area of hardstanding within the south-west of the site. The site covers a total area of 3.31 ha and lies at an elevation between approximately 74 and 75 m Above Ordnance Datum (m AOD).

1.26 The existing Baldonnel steam flows through the south of the site, orientated in a south-east to north-west direction, and entering in the south-east and flowing west.

1.27 The site can currently be accessed from three access points, two from the north off New Nangor Road (R134), and one from Falcon Avenue on the eastern border, which leads to a roundabout on the R134 New Nangor Road.

Figure 1-3: Representative Photographs of the Site (left upper image looking north-west across the site, left lower image looking south-west across the site, right upper image looking north-east across the site, and right lower image looking south-east at the residential dwelling on site)

Environmental Sensitivity

1.28 The environmental sensitivity's surrounding the site are presented in Figure 1-4.

1.29 The site is located within an established mixed-use area, comprising both industrial and agricultural land uses. The proposed development would be built upon agricultural land. Under the South Dublin County Development Plan 2022-2028[5] the site is allocated within Zone EE: Enterprise and Employment. The stated aim is to provide for enterprise and employment related uses. The proposed use is a permitted use under this zoning. Significant precedent exists for the establishment of this use on other EE zoned lands in the area. EE zoned areas are established economic industrial areas running essentially in an arc northward from City West to Grange and Grange Castle.

1.30 The site benefits from good road network structure within Profile Park connecting to the local road network. The site is directly bordered to the north by New Nangor Road (R134) and to the east and south by Falcon Avenue.

1.31 The nearest surface water feature is the Baldonnel stream, located adjacent to the sites southern boundary which enters into the southern section of the site.

1.32 The Grand Canal is located approximately 2 km directly north of the site and is classified as a proposed Natural Heritage Area (NHA). No other ecologically protected sites (such as Special Protection Areas (SPA), Special Areas of Conservation (SAC), National Parks or Nature Reserves) are located within 1 km of the site.

1.33 There are no structures included in the statutory Register of Protected Structures or assets on the Record of Monuments and Places or the Register of Historic Monuments within the site. The closest statutory designated heritage asset is Grange Castle (RPS, RM) located 1 km to the north.

1.34 The location of the site within a range of land types contributes to its fragmented character. Its proximity to the urban area of Dublin gives the area an 'urban fringe' or 'transitional' character as you move from the urban to limestone farmland character type.

1.35 The surrounding landscape context is predominantly industrial to the north and west, agricultural to the south, with commercial and residential properties to the east and the Grange Castle Golf Club to the south-east (refer to Figure 1-2).

1.36 Although the surrounding context of the site is largely industrial and agricultural, the site is surrounded by some residential properties primarily located to the east and west of the site. The nearest existing residential properties are located approximately 600 m to the south of the site along Baldonnel Road. There is a hotel 200 m north-east of the site boundary. Grange Castle Golf Club is an outdoor amenity space located immediately east of the site.

1.37N7 It is noted that a 5m section of existing hedge located in the north-west of the site (no.H7-C2) was removed by a Contractor on an adjacent site, this has since been reinstated through remedial works on the site.

[5] SDCC, 2022. South Dublin County Council Development Plan 2022-2028 [online]. Available at: https://www.sdcc.ie/en/devplan2022/adopted-plan/county-development-plan-written-statement/county-development-plan-written-statement.pdf https://www.sdcc.ie/en/services/planning/development-plan/plan-2016-2022/[Accessed on 23/08/2022].

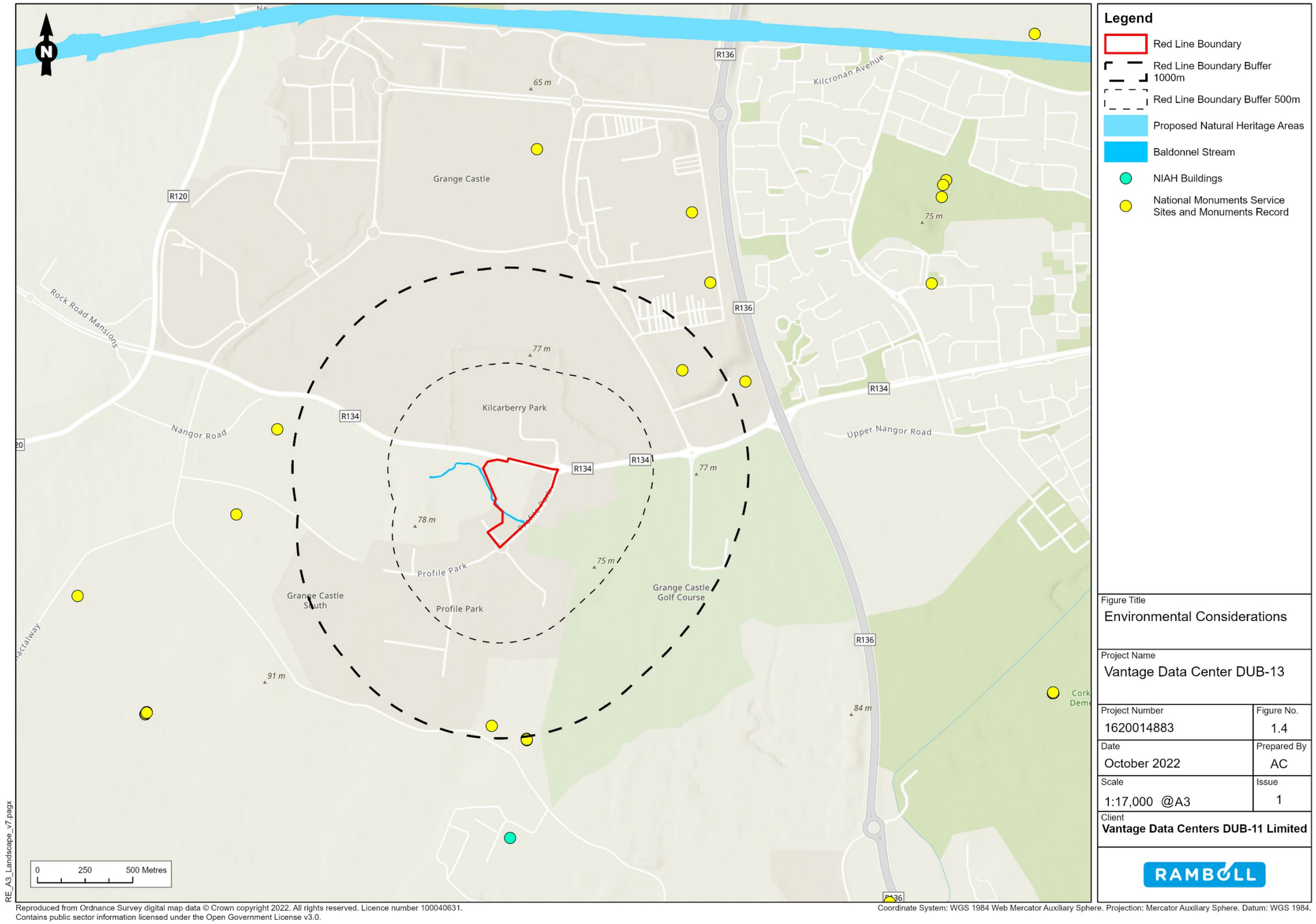


Figure 1-4: Environmental Considerations

Planning Context

Planning Policy Context

1.38 It is necessary to consider the proposed development against relevant policies and guidance at national, regional and local levels.

National Planning Policy

National Planning Framework (2018)

1.39 At the national level, planning policy is contained within the National Planning Framework (NPF) 2018[6]. The Department of Housing Planning and Local Government, on behalf of the Government of Ireland, published the NPF in February 2018 and is the Government's high-level strategic plan for shaping the future growth and development of our country out to the year 2040.

National Development Plan 2021-2030 (2021)

1.40 Additionally, the National Development Plan 2021-2030 (NDP)[7] sets out the investment priorities that will underpin the implementation of the NPF, through a total investment of approximately €165 billion.

1.41 Finalisation of the NPF alongside the ten-year NDP will culminate one plan to guide strategic development and the infrastructure investment at the national level.

Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (2022)

1.42 The Government Statement on The Role of Data Centres in Ireland's Enterprise Strategy (2022)[8] view data centres as core digital infrastructure that can play an indispensable role in our economy and society.

1.43 National Climate Action Plan 2021

1.44 The National Climate Action Plan[9] for Ireland published in November 2021 is materially relevant to this EIAR and is considered within the relevant technical assessments.

Regional Planning Policy

Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly (2019)

1.45 The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midlands Regional Assembly (EMRA)[10] includes Regional Policy Objective (RPO) 8.25 which states the following:

- "Local Authorities shall:
  - Support and facilitate delivery of the National Broadband Plan.
  - Facilitate enhanced international fibre communications links, including full interconnection between the fibre networks in Northern Ireland and the Republic of Ireland.
  - Promote and facilitate the sustainable development of a high-quality ICT network throughout the Region in order to achieve balanced social and economic development, whilst protecting the amenities of urban and rural areas.
  - Support the national objective to promote Ireland as a sustainable international destination for ICT infrastructures such as data storage facilities and associated economic activities at appropriate locations.
  - Promote Dublin as a demonstrator of 5G information and communication technology."

1.46 The site is therefore considered to be an appropriate location for the development of data centres under this Strategy.

Local Planning Policy

South Dublin County Council Corporate Plan 2020-2024

1.47 The SDCC Corporate Plan 2020-2024[11] identified SDCC's objectives and strategies for each of the councils' principal activities. The plan builds in flexibility to meet the demands of a changing environment over the plan period.

South Dublin County Council Development Plan 2022-2028 (2022)

1.48 The relevant statutory development plan for the site is the SDCC Development Plan 2022-2028[5], adopted in August 2022. The core strategy, included within the Development Plan, provides an overarching strategy for the spatial development of the County over the medium to longer term and will form the basis for policies and objectives throughout the Development Plan. It translates the strategic planning framework set out in the National Development Plan and the Regional Planning Guidelines for the Greater Dublin Area, to County level.

1.49 As outlined in the Development Plan, the site is classified under Objective EE: to provide for enterprise and employment related uses.

[6] Government of Ireland, 2018. National Planning Framework (NPF) – Ireland 2040 Our Plan (February 2018) [online]. Available at: https://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf [Accessed on 23/08/2022].
[7] Government of Ireland, 2021. National Development Plan 2021-2030 (last updated 4 October 2021) [online]. Available at: https://www.gov.ie/en/publication/774e2-national-development-plan-2021-2030/https://www.gov.ie/pdf/?file=https://assets.gov.ie/37937/12baa8fe0dcb43a78122fb316dc51277.pdf - page=null [Accessed on 23/08/2022].
[8] Government of Ireland, 2022. Government Statement of the Role of Data Centres in Ireland's Enterprise Strategy [online]. Available at: https://enterprise.gov.ie/en/publications/publication-files/government-statement-on-the-role-of-data-centres-in-irelands-enterprise-strategy.pdf [Accessed 23/08/2022].
[9] Government of Ireland, 2021. Climate Action Plan. Department of the Environment, Climate and Communications (last updated 2 June 2022) [online]. Available at: https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/ [Accessed 23/08/2022].
[10] Eastern & Midland Regional Assembly, 2019. Regional Spatial & Economic Strategy 2019-2031 [online]. Available at: https://emra.ie/dubh/wp-content/uploads/2020/05/EMRA_RSES_1.4.5web.pdf [Accessed on 23/08/2022]

[11] SDCC, 2019. South Dublin County Council Corporate Development Plan 2020-2024, [online]. Available at: corporate-plan-2020-24.pdf (sdcc.ie) [Accessed on 23/08/2022]

Planning History

1.50 There are no relevant historical planning applications at the site in the last five years.

1.50A The Applicant submitted a full planning application (planning reference SD21A/0241) in March 2022 for the "construction of 2 no. two storey data centers with plant at roof level of each facility and associated ancillary development that will have a gross floor area of 40,589 sqm" on land adjacent to the site's western boundary. The application was granted permission on 19 July 2022 (hereafter referred to as the 'July 2022 DUB-1 permitted development'). The application was accompanied by an EIAR which reported on the outcomes of the EIA undertaken in accordance with the Regulations (hereafter the 'DUB-1 EIAR'). A subsequent planning application was submitted in February 2023 to amend the planning permission SD21A/0241. This planning application is yet to be decided. An Environmental Implications Letter was produced and reported on the implications of the proposed design changes. The proposed DUB-13 development is an extension to, and final phase of, the July 2022 DUB-1 permitted development (as amended) and would be operated as part of the wider co-ordinated data center campus. The site boundary of the proposed development and the DUB-1 permitted development are shown in Figure 1-5 below.

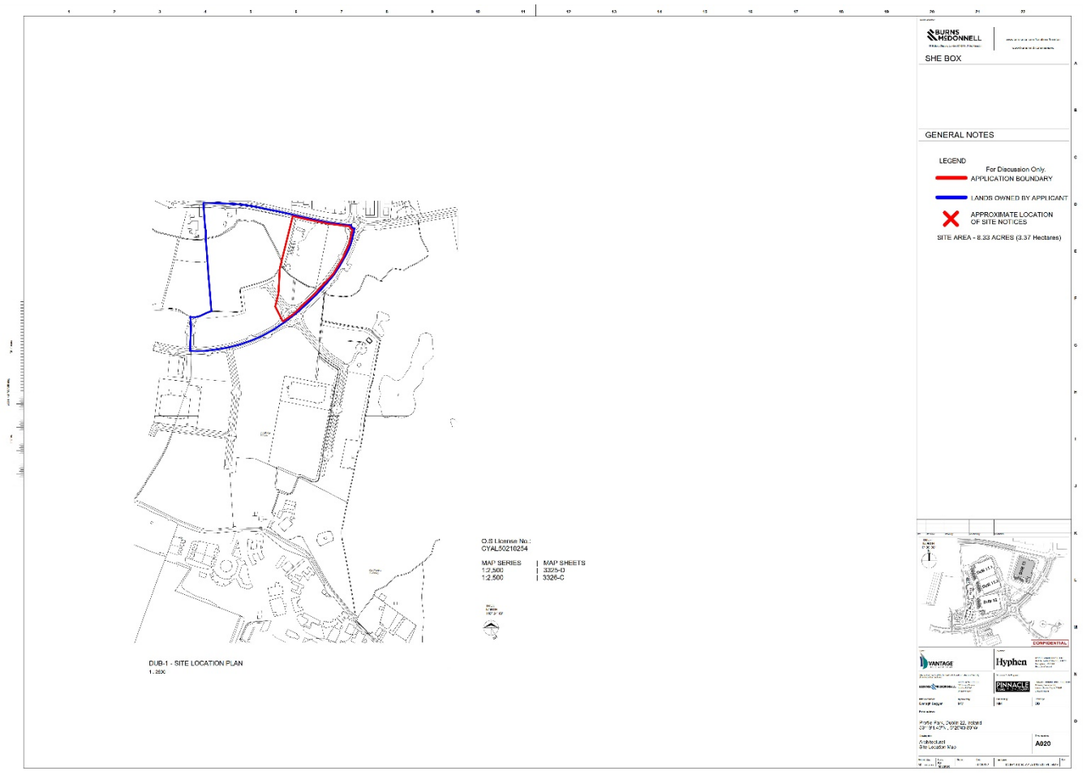


Figure 1-5: The proposed development (red) adjacent to the DUB-1 permitted development, all under ownership of the Applicant (blue)

Application Details

1.51A The AI response does not alter the proposed development description. The description of the proposed development as stated on the application form is:

1.52 "Vantage Data Centers DUB11 Ltd. are applying for permission for development at this site that includes a two storey residential property on lands to the south of the New Nangor Road (R134), Dublin 22; and on land within the townlands of Ballybane and Kilbride within Profile Park, Clondalkin, Dublin 22 on an overall site of 3.79 hectares. The development will consist of the demolition of the two storey dwelling (207.35sqm) and associated outbuildings and farm structures (348.36sqm); and the construction of 1 no. two storey data center with plant at roof level and associated ancillary development that will have a gross floor area of 12,893sqm that will consist of the following:

- 1 no. two storey data center (Building 13) with a gross floor area of 12,893sqm. It will include 13 no. emergency back-up generators of which 12 will be double stacked and one will be single stacked within a compound to the south-western side of the data center with associated flues that each will be 22.316m in height and 7 no. hot-air exhaust cooling vents that each will be 20.016m in height;
- The data center will include data storage rooms, associated electrical and mechanical plant rooms, loading bays, maintenance and storage spaces, office administration areas, and plant including PV panels at roof level as well as a separate house generator that will provide emergency power to the admin and ancillary spaces. Each generator will include a diesel tank and there will be a refuelling area to serve the proposed emergency generators;
- The data center will have a primary parapet height of 14.246m above ground level, with plant and screen around plus a plant room above at roof level. The plant room has an overall height of 21.571m;
- Construction of an internal road network and circulation areas, with a staff entrance off Falcon Avenue to the east, as well as a secondary vehicular access for service and delivery vehicles only across a new bridge over the Baldonnel Stream from the permitted entrance as granted under SDCC Planning Ref. SD21A/0241 from the south-west, both from within Profile Park that contains an access from the New Nangor Road (R134);
- Provision of 60 no. car parking spaces (to include 12 EV spaces and 3 disabled spaces), and 34 no. cycle parking spaces;
- Signage (5.7sqm) at first floor level at the northern end of the eastern elevation of the data center building; and
- Ancillary site development works will include footpaths, attenuation ponds that will include an amendment to the permitted attenuation pond as granted to the north of the Baldonnel Stream under SDCC Planning Ref. SD21A/0241, as well as green walls and green roof. The installation and connection to the underground foul and storm water drainage network, and installation of utility ducts and cables, that will include the drilling and laying of ducts and cables under the internal road network within Profile Park. Other ancillary site development works will include hard and soft landscaping that will include an amendment to the permitted landscaping as granted under SDCC Planning Ref. SD21A/0241, lighting, fencing, signage, services road, entrance gates, and sprinkler tanks."

An Environmental Impact Assessment Report (EIAR) has been submitted with this application. This application and EIAR may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of South Dublin County Council during its public opening hours of 9am – 4pm, Mon-Fri, and a submission or observation may be made to South Dublin County Council in writing and on payment of the prescribed fee (€20.00) within the period of 5 weeks beginning on the date of receipt by South Dublin County Council of the application."

Applicant

1.53 The Application is submitted on behalf of the following entity:

Vantage Data Centers DUB11 Limited,
1-2 Victoria Buildings,
Haddington Road,
Dublin 4,
Dublin,
Ireland

Project Team

1.54 The Applicant has appointed a consultant team to assist in the development of the application and concurrently appointed an EIA team to undertake the EIA and prepare this EIAR in accordance with Regulations aforementioned. The team members and their respective roles are presented in Table 1-2: Design and EIA Team.

Table 1-2: Design and EIA Team

Company	Role
Vantage Data Centers DUB11 Ltd	Client/Development Manager
Turner & Townsend	Project Manager
Burns & McDonnell	Principal Architect/Project Manager/Project Manager (Power plant development and substation)/Mechanical Engineer/BIM 360 Coordinator/GFS Power and Energy Project Manager and Engineer
Hyphen Architects	Local Architect
Kevin Fitzpatrick Landscape Architecture	Landscape Architects
Marston Planning	Planning Consultant
Ramboll	EIA Project Manager and Coordinator; Environmental Consultants for Population and Human Health, Transport, Air Quality, Noise and Vibration, Water Resource and Flood Risk, Ground Conditions, Climate Change, Waste, Material Assets and Landscape and Visual Assessment.
Neo Environmental	Ecology Consultant
Terence O'Rourke	Cultural Heritage Consultant
Geraghty Energy Consultants	Sustainability and Energy Consultant
Jensen Hughes Fire Consultants	Fire Engineering Consultant
O'Herlihy Access Consultants	Disability Access Consultant
Pinnacle	Structural and Civil Engineer and Flood Risk Consultant
Punch Consulting	Health and Safety Consultant
Found Digital	Fibre and Power Consultant

1.55 The EIA has been carried out by Ramboll UK Limited ('Ramboll') and a number of technical specialists. The technical specialists appointed are regarded as being competent experts within their relevant fields.

Structure of the Environmental Impact Assessment Report

1.56 The EIAR comprises the following documents:

- Non-Technical Summary (NTS);
- Volume 1: Main Environmental Impact Assessment Report, comprising the following chapters:
  - Table of Contents, List of Figures, List of Tables
  - Chapter 1: Introduction
  - Chapter 2: EIA Process and Methodology
  - Chapter 3: Alternatives and Design Evolution
  - Chapter 4: Proposed Development Description
  - Chapter 5: Demolition and Construction Environmental Management
  - Chapter 6: Population and Human Health
  - Chapter 7: Transport and Accessibility
  - Chapter 8: Air Quality
  - Chapter 9: Noise and Vibration
  - Chapter 10: Water Resources and Flood Risk
  - Chapter 11: Ecology
  - Chapter 12: Ground Conditions
  - Chapter 13: Climate Change
  - Chapter 14: Waste
  - Chapter 15: Material Assets
  - Chapter 16: Cumulative Effects
  - Chapter 17: Residual Effects and Mitigation
  - Glossary of Terms and Abbreviations
- Volume 2: Landscape and Visual Impact Assessment and Cultural Heritage Assessment
- Volume 3: Technical Appendices
  - Technical Appendix 1.1: IEMA Quality Mark Checklist
  - Technical Appendix 7.1: Traffic Flow and Distribution Diagrams;
  - Technical Appendix 7.2: Accident Data;
  - Technical Appendix 7.3: Cumulative Schemes Daily Traffic Flow Diagrams;
  - Technical Appendix 7.4: Proposed Development Trip Generation;
  - Technical Appendix 8.1: Air Quality Modelling Inputs;
  - Technical Appendix 8.2: Air Quality Detailed Results;
  - Technical Appendix 9.1: Acoustic Terminology;
  - Technical Appendix 9.2: Construction Noise Calculations;
  - Technical Appendix 10.1: Engineering Planning Strategy;
  - Technical Appendix 10.2: Site-Specific Flood Risk Assessment;
  - Technical Appendix 11.1: Ecological Impact Assessment Report;
  - Technical Appendix 11.2: Appropriate Assessment Screening Report;
  - Technical Appendix 11:3: Biodiversity Management Plan;

- Technical Appendix 12.1: Ground Investigation & Geotechnical Report; and
- Technical Appendix 12.2: Contaminated Land Interpretative Report.

Environmental Impact Assessment Report

Content of the EIAR

1.57 The required content of the EIAR is set out in Schedule 6 of the Regulations (2001 to 2022)[2] as presented in Table 1-3 indicating where in this EIAR the requirements have been met.

Table 1-3: Information which is required in an EIAR (Schedule 6 of the Planning and Development Regulations (2001 to 2022)

Required Information		Section of EIAR
1	Description of the project, including in particular: (a) a description of the location of the project; (b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases; (c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used; (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, and soil and subsoil pollution, noise, vibration, light, heat, radiation, etc.) and quantities and types of waste produced during the construction and operation phases.	Volume 1: EIAR Chapter 1: Introduction, EIAR Chapter 4: Proposed Development Description, EIAR Chapter 5: Demolition and Construction Environmental Management. EIAR Chapters 6-15, Volume 1 EIAR Volumes 2 and 3
2	A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	Volume 1: EIAR Chapter 3: Design Evolution,
3	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	Volume 1: EIAR Chapter 1: Introduction, EIAR Chapter 4: Proposed Development Description, EIAR Chapter 5: Demolition and Construction EIAR Chapters 16 and 17, Volume 1. EIAR Volumes 2 and 3.
4	A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape	EIAR Chapters 6-15, Volume 1
5	A description of the likely significant effects of the proposed project on the environment resulting from, inter alia: (a) the construction and existence of the project, including, where relevant, demolition works; (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources; (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste; (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters); (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources; (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; (g) the technologies and the substances used. The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.	EIAR Chapters 6-15, Volume 1 Volume 1: EIAR Chapter 16: Intra-Cumulative Effects Volume 1: EIAR Chapter 17: Summary of Residual Effects
6	A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Volume 1: EIAR Chapter 2: EIA Process and Methodologies EIAR Chapters 6-15, Volume 1
7	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	EIAR Chapter 4: Proposed Development Description, EIAR Chapter 5: Demolition and Construction EIAR Chapters 6-15, Volume 1
8	A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European	EIAR Chapter 4: Proposed Development Description, EIAR Chapter 5:

Table 1-3: Information which is required in an EIAR (Schedule 6 of the Planning and Development Regulations (2001 to 2022)

Required Information		Section of EIAR
	Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. W here appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	Demolition and Construction EIAR Chapters 6-15, Volume 1
9	A non-technical summary of the information provided under points 1 to 8.	Non-technical Summary
10	A reference list detailing the sources used for the descriptions and assessments included in the report.	EIAR Volume 1 and 2, all chapters EIAR Volume 3, all technical appendixes.

Good Practice

1.58 As with EIA, good practice in the preparation of the EIAR is defined in a number of sources, with more specific issues covered by EIAR review checklists. Many of these checklists are very detailed and go to some length. In terms of widely applicable and practical guidance, the recent IEMA Quality Mark indicator check has been referenced in producing this EIAR as described in Appendix 1.1: IEMA Quality Mark Checklist. Ramboll UK Ltd is a Registrant on the IEMA Quality Mark. Accordingly, as part of Ramboll's QA procedures and Quality Mark Commitments, this EIAR and EIA has been undertaken to meet the Quality Mark Commitments as set out in Appendix 1.1: IEMA Quality Mark Checklist. Additional detail on relevant guidance is provided within Volume 1, EIAR, Chapter 2: Process and Methodology.

2A EIA PROCESS AND METHODOLOGY

Introduction

2.1 This chapter of the Environmental Impact Assessment Report (EIAR) sets out the general approach to the process and to the methodology that is adopted when undertaking an Environmental Impact Assessment (EIA). It describes the legislative framework in which the EIA for the proposed development has been undertaken and identifies the key guidance that was considered. The EIA Scoping and consultation process that was adopted to identify the key environmental topics for inclusion in the EIA is outlined, as well as the overall EIA methodology adopted.

2.2 While the approach and methodology to the EIA are described in this chapter, further detail on how the methodology was tailored to each technical aspect of the EIA is presented in the relevant technical assessment chapters of the EIAR. Other supporting assessments for environmental aspects that were scoped out of the EIA are included as technical appendices to this EIAR.

Environmental Impact Assessment

2.3 Since the adoption of Directive 85/337/EEC[1] (on 27 June 1985) on the assessment of the effects of certain public and private projects on the environment, both the law and EIA practices have evolved significantly. The 1985 Directive was amended by Directives 97/11/EC[2], 2003/35/EC[3] and 2009/31/EC[4], and the Directive and its amendments were codified in 2011 by Directive 2011/92/EU[5]. The current Directive 2014/52/EU[6] amends the 2011 codified Directive but does not replace it. The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018[7,8] transpose the requirements of the 2014 Directive into existing planning consent procedures.

2.4 EIA provisions in relation to planning development consents are contained in the Planning and Development Act 2000 (as amended)[9] (the 'Act') and in the Planning and Development Regulations 2001 (as amended)[10] (the 'Regulations').

2.5 The Regulations set out the statutory process and minimum requirements for EIA and the contents of the EIAR. Specifically, they prohibit the grant of planning permission for developments likely to have significant effects on the environment (defined in the Regulations as 'EIA development') unless information on those effects is considered by the relevant planning authority in reaching its decision on a planning application. That information includes both the EIAR, which is the Applicant's own assessment, and any other information provided by consultees, the public, and any other persons about the proposal's environmental effects. This EIAR has been prepared pursuant to (and in accordance with) the Regulations.

2.6 In addition to the Regulations, there is guidance available on EIA and the application of the Regulations that has been considered in undertaking this EIA, including:

- Environmental Protection Agency's (EPA) Guidelines on Information to be Contained in an Environmental Impact Statement (2002)[11];
- EPA's Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2003)[12];
- EPA's Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2015)[13];
- EPA's Guidelines on the information to be contained in Environment Impact Assessment Reports (2022)[14];
- European Commission's (EC) Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (2017)[15];
- EC's Environmental Impact Assessment of Projects – Guidance on Scoping (2017)[16]; and
- Department of Housing, Local Government and Heritage's Guidelines for Planning Authorities and An Board Pleanála on carrying out Environmental Impact Assessment (2018)[17].

2.7 Guidance of relevance to individual technical assessments have been set out in Chapters 6-15 of this EIAR Volume, as well as in Volume 2.

2.8 In accordance with the Regulations, this EIA has been undertaken based on the proposed development as described in Chapter 4: Proposed Development Description and details of the demolition and construction works in Chapter 5: Demolition and Construction Description of this EIAR Volume.

EIA Process

2.9 EIA is a process that identifies the likely significant environmental effects (both positive and negative) of a proposed development. The process aims to avoid, off-set and/or reduce any significant negative environmental effects, where these are identified, and to enhance any positive effects. Proposed developments to which EIA is applied (i.e., 'EIA development') are those that are likely to have significant effects on the environment by virtue of factors such as their nature, size, or location.

2.10 The process and outcomes of the EIA are presented in an EIAR. The contents of an EIAR are prescribed by the Regulations and should be a clear and concise summary of a proposed development and its likely environmental effects (including direct, indirect, and cumulative effects) on the natural, built and human environments. The EIAR is submitted to a relevant planning authority to accompany an application for planning permission. In this way, the aim of EIA is to protect the environment by ensuring that a local planning authority, when deciding whether to grant planning permission for a project which is likely to have significant effects on the environment, does so in the full knowledge of the project's likely significant effects and takes this into account in the decision-making process. Alongside this, an EIA's objective is also to ensure that the public and statutory consultees are given early and effective opportunities to participate in decision making procedures and to enable the grant of required licences.

[1] European Union, 1985. Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment. Document 31985L0337.
[2] European Union, 1997. Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. Document 31997L0011.
[3] European Union, 2003. Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC - Statement by the Commission. Document 32003L0035.
[4] European Union, 2009.Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (Text with EEA relevance). Document 32009L0031.
[5] European Union, 2011. Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance Official Journal of the European Union. Document 32011L0092.
[6] European Union, 2014. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance. Official Journal of the European Union. Document 32014L0052.
[7] Government of Ireland, 2018. European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. S.I. No. 296/2018. ISB.
[8] Later amended to: Government of Ireland, 2018. European Union (Planning and Development) (Environmental Impact Assessment) (Amendment) Regulations 2018. S.I. No. 646/2018. ISB.
[9] Government of Ireland, 2000. Planning and Development Act 2000 (as amended). S.I. No. 30/2000. ISB.
[10] Government of Ireland, 2001-2019. Planning and Development Regulations 2001 (as amended). S.I. No. 600 of 2001. ISB.

[11] Environmental Protection Agency, 2002. Guidelines on the information to be contained in Environmental Impact Statements
[12] Environmental Protection Agency, 2003. Advice Notes on Current Practice in the preparation of Environmental Impact Statements
[13] Environmental Protection Agency, 2015. Advice Notes on Current Practice in the Preparation of Environmental Impact Statements Draft
[14] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)
[15] European Commission, 2017. Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report.
[16] European Commission, 2017. Environmental Impact Assessment of Projects, Guidance on Scoping
[17] Government of Ireland, 2019. Guidelines for Planning Authorities and An Bord Pleanala om carrying out Environmental Impact Assessment 2018 (last updated 19 December 2019).

Screening

2.11 EIA Screening is the term in the Regulations used to describe the process by which the need for EIA is considered in respect of a proposed development. Some developments require a mandatory EIA by reason of their size, nature, and effects. These projects, known as 'Schedule 5, Part 1 developments', include mainline railways, airports, waste facilities and large power stations. The proposed development is not such a Schedule 5, Part 1 development.

2.12 The need for an EIA for all other projects is determined on the basis of the following set criteria:

- The development is within one of the classes of development stated in Schedule 5 Part 2 of the Regulations; AND
- EITHER it meets or exceeds the size threshold for that class of development in Schedule 5 Part 2; OR a part of the project is in a sensitive area; AND
- It is likely to have significant effects on the environment by virtue of factors such as its nature, size, or location.

2.13 These are known as 'Schedule 5, Part 2 developments'. The proposed development is below the 15 ha threshold under Part 2 of Schedule 5 (10 (a)) of the Regulations. However, the scale and nature of the proposed development provides the potential for significant effects on the environment and the Applicant has therefore decided to undertake an EIA on this basis. Accordingly, a formal EIA Screening exercise with SDCC was not deemed necessary.

Scoping and Consultation

2.14 EIA Scoping is the term used in the Regulations whereby an applicant can request a formal 'scoping opinion' from the relevant local planning authority on the content of an EIAR and the extent of the information to be considered in the assessments. The purpose of EIA Scoping is to focus the EIA on the environmental issues and potential impacts which need the most thorough attention; to identify those which are unlikely to need detailed study; and to provide a means to discuss methods of impact assessment so as to reach agreement on the most appropriate.

2.15 The Applicant has not produced a formal EIA Scoping Opinion Request Report, rather a more informal discussion was held with SDCC at the pre-application meeting on 21 September 2022. SDCC, the Applicant and Ramboll all attended this pre-application meeting. The purpose of this meeting was to discuss the scope of the EIA and the proposed approach that would be adopted for the EIAR.

SDCC Request for Additional Information

2.16N1 As part of the statutory consultation process associated with the determination of the full planning application, SDCC raised a number of queries in respect of the submitted application.

2.17N2 On 12 January 2023 SDCC responded to the full planning application requesting additional information to be submitted ('request for additional information' (AI)) in relation to:

- A need to demonstrate compliance with a number of Objectives of the South Dublin County Council Development Plan 2022-2028 including EDE4 Objective 4, EDE Objective 6, EDE7 Objectives 2 and 3;
- The proposed elevation treatments on prominent frontages of the proposed development;
- Clarity on the acoustic assessment for the proposed development;
- The inclusion of a footpath and cycle lane along the northern boundary of the site to the R134;
- Landscape strategy, maintenance and green infrastructure network connectivity amendments;
- The approach to tree and hedgerow protection;
- A need to demonstrate compliance with the SDCC SUDs Design Guide 2022;
- Addition of ecological enhancements in the form of bird boxes, bat boxes and mammal passes onsite; and
- Revisions to the EIAR in line with the design changes, alternatives and material assets.

2.18N3 Accordingly, the design of the proposed development has evolved to respond to the items raised by SDCC as part of the AI response which is discussed in Chapter 3: Alternatives and Evolution and Chapter 4: Development Description. As such, the Applicant is now submitting a revised EIAR for the proposed development.

2.19N4 A comprehensive response to the AI request is discussed within the Additional Information Response Letter prepared by Marston Planning Consultants.

Scope of EIA

Non-Significant Issues

2.20 The aim of the EIA Scoping process is to ensure that the EIA is proportionate and focussed only on the likely significant environmental effects of the proposed development. Appraisals for each technical topic were undertaken as part of the informal EIA Scoping process to determine the existing baseline conditions and as a result, the potential for significant effects to arise.

2.21 Accordingly, the informal EIA Scoping process identified that the proposed development is unlikely to give rise to significant environmental effects in respect of the following environmental aspects and therefore would not need to be scoped in as discrete technical assessment chapters within the EIAR:

- Daylight, Sunlight, Overshadowing and Wind Microclimate; and
- Major Accidents and Disasters.

2.22 Whilst significant environmental effects in respect of Major Accidents and Disasters is unlikely, consideration has been given to this topic within the following technical chapters in this EIAR:

- Chapter 4: Proposed Development Description;
- Chapter 5: Demolition and Construction Description;
- Chapter 10: Water Resource and Flood Risk; and
- Chapter 13: Climate Change.

2.23 Standard best practice, mitigation and enhancement measures identified during the course of preparing these chapters were integrated into the proposed development as described in Chapter 4: Proposed Development Description and in Chapter 5: Demolition and Construction Description of this EIAR Volume.

Potentially Significant Issues

2.24 The potentially significant environmental issues that were identified during the informal EIA Scoping process and that have been addressed within discrete technical assessment chapters are as follows:

- Population and Human Health (Chapter 6, EIAR Volume 1);
- Transport and Accessibility (Chapter 7, EIAR Volume 1);
- Air Quality (Chapter 8, EIAR Volume 1);
- Noise and Vibration (Chapter 9, EIAR Volume 1);
- Water Resources and Flood Risk (Chapter 10, EIAR Volume 1);
- Ecology (Chapter 11, EIAR Volume 1);
- Ground Conditions (Chapter 12, EIAR Volume 1);
- Climate Change (Chapter 13, EIAR Volume 1);
- Waste (Chapter 14, EIAR Volume 1);
- Material Assets (Chapter 15, EIAR Volume 1); and
- Landscape, Visual and Cultural Heritage (EIAR Volume 2).

EIA Approach

Additional Information (AI) Response

2.25N5 The March 2023 Revised EIAR builds upon the analysis and assessments presented in the November 2022 EIAR. Large section of the November 2022 EIAR remain valid and therefore do not need updating. As outlined in Chapter 1A: Introduction, those chapters that have been amended are labelled with the addition of the letter A, and specific changes are highlighted within the chapter.

2.26N6 In respect of ES Volume 1A, the following chapters have not been updated and remain the same as presented in the November 2022 EIAR:

- Chapter 6: Population and Human Health;
- Chapter 8: Air Quality;
- Chapter 9: Noise and Vibration;
- Chapter 13: Climate Change;
- Chapter 14: Waste;
- Chapter 16: Intra Cumulative Effects; and
- Chapter 17: Summary of Residual Effects.

2.27N7 In respect of ES Volume 2A, the following chapter have not been updated and remain the same as presented in the November 2022 EIAR:

- Chapter 2: Cultural Heritage and Archaeology,

2.28N8 In respect of ES Volume 3A, the majority of the volume remains the same as presented in the November 2022 EIAR and the only changes are in relation to:

- Appendix 11.1A: Ecological Impact Assessment;
- Appendix 11.2A: Appropriate Assessment Screening; and
- Appendix 11.3A: Biodiversity Management Plan.

2.29N9 The large section of the November 2022 EIAR that remains valid is because following a review of the AI design response proposed amendments, baseline conditions, policy and assessment guidance, it has been concluded that the November 2022 EIAR assessment and assessment conclusions remain valid and do not require updates.

Consideration of Alternatives

2.30 The Regulations require that an applicant provides a summary description of reasonable alternatives studied and to provide a description of their specific characteristics, as well as an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects. The Regulations do not define the term 'alternative' and EIA practice tends to consider alternative design proposals and to explain the process through which the proposed development has evolved.

2.31 Chapter 3: Design Evolution and Alternatives of this EIAR Volume explores the objectives of the proposed development and describes how the development proposals have evolved in response to environmental and planning opportunities and constraints.

2.32 For the proposed development, the following alternatives have been considered:

- The 'Do-Nothing' alternative where the existing site condition remains in its underutilised state with no redevelopment; and
- Alternatives considered in the course of the design process (such as layouts and design) taking into account environmental and other relevant planning and design constraints as part of the design evolution.

2.33 In respect of the 'Do-Nothing' alternative, it is considered that, should the proposed development not be brought forward, the Applicant would implement the adjacent July 2022 DUB-1 permitted development.

Baseline & Future Baseline

2.34 The purpose of the EIA is to predict how environmental conditions may change as a result of a proposed development and to specify any investigative measures to be taken and/or required. This requires that the current environmental conditions and those in the future, are established. This is referred to as the 'baseline' and is usually established through a combination of desk-based research, site surveys and empirical studies and projections. Together, these describe the existing and future character of a site and the value and vulnerability of key environmental resources and receptors, against which any changes or effects resulting from a proposed development can be identified, understood and assessed.

2.35 For the EIA of the proposed development, the existing baseline represents the existing environmental conditions of the site and the surrounding study areas at the time of the assessments as described in Chapter 1: Introduction of this EIAR Volume.

2.36 When completed the proposed development would operate as an extension to the July 2022 DUB-1 permitted development campus and would utilise the wider campus for power provision. As the Applicant owns both sites there is certainty that power provision from the proposed development placed upon the July 2022 DUB-1 permitted development, would be delivered. Due to this relationship between the proposed development and the adjacent July 2022 DUB-1 permitted development, for the purpose of the EIA, a future baseline has been established for all technical assessment chapters based on the implementation of the permitted DUB-1 scheme. The future baseline for each chapter is described in each respective chapter.

2.37 Where linkages exist between the proposed development and the July 2022 DUB-1 permitted development, there is the potential for effects to be duplicated as the effects for the July 2022 DUB-1 permitted development have been reported on within the DUB-1 EIAR. Therefore, the proposed development has been assessed against a future baseline which represents the projected environmental conditions in the future in 2025, which is the projected year when the July 2022 DUB-1 permitted development would become fully operational.

2.38 With specific reference to power generation, the proposed development would utilise both the EirGrid connection and the multifuel generation plant proposed as part of the July 2022 DUB-1 permitted development. For the operational air quality, noise and vibration and climate assessments consideration has been given to the modelling scenarios adopted for the DUB-1 EIAR which are outlined in Table 2-1, with information provided on the relevant scenarios which are to be taken forward to the assessment of effects for the proposed development. The timeframes provided in Table 2-1 are indicative, but they provide a basis for assessment, including a reasonable 'worst case' at a particular point in time.

2.39 Further information on the linkages between the proposed development and the July 2022 DUB-1 permitted development are described in Chapter 4: Proposed Development Description.

Table 2-1: Air Quality, Nosie and Vibration and Climate Operation Modelling Scenarios used for DUB-1

Assessment Scenarios described in the EIAR for the July 2022 DUB-1 permitted development		Proposed Development EIAR Scenarios
Scenario 1 (~from Q4 2023 to Q1 2025)	• DUB 11 powered by northern block of MFGP using HVO as the fuel source. • MFGP running 24/7. • Emergency scenario below applies if there is the MFGP fails.	Not relevant as the proposed development would become operational in 2025.
Scenario 2 (reasonable worst case from Q1 2025)	• DUB 11 and 12 powered from the EirGrid connection across Falcon Avenue.	Would form the operation assessment scenarios for DUB-13 with the emissions from DUB-13 assessed against these future baseline scenarios.

Table 2-1: Air Quality, Nosie and Vibration and Climate Operation Modelling Scenarios used for DUB-1

	• MFGP powered by gas from GNI. In a reasonable worst case this is assessed to be operational 24/7 using natural gas. • Emergency scenario below applies if the gas connection from GNI to the MFGP fails and there is a local grid network failure from EirGrid.	
Scenario 3 (reasonable best case from Q1 2025)	• DUB 11 and 12 powered from the EirGrid connection across Falcon Avenue • MFGP not in operation. • Emergency scenario below applies if there is a local grid network failure from EirGrid.	
Emergency Scenario	• Diesel used for day tanks for emergency backup generators for the data center in the unlikely event of an outage of the MFGP and grid connection (depending on scenario). MFGP and emergency generators would not be operational at the same time.	Would form the emergency scenario for the proposed development.

2.40 As such, the following scenarios will be used for Air Quality, Noise and Vibration and Climate modelling for the proposed development.

Table 2-2: EIAR Air Quality, Nosie and Vibration and Climate Operation Modelling Scenarios for Proposed Development

Scenario 1 (reasonable worst case)	• DUB-13 powered from the EirGrid connection through wider DUB-1 campus. • MFGP on wider DUB-1 campus powered by gas from GNI. In a reasonable worst case this is assessed to be operational 24/7 using natural gas. • Emergency scenario below applies if the gas connection from GNI to the MFGP fails and there is a local grid network failure from EirGrid.
Scenario 2 (reasonable best case)	• DUB-13 powered from the EirGrid connection through wider DUB-1 campus. • MFGP on wider DUB-1 campus not in operation. • Emergency scenario below applies if there is a local grid network failure from EirGrid.
Emergency Scenario	• Diesel used for day tanks for emergency backup generators for the data center in the unlikely event of an outage of the MFGP and grid connection (depending on scenario). MFGP and emergency generators would not be operational at the same time.

2.41 The existing and future baseline conditions have been characterised by means of desk studies, site visits, surveys and modelling.

2.42 The technical assessments in EIAR Volume 1 (6 to 15), EIAR Volume 2 (1 and 2) and EIAR Volume 3 provide a description of topic specific existing and future baseline conditions against which the proposed development has been assessed.

Receptors

2.43 Receptors that may be sensitive to potential environmental impacts as a result of the proposed development, can be summarised as follows, with further detail provided in respective technical assessments:

- Existing underlying geology and hydrogeology;
- Existing soils;
- Existing water resources, in particular ground water, surface water features and public potable water supplies;
- Existing utilities;
- Existing ecological receptors, in particular the Baldonnel Stream;
- Future users of and visitors to the site and surrounding study area;
- Future pedestrians at and around the proposed development;
- Existing community facilities in proximity to the site;
- Existing landscape character areas;
- Existing visual receptors and local and strategic views from publicly accessible locations such as roads, footpaths and open spaces;
- Existing above ground heritage assets such as archaeology and built heritage;
- Potential existing buried heritage assets on-site;
- Existing transport facilities, such as Nangor Road; and
- Demolition and construction workers.

Impact Assessment

Basis of the EIAR

2.44 In accordance with the Regulations, the EIA has been undertaken based on the:

- site, as shown and described in Chapter 1: Introduction, as well as the individual technical assessments (Chapters 6 to 15) of this EIAR Volume and EIAR Volume 2; and
- proposed development and proposed demolition and construction works, as shown and described in Chapter 4: Proposed Development Description and Chapter 5: Demolition and Construction Description, respectively, of this EIAR Volume.

2.45 The proposed development has been assessed in the EIAR, as defined by the following documents and materials:

- Detailed planning application drawings;
- Design Statement;
- Planning Statement;
- Engineering Planning Report; and
- 3D model.

Sources of Proposed Development Information

2.46 In addition to the above, information on the proposed development has been drawn from the following application documents, as appropriate:

- Site notice;
- Additional information response letter;
- RFI individual responses from relevant consultants;
- Architectural drawings;
- Screening Report for Appropriate Assessment;
- Landscape masterplan and drawings;
- Site Lighting Plan, modelling and details;
- Engineering Planning Report;
- Flood Risk Assessment;
- Engineering drawings; and

- Environmental Impact Assessment Report, Appendices and Non-technical Summary.

Assessment Methodology

General

2.47 The aim of the EIAR is not to assess the proposed development's compliance/performance against planning policy as this is considered within the Planning Statement that accompanies the application. Instead, reference has been made to national, regional and local policy (where appropriate) to inform the scope of the technical assessments, assessment methodologies applied and existence of any sensitive receptors to be considered. Detailed methodologies for the assessment of each of the environmental aspects scoped into the EIA as discrete technical assessment chapters are provided within each technical chapter of this EIAR Volume and EIAR Volume 2; however, in general terms, the assessments have been based upon the following approach:

- Review of the existing conditions at and surrounding the site for the environmental topic area under consideration via various sources of existing information, data and reports;
- Desk-top studies;
- Site surveys;
- Consideration of relevant legislation;
- Consideration of relevant planning policies (national, regional and local), guidance and standards;
- Consultations with stakeholders and consultees as appropriate;
- Consideration of potentially sensitive receptors that could be affected by the proposed development;
- Use of published technical guidance and best practice;
- Use of quantitative and qualitative assessment methods, professional judgement and expert opinion;
- Identification of potential environmental impacts and likely effects, with an evaluation of their likely duration, magnitude and scale, taking into consideration embedded mitigation (where relevant); and
- Recommendation for additional mitigation and/or enhancement measures, followed by an assessment of the significance of the residual effects.

2.48 How the proposed development might affect the environment relies on predictions about what impact a certain action would have. Some predictions can be made using mathematical or simulation models, particularly where there are well known relationships between cause and effect. For example, the degree to which noise levels may increase as a result of additional traffic flows can be predicted using a mathematical equation; or the level of air pollution from a known traffic flow can also be predicted from a computer-based simulation model; or the visibility of a building can be predicted by accurately superimposing its outline and position over a photograph. Other impacts are less easy to predict in quantitative terms; for example, whilst the extent of a loss of a habitat on the abundance of individual species is more difficult to predict. In such cases, the EIA attempts to quantify the anticipated scale of impact using empirical experience, literature and professional judgement.

2.49 In all cases, the overall approach and specific methods of predicting the likely nature and magnitude of impact, as well as the scale of effect is set out in each of the technical assessments. Where used, recognised specific predictive methods are referenced. Any assumptions or limitations to knowledge are stated. In either case, the thought process leading to the conclusions is based on reasonably reliable data and so is considered to be prudent and robust.

2.50 Where detailed information on the proposed development has not been available, reasonable assumptions have been made, and clearly set out, based on experience of other developments of similar type and scale to enable assessment of likely significant effects.

2.51 The proposed development has not yet been approved so the conditional tense ('would') has been used to describe the development proposals, situations, potential impacts and likely effects that could/would arise from the introduction of the proposed development, as well as the mitigation measures that would be delivered or would be required upon approval of the proposed development. This approach does not lessen the Applicant's commitment to deliver the proposed development as presented within this EIAR. Furthermore, each technical assessment (and in particular summary tables at the conclusion of each chapter) clearly sets out the means by which any required mitigation measures relied upon, would be secured.

Proposed Development Stages

2.52 The EIA considers the following stages of the proposed development:

- Demolition and Construction stage;
- Operation stage; and
- Cumulative stage

2.53 Although the demolition and construction programme of the proposed development would be sequenced over an 11 month period, the EIA has assessed and reported on the environmental effects of the construction stage as a whole. The demolition and construction stage assessment is based on the information provided in Chapter 5: Demolition and Construction Description of this EIAR Volume. The development programme and demolition and construction methods presented in this chapter have informed the identification of on- and off-site receptors for assessment, as well as potential 'worst-case' scenarios.

Assessment Scenarios

2.54 As noted earlier, the assessment of the proposed development has been carried out against the future baseline conditions as described in Chapter 1: Introduction of this EIAR Volume, this Chapter and technical assessment chapters (6-15) of this volume and supplemented by relevant existing and updated surveys.

2.55 The 'future baseline' is a projection of likely environmental conditions in the future with the July 2022 DUB-1 permitted development constructed and operational.

Demolition and Construction Stage

2.56 The future baseline for the demolition and construction stage is the year of the most intensive demolition and construction works for the proposed development, in terms of traffic flows and the equivalent year of the construction and operation stages of the July 2022 DUB-1 permitted development. This is set out in Chapter 5: Demolition and Construction Description of this EIAR Volume.

2.57 Accordingly, the following assessments scenarios have been considered:

- Scenario 1: Existing Baseline (2022);
- Scenario 2: Future Baseline (2024) Construction and Operation Stage flows for 2024 associated with the July 2022 DUB-1 permitted development;
- Scenario 3: Future Baseline (2024) Construction and Operation Stage flows for 2024 associated with the July 2022 DUB-1 permitted development + Year of Peak Demolition and Construction Works of Proposed Development (2024);
- Scenario 4: Future Baseline (2024) Construction and Operation Stage flows for 2024 associated with the July 2022 DUB-1 permitted development + Year of Peak Demolition and Construction Works of Proposed Development (2024) + Cumulative Development.

Operation Stage

2.58 The future baseline for the operation stage comprises the July 2022 DUB-1 permitted development year of full operation and the year in which the proposed development would be fully completed, occupied and operational.

2.59 Accordingly, the following assessment scenarios have been considered:

- Scenario 1: Existing Baseline 2022;
- Scenario 2: Future Baseline (2025) July 2022 DUB-1 permitted development Operational;
- Scenario 3: Future Baseline (2025) July 2022 DUB-1 permitted development Operational + Operational Year Baseline of the Proposed Development (2025); and
- Scenario 4: Future Baseline (2025) July 2022 DUB-1 permitted development Operational + Operational Year Baseline of Proposed Development (2025) + cumulative development.

Mitigation

2.60 Mitigation is the term used to refer to the process of avoiding where possible and, if not, reducing, controlling and/or off-setting the likely significant negative effects of a development. Mitigation measures relate to the design stage; the demolition and construction stage; or the activities associated with the operation stage.

2.61 As part of the EIA, an iterative approach has been adopted where significant environmental effects have been avoided where possible in the first instance through the design refinements and iterations (referred to as 'embedded' mitigation'), as reported upon within Chapter 3: Alternatives and Design Evolution of this EIAR Volume. Where negative environmental effects were identified through early assessment work, opportunities to reduce or control impacts and effects, or in some cases, to compensate for impacts and effects, were identified and incorporated into the proposed development. In addition, opportunities to enhance the positive environmental effects of the proposed development have also been sought and incorporated into the proposed development.

2.62 Within each technical chapter of this EIAR, the assessment of the effects that are likely to arise as a consequence of a potential impact/change to environmental receptors from the proposed development is initially presented. If any 'additional mitigation' measures are required, further to that already embedded into the proposed development throughout its design evolution, these are proposed, and the proposed development is reassessed to ascertain the likely residual effects and the likely significant environmental effects. This is reported on within each technical assessment chapter of the EIAR.

2.63 In all cases, mitigation measures are presented as embedded, specific commitments or statements of fact. It is anticipated that the implementation of mitigation identified throughout the EIAR, would be secured by means of approval of the planning drawings, appropriately worded planning conditions or planning obligations. Where the need for mitigation is identified, each assessment confirms how the mitigation will be secured.

Impacts and Effects

2.64 Unless otherwise required by published assessment guidance, the EIA has made distinction between:

- **Impacts**: the change or action; and
- **Effects**: the result/consequence/outcome of the change.

2.65 As a general rule, the EIA assesses the effects that are likely to arise as a consequence of a potential impact to environmental receptors following the application/consideration of embedded mitigation measures.

2.66 The quality, magnitude and duration or potential effects are defined in accordance with EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports[14]. These are summarised below.

Table 2-3: Description of Effects

Effect Characteristic	Description
Quality	
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Significance	
Imperceptible	An effect capable of measurement but without significant consequences.

Table 2-3: Description of Effects

Effect Characteristic	Description
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline 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 significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Duration of Effects	
Momentary	Effects lasting from seconds to minutes.
Brief	Effects lasting less than a day.
Temporary	Effects lasting less than a year.
Short-term	Effects lasting one to seven years.
Medium-term	Effects lasting seven to 15 years.
Long-term	Effects lasting 15 to 60 years.
Permanent	Effects lasting over 60 years.
Reversible	Effects that can be undone, for example through remediation or restoration.
Probability of Effects	
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Type of Effects	
Indirect effects	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
Cumulative effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
'Do-nothing' effects	The environment as it would be in the future should the subject project not be carried out.
'Worst case' effects	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminant effects	When the full consequences of a change in the environment cannot be described.
Irreversible effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Table 2-3: Description of Effects

Effect Characteristic	Description
Synergistic effects	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

2.67 There are some exceptions to the conventions and terminology described above for certain topic specific assessments. This is set out in the relevant technical assessment chapter.

2.68 The scale of effects is typically determined through the use of the terminology above and the application of professional judgement and discretion of the particular technical specialist. Accordingly, a fixed/set/generic matrix has not been adopted for the EIA as a whole.

2.69 The specific benchmarks have been established by the project team using available national, regional and local policy together with other relevant guidance, recognised best practice and expert judgement. The development of these benchmarks is explained in more detail in each assessment or technical appendix.

2.70 Throughout the EIAR, residual effects have been predicted as either '**Significant**' or '**Not Significant**'. Significant effects are considered material to the planning decision process. Residual effects of moderate, significant, very significant and profound are typically considered **'Significant'**, but would be dependent on the relevant technical assessment, as well as the existence of published assessment guidance. Where published assessment guidance is not definitive in respect of categorising/determining significant environmental effects, professional judgement has been applied, taking into account the duration, extent and context of the effect, to determine significant effects.

Cumulative Assessment

2.71 The Regulations require that all likely significant effects of a development are taken into account, including cumulative effects.

2.72 There is no prescriptive guidance on the methodology for the assessment of cumulative effects in Ireland. However, the Institute of Environmental Management & Assessment (IEMA) Guidelines[18] identifies two types of cumulative effects:

- Type 1 – **Intra-Project Effects**: Combined effects of different types of impact or 'impact interactions', for example the multiplying effects arising from noise, dust and visual impacts during the construction of the proposed development on a particular sensitive receptor; and
- Type 2 – **Inter-Project Effects**: Combined or additive effects generated from the proposed development together with other planned or likely foreseeable developments and also referred to as 'in-combination effects'. These other developments may generate their own individually insignificant effects but when considered together could amount to significant cumulative effects, for example, combined transport and accessibility impacts from two or more (proposed) developments. Additive effects were considered where relevant.

2.73 As Stated in Table 3-3 of the EPA Guidance, under 'Describing the Types of Effects' synergistic effects should be considered. Synergistic effects are considered within the inter-project cumulative effects, also known as additive effects. Where the proposed development would likely result in additive effects, these will be identified within the relevant EIAR chapter.

Intra-Project Cumulative Effects

2.74 As mentioned above, there is no established EIA methodology for assessing and quantifying the intra-project cumulative effects of individual effects on sensitive receptors. Therefore, Ramboll has developed an approach which uses the defined residual effects of the proposed development to determine the potential for effect interactions and so the potential for intra effects of individual effects.

2.75 Intra-project cumulative effects from the proposed development itself on existing off-site and future on-site sensitive receptors during the demolition and construction stage and operation stage have been considered. It is possible, however, that depending on the predicted individual 'completed developments' effects, only the demolition and construction stage effects would actually be considered as often they generate the greatest likelihood of interactions occurring and hence significant effects. Indeed, demolition and construction stage effects are usually more negative (albeit on a temporary basis) than effects as a result of the operation stage.

2.76 Dependent on the relevant sensitive receptors, the assessment focusses either on key individual receptors or on groups considered to be most sensitive to potential interacting effects. The criteria for identifying those receptors which are considered to be potentially sensitive include existing land uses, proximity to the demolition and construction works and the site, and likely duration of exposure to impacts.

2.77 It should be noted that only residual effects that are slight, moderate, significant, very significant or profound in scale have been considered within this assessment. Imperceptible and not significant effects are not considered in the assessment. Due to the 'cross-boundary' and 'overlapping' nature of these effects across various environmental topics, and the assessment approach adopted, the results of intra-project cumulative effects are holistically presented within a discrete assessment chapter (Chapter 16: Cumulative Effects of this EIAR Volume) and not within each of the technical assessment chapters. This avoids unnecessary duplication and repetition and presents a proportionate approach.

2.78 With regard to the potential for cumulative effects to occur, it is anticipated that standard mitigation measures as detailed in Chapter 5: Demolition and Construction Description of this EIAR Volume can be applied to prevent temporary significant effects from the interaction of effects occurring on-site. It is also anticipated that a site-specific Construction Environmental Management Plan (CEMP) would be secured by SDCC by means of an appropriately worded planning condition.

Inter-Project Cumulative Effects

2.79 The Regulations require an assessment of potentially significant cumulative effects of a proposed development along with other 'existing and/or approved projects'. There are no legislative or policy requirements which set out how an inter-project cumulative impact assessment should be undertaken.

2.80 Accordingly, inter-project effects arising from the proposed development in combination with, or in addition to, 'cumulative development' during the demolition and construction stage and operation stage, have been considered in the EIA.

2.81 Each technical EIAR chapter presents the assessment of combined effects of the proposed development with certain other cumulative developments. Schedule 6 of the Regulations states that only developments which are existing and/or approved should be considered, i.e. developments built or under construction or with a planning permission.

2.82 Spatial considerations and scale of development criteria has been developed based on professional judgement to determine whether cumulative developments have the potential for cumulative effects when combined with the proposed development's effects. The criteria applied to the cumulative developments are those which are either:

- Data centres that are permitted/approved or have resolution to grant or are currently at early stage of demolition and enabling/construction; and
- are within 1km of the application site.

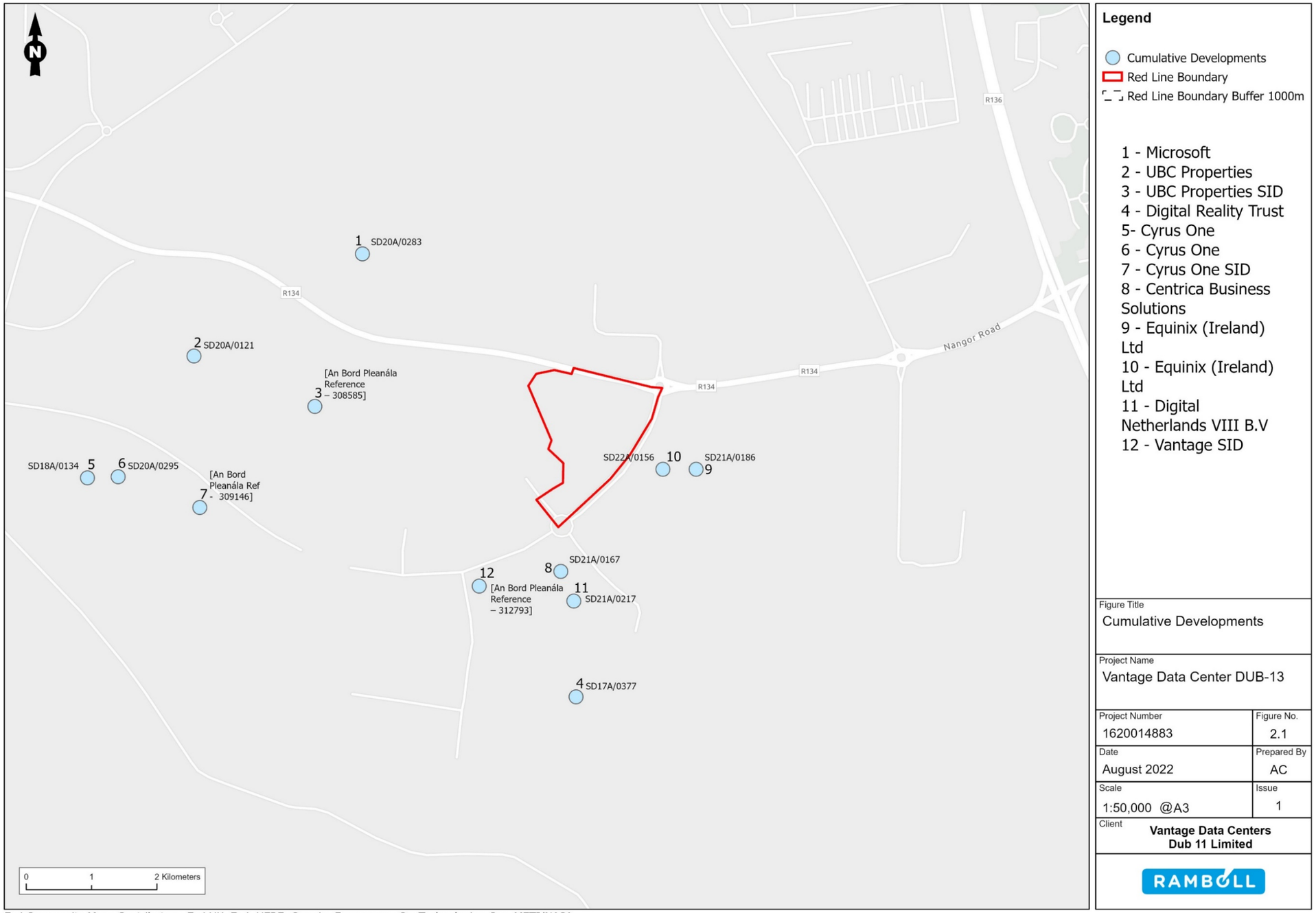
2.83 The cumulative developments have been quantitatively assessed on a topic by topics basis, subject to the availability of development information in the public domain. Where information is not available, or cumulative developments do not comply with the above criteria, qualitative approaches have been adopted based on professional judgement.

2.84 The location of the cumulative developments considered in the EIAR is shown in Figure 2-1 overleaf and the description of each cumulative developments, is summarised in Table 2-4.

2.85 Where possible, the status of cumulative developments' construction works have been taken into account. For example, where construction has progressed to a material degree, such as to affect local views, traffic flows and air quality, such schemes have been considered as part of the existing baseline.

Table 2-4: Cumulative Development Descriptions

No.	Address (Application Reference)	Planning Application Description	Application Status
1	Microsoft - Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 [SD20A/0283]	Demolition of existing single-storey vacant house, garage and outhouse (total gross floor area (GFA) approximately 291.2sqm) and removal of existing temporary construction car park; construction of a single one- to four-storey central administration building and two two-storey (with mezzanine) data centres (DUB14 & DUB15) all to be located west of data centres DUB9, DUB10, DUB12 & DUB13 within the MS campus.	Grant Permission – 29/03/2021 Enabling works in progress
2	UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	The development will consist of the demolition of the existing two-storey dwelling of Ballybane and associated farm buildings (565sqm) and the construction of three two-storey data centres with mezzanine floors at each level of each facility and associated ancillary development that will have a gross floor area of 80,269sqm on an overall site of 16.5 hectares (ha).	Grant Permission – 09/09/2020 Construction in progress
3	UBC Properties -Grange Castle South Business Park, Dublin 22 [An Bord Pleanála Reference – 308585]	Clutterland 110 kilovolt (kV) GIS Substation building and two underground single circuit transmission lines.	Approved 07/05/21
4	Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	Revisions and alterations of the permitted development of a data processing facility under planning Ref: SD12A/0002 on a 3.85ha site. The revised application consists of alterations to the DUB14 (previously DUB12) data centre/warehouse structure, granted in the previous application. The alterations to the DUB14 (Previously DUB12) include: (i) two data halls 2137sqm (increase of 180sqm), (ii) offices/reception 478sqm (decrease of 190sqm), (iii) support space/staff facilities and internal plant with a floor area of 953sqm (increase of 84sqm), (iv) external plant of 1,777sqm (footprint increase of 35sqm).	Grant Permission – 15/12/2017 Constructed
5	Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD18A/0134]	Demolition of the existing single-storey house of 'Erganagh' and the construction of a two-storey data centre and delivery bays with associated three-storey office block and services that will have a gross floor area of 35,426sqm on an overall site of 9.2 ha.	Grant Permission – 24/09/2018
6	Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0295]	Amendments and modifications to the permitted data centre development granted under Registration Ref SD18A/0134 - ABP Ref. ABP-302813-18 and the temporary substation	Grant Permission under SD19A/0300
7	Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [An Bord Pleanála Ref - 309146]	Two 110kV transmission lines and a 110kV Gas Insulated Switchgear (GIS) substation	Grant Permission with conditions – 19/07/2021
8	Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	Construction of a gas fired power plant with an electrical output of up to 125MW with associated balance of plant, equipment and buildings.	Grant Permission – 19/07/2022
9	Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	Construction of a three-storey (part four-storey) data centre known as 'DB8' to include data halls, electrical/plant rooms including internal generators, offices, lobbies, ancillary staff areas including break rooms and toilets, stores, stair/lift cores throughout and photovoltaic panels at roof level.	Grant Permission – 05/05/2022
10	Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD22A/0156]	10 year permission on a site for modifications to the permitted data centre granted under SDCC Reg. Ref. SD21A/0186 comprising the f reconfiguration and alterations to the data centre building and associated development.	Request Additional Information – 25/07/2022
11	Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0217]	10 year permission for development consisting of removal of an existing unused waste water treatment facility on site and the erection of two data centre buildings, gas powered energy generation compound, and all other associated ancillary buildings and works; the two data centre buildings, DUB 15 and DUB 16, will comprise a total floor area of c. 33,577sq.m over two storeys.	Grant Permission – 02/08/2022
12	Vantage Data Centers Dub 11 Limited - Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22 [An Bord Pleanála Ref - 312793]	110kV Gas Insulated Switchgear (GIS) Substation compound and 110kV transmission lines along with associated and ancillary works.	Due to be decided – 18/10/2022



Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Figure 2-1: Cumulative Development Locations

Assumptions and Limitations

2.86 The principal assumptions that have been made, and any limitations that have been identified, in undertaking the EIA are set out below. Assumptions specifically relevant to each environmental topic have been set out in each technical assessment of the EIAR.

- Baseline conditions have been established from a variety of sources, including historical data, but due to the dynamic nature of certain aspects of the environment, conditions at the site and surrounding land uses may change.
- The future baseline has been established based on the July 2022 DUB-1 permitted development as described within the EIAR which was prepared as part of that planning application.
- The assessments contained within each of the technical assessments of this EIAR Volume and within EIAR Volume 2 are based on the current legislative and policy framework, having regard to emerging policies and legislative changes.
- It is assumed that information received from third parties is accurate, complete and up to date.
- The assessments contained within each of the technical assessments of EIAR Volume 1 and within EIAR Volume 2 are based upon the application drawings submitted.
- The assessments contained within each of the technical chapters are based on the assumption that embedded mitigation measures set out in the application drawings, through regulatory regimes or via the management controls as set out in Chapter 4: Proposed Development Description and Chapter 5: Demolition and Construction Description of this EIAR Volume are implemented.
- The assessments contained within the Chapter 8: Air Quality and Chapter 9: Noise and Vibration of this EIAR Volume are based on industry-average specifications for construction, mechanical and services plant as project-specific details will be finalised during the construction planning and procurement stages.
- Demolition, enabling and construction works across the site would take place substantially in accordance with the programme of works described in Chapter 5: Demolition and Construction Description of this EIAR Volume.
- Cumulative developments would be implemented substantially in accordance with information that is publicly available or that has been provided to the Applicant, and subject to the same regulatory regimes and good practice management controls.
- Assessments have assessed the existing baseline conditions at the time of EIAR preparation (mid-2022) and the future baseline as described above unless otherwise stated in the technical assessment chapter. In respect of transport baseline traffic flows have been taken from the July 2022 DUB-1 Permitted Development and have been pro-rated based on MW values.
- The EIAR does not include assessment of the decommissioning stage effects of the proposed development due to the long design life of the proposed development. It is assumed that an appropriate assessment of the potential decommissioning effects, and relevant mitigation proposed, would be undertaken prior to such works progressing.

Technical Assessment Chapters

2.87 A consistent approach to the presentation of EIA findings in the EIAR has been adopted for each of the technical assessments, including:

- explanation of the information gathering and assessment methodology, including a review of policy and legislative requirements of relevance to the specific technical area;
- description of the existing and future baseline conditions;
- description of mitigation that has been embedded into the proposed development's design;
- the identification and assessment of the potential impacts and likely effects arising during the demolition, construction and operation stages of the proposed development taking into account any embedded mitigation measures;
- description of additional opportunities for mitigation or enhancement to reduce the significance of any negative environmental effects, including the requirements for post-development monitoring; and
- assessment of the residual environmental effects and an evaluation of their significance against defined criteria.

2.88 Each environmental topic considered in the EIA has been assigned a separate chapter in EIAR Volume 1 (Chapter 6-15) with the exception of the landscape, visual and cultural heritage impact assessment which is presented separately in EIAR Volume 2. Within each technical chapter the assessment is presented and reported in the following format:

- Introduction – a brief introduction to the assessment;
- Methodology – an overview and review of policy and legislative requirements of relevance to the specific technical area, an outline of the technical, spatial and temporal scope of the assessment, a description of the methods undertaken to characterise the baseline, as well as an explanation of the approach to defining the significance of likely environmental effects;
- Baseline Conditions – a description of the existing and future baseline conditions;
- Assessment of Effects – an assessment of the likely significant effects of the proposed development and an evaluation of their significance against defined criteria taking into account embedded mitigation;
- Assessment of Residual Effects – a description of the additional mitigation, if required and then an assessment of the likely residual effects of the proposed development;
- Summary of Residual Effects – tabulated summary of the residual effects;
- Cumulative Effects – cross reference to the intra-cumulative effects assessment in Chapter 16: Cumulative Effects (of this EIAR Volume) and an assessment of inter-project cumulative effects; and
- Summary of Assessment– brief summary of the technical assessment.

3A ALTERNATIVES AND DESIGN EVOLUTION

Introduction

3.1 The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018[1,2] requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer[3]. These are reasonable alternatives which are relevant to the project and its specific characteristics (e.g., in terms of design, technology, location, size and scale), studied by the Applicant and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3.2 This chapter of the EIAR therefore explores the objectives of the proposed development, its design evolution and the reasonable alternatives considered. In doing so, the chapter considers the analysis of the site and existing environmental conditions which informed the design evolution of the proposed development.

3.3 The following three alternatives were considered:

- The 'Do-Nothing' alternative;
- Alternative locations and uses; and
- Alternative design/layouts of the proposed development.

3.4 Further details can be found in the Design Statement which accompanies the application.

Development Objectives

3.5 The proposed development aims to develop the existing low grade agricultural land to meet development aspirations set out within local and regional policies.

3.6 The specific development objectives for the proposed development are to deliver:

- Add to Irelands national IT and data storage infrastructure;
- Generation of employment;
- Provision of 4 data modules;
- Create a high-quality Business Park environment;
- Provision of SuDs and green infrastructure;
- Increased biodiversity;
- Increase the ecological value of the Baldonnel stream; and
- Reduced climate impact of the proposed development and increase climate resilience.

Development Considerations

Policy Considerations

3.7 The development considerations for the site are set out in the following planning policy and guidance documents at national, regional and local levels:

- National Planning Framework (NPF) (2018)[4];
- National Development Plan (NDP) 2021-2030 (2021)[5];
- National Climate Action Plan 2021[6];
- Regional Spatial and Economic Strategy (RSES) for the Eastern and Midlands Regional Assembly (EMRA)[7] – in particular Regional Policy Objective (RPO) 8.25: *"Support the national objective to promote Ireland as a sustainable international destination for ICT [information and communications technology] infrastructures such as data centres and associated economic activities at appropriate locations"*;
- South Dublin County Council Corporate Plan 2020-2024[8];
- South Dublin County Council (SDCC) Development Plan 2022-2028[9]– in particular Objective EE: *"To provide for enterprise and employment related uses"*.

Site Considerations

3.8 The following site considerations informed the design process:

- Sensitive residential receptors located 600 m south of the site boundary, north of Baldonnel road and a hotel 200 m north-east of the site boundary;
- Site allocations under aforementioned planning policies;
- On-site environmental features, such as Baldonnel stream and existing trees and hedgerows.

Environmental Considerations

3.9 The design has considered the following primary environmental constraints:

- Baldonnel Airfield Height Limit for the area;
- On-site trees and hedgerows;
- The surrounding landscape and visual character;
- Greenhouse gases;
- Flood risk at the site (primarily from the blocked downstream culvert) and infiltration associated with the Baldonnel stream;
- Biodiversity of the site and Baldonnel stream; and

[1] Government of Ireland, 2018. European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. S.I. No. 296/2018. ISB.
[2] Later amended to: Government of Ireland, 2018. European Union (Planning and Development) (Environmental Impact Assessment) (Amendment) Regulations 2018. S.I. No. 646/2018. ISB.
[3] See Article 5(1)(d) of Directive. See Schedule 6(1)(d) to the Regulations.
[4] Government of Ireland, 2018. National Planning Framework (NPF) – Ireland 2040 Our Plan (February 2018) [online]. Available at: https://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf [Accessed on 26/09/2022].
[5] Government of Ireland, 2021. National Development Plan 2021-2030 (last updated 4 October 2021) [online]. Available at: https://www.gov.ie/en/publication/774e2-national-development-plan-2021-2030/ [Accessed on 26/09/2022].
[6] Government of Ireland, 2021. Climate Action Plan. Department of the Environment, Climate and Communications
[7] Eastern & Midland Regional Assembly 2019. Regional Spatial & Economic Strategy 2019-2031 [online]. Available at: https://emra.ie/dubh/wp-content/uploads/2020/05/EMRA_RSES_1.4.5web.pdf [Accessed on 26/09/2022]
[8] SDCC, 2020. South Dublin County Council Corporate Development Plan 2020-2024, [online]. Available at: https://www.sdcc.ie/en/services/our-council/policies-and-plans/corporate-plan/corporate-plan-2020-24.pdf [accessed on 26/09/2022]
[9] South Dublin County Council, 2021. South Dublin County Development Plan 2022-2028 [online]. Available at: https://consult.sdublincoco.ie/en [Accessed 26/09/2022]

- Water quality of the Baldonnel stream.

Consultation

Pre-Submission Consultation

3.10 As part of the pre-submission design process, pre-application consultation was held with SDCC on 21 September 2022, in which the design evolution of the proposed development was discussed. SDCC commented relating to design and policy expectations for the proposed development. The proposed development is considered to meet the design expectations and requirements and therefore no additional design changes have occurred following pre-application consultation.

Additional Information Request

3.11N1 On 13 January 2023 SDCC responded to the planning application requesting Additional Information to address a number of issues as outlined in Chapter 2.

3.12N2 The design process has therefore been an iterative one, as the design team has sought to respond and address these issues raised at the different stages of the planning process. This has therefore produced 'alternatives' or different ways in which the development objectives could be feasibly achieved on-site. The resulting proposed development as submitted under the AI response is discussed in detail in Chapter 4: Description of Development.

Alternatives

Do-Nothing Alternative

3.13 The 'Do Nothing' scenario is a hypothetical alternative conventionally considered, albeit briefly, in EIA as a basis for comparing the development proposal under consideration.

3.14 For the purposes of the EIAR, the 'Do Nothing' scenario is where no development occurs on the site and therefore remains vacant and unchanged. Should the proposed development not be brought forward, the Applicant would implement the July 2022 DUB-1 consented development.

3.15 When considering the 'Do-Nothing' alternative, the following is noted:

- Whilst the site currently includes a single residential property it is largely unused agricultural land and the site needs to be re-purposed;
- The site is located within Profile Park, on land which is designated in the SDCC Development Plan 2022-2028 as Objective EE to provide for enterprise and employment uses. This gives the encouragement for development which seeks to provide alternative uses to those that have recently occupied the site. Furthermore, the provision of the proposed data center would support RPO 8.25 to promote Ireland as a sustainable international destination for ICT infrastructures (such as data centres);
- The Applicant owns the site and the adjacent site for which planning consent was secured in July 2022 for the development of two data centers (SDCC planning reference: SD21A/0241) (refer to Chapter 1: Introduction of this EIAR Volume for further information);
- The proposed development, consisting of one data center building, would sit within a cluster of data centres within Profile Park;
- The Profile Park area has excellent fibre connectivity; and
- The 'Do-Nothing' alternative does not meet any of the developers objectives for the site.

3.16A In the event the proposed development at the site, or any other development, did not come forward, a number of negative effects and lost opportunities would result:

- Loss of opportunity for further economic and employment growth;
- Loss of opportunity to maximise the productive use of the site;
- Loss of national and international data storage capacity and IT infrastructure;
- Loss of opportunity to further establish Profile Park and the surrounding area as a data center hub; and
- Loss of opportunity to improve on-site biodiversity and green corridor connectivity with the wider network in South Dublin.

3.17 The Applicant has therefore not considered the 'Do Nothing' alternative further.

Alternative Sites

3.18 No alternative sites have been considered by the Applicant for the following reasons:

- The site is owned by the Applicant and therefore the Applicant did not consider alternative sites which are the property of a third-party;
- The site is adjacent to the July 2022 DUB-1 consented development site which is under the Applicants ownership and provides an opportunity for an extended and co-ordinated data center campus;
- The site is located within an area identified in SDCC's Development Plan 2022-2028 as an area for enterprise and employment uses (as previously stated);
- The site would provide a key development opportunity to contribute to the regeneration of an underutilised site and with the land use identified in ROP 8.25 (as previously stated);
- The site sits within a wider area dominated by data centers which has good network provision and fibre suppliers, that suit the needs of the site and is thus an ideal location for the proposed development to be situated;
- Alternative sites in the Dublin area may lack adequate power provision and alternative sites in the west of Ireland may lack fibre connectivity;
- A new EirGrid substation is to be constructed, located to the immediate south of the site;
- Under the July 2022 DUB-1 consented development, the Applicant will provide on-site power generation to provide support and capacity to ensure that the development would reinforce the grid and not lead to supply disruption in the surrounding area at peak demand;
- Existing trees along the north and east boundaries creates a natural visual screen;
- There is no evidence of site contamination; and
- The level terrain is suitable for large floorplate buildings.

Alternative Land Uses

3.19 The proposed land use has been informed by prevailing local and regional policy (as previously stated). Accordingly, no other land uses were considered outside of the proposed development. Additionally, due to the site utilities connections and the surrounding uses the Applicant does not propose any other form of development.

3.20 The site shape and area meet the Applicants requirements for the viability of building the data center due to the developable floorspace and space for the number of required data modules.

Alternative Layouts, Designs and Design Evolution

3.21 The following sub-sections of this chapter describe the design evolution process undertaken by the Applicant's design team. A series of site layout and built form options are presented and described along with an explanation of the decisions that have informed the evolution of the alternatives considered.

3.22 A series of concept options were explored throughout the design development process. These sought to define the most appropriate design response for the site. The alternative layouts, designs and design evolution of the proposed development is presented in Table 3-1A.

Table 3-1A: Proposed Development Design Evolution and Alternative Layouts

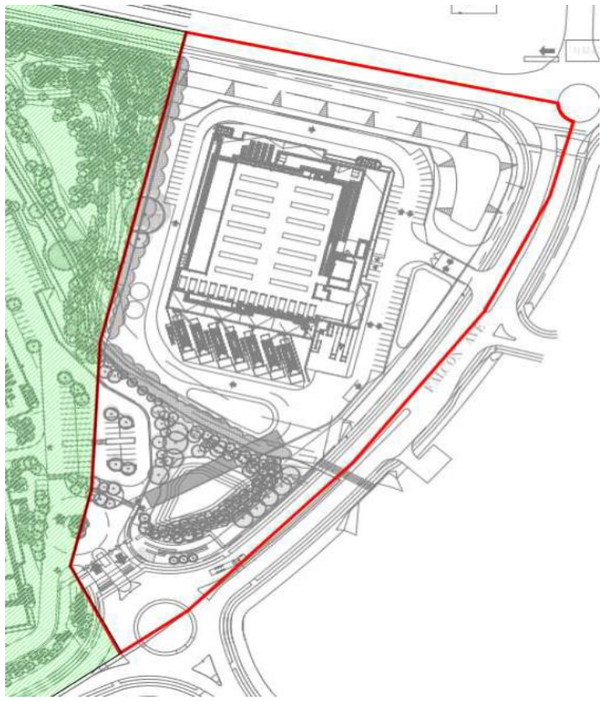
Concept Option	Concept Layout	Environmental Considerations
1 – Early-Stage Design	In the early stages of design and appraisal, DUB-13 was orientated parallel to New Nangor Road with offices facing north. 	This option limits space for natural solutions, SuDS, and green infrastructure to increase stormwater attenuation and reduce flood risk. The drainage strategy would have encroached onto the Baldonnel Stream riparian strip. From a transport perspective an existing access point to the proposed development is located to the south of New Nangor roundabout, along the eastern boundary. A second access point was added to the south of the proposed development in the form of a road crossing over the Baldonnel Stream.
2 – Shift in Orientation	A change in the size and shape of DUB-13, and a shift in orientation.	**Landscape and Visual** The clockwise shift in DUB-13 allows the more "aesthetically pleasing" face of DUB-13 to be seen from New Nangor Road. This alignment reduced the visual impact along the northern frontage, particularly the view from New Nangor Road roundabout. Berms and landscaping, consistent with the that implemented for the July 2022 DUB-1 consented development, were implemented along the northern and eastern boundaries to provide screening of the proposed development from New Nangor Road and Falcon Avenue, respectively. SuDS and Ecology This orientational shift resulted in the proposed development building footprint avoiding the riparian strip which runs adjacent to the site's western boundary and enters the southern section of the site. An attenuation pond was proposed in the north western corner of the site. Berms and landscaping creation along the northern and eastern boundaries would act as a green infrastructure corridor linking new habitats and would act as an extension to the existing habitat created through the July 2022 DUB-1 consented development. Transport and Access . The access strategy was refined to allow service and maintenance vehicles to cross between the July 2022 DUB-1 consented development and the proposed development. The aim of the second access was

Table 3-1A: Proposed Development Design Evolution and Alternative Layouts

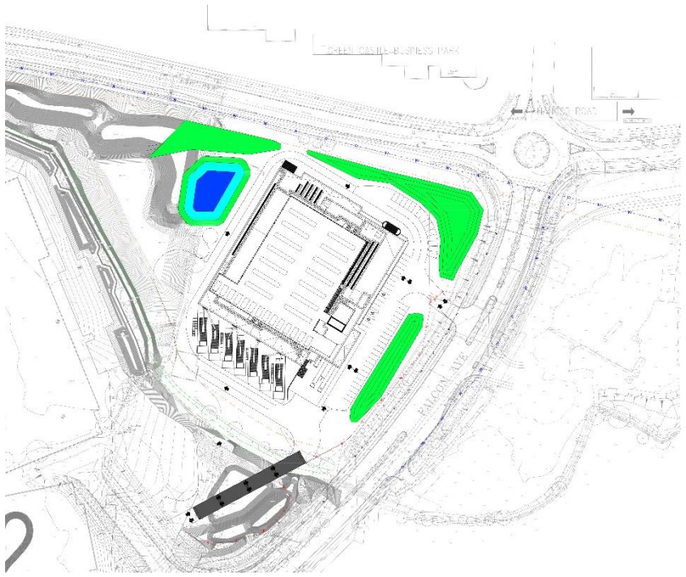
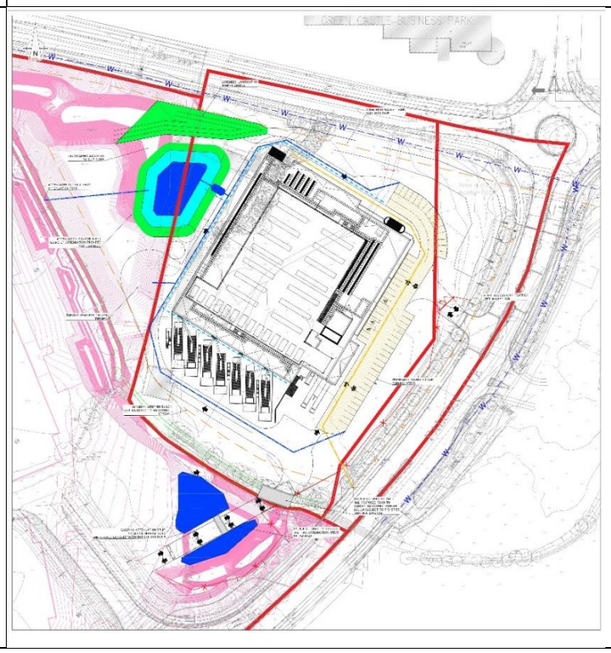
		to increase health and safety through segregating service vehicles from the main site entrance proposed east off Falcon Avenue, used for cars, pedestrians, and cyclists. Despite improvements across the environmental factors above, this option was not taken forward because attenuation volume for the site could be improved.
3 – Attenuation Provision		SuDS and Ecology This option incorporates a second attenuation pond to the south of the proposed development to accommodate the required attenuation volume of the site. However, this option does not include landscaping and biodiversity improvements along the northern and eastern boundaries, which would have been detrimental to visual impacts.

Table 3-1A: Proposed Development Design Evolution and Alternative Layouts

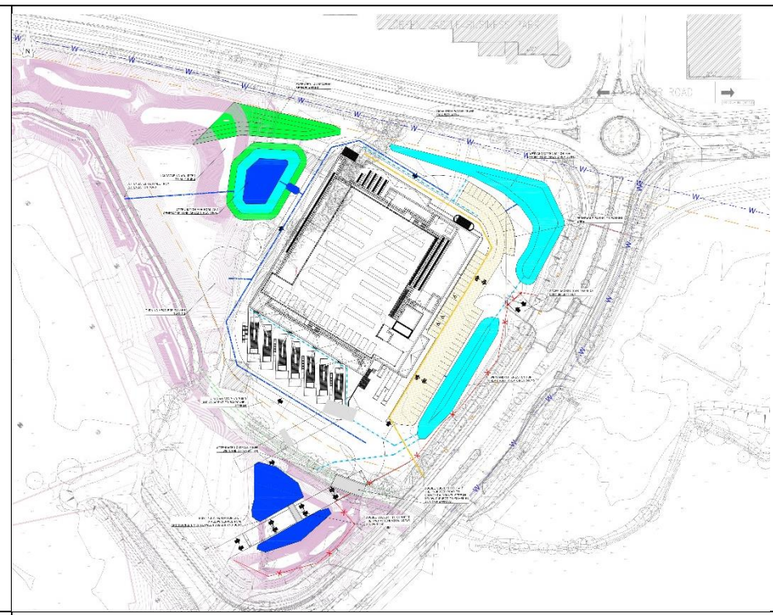
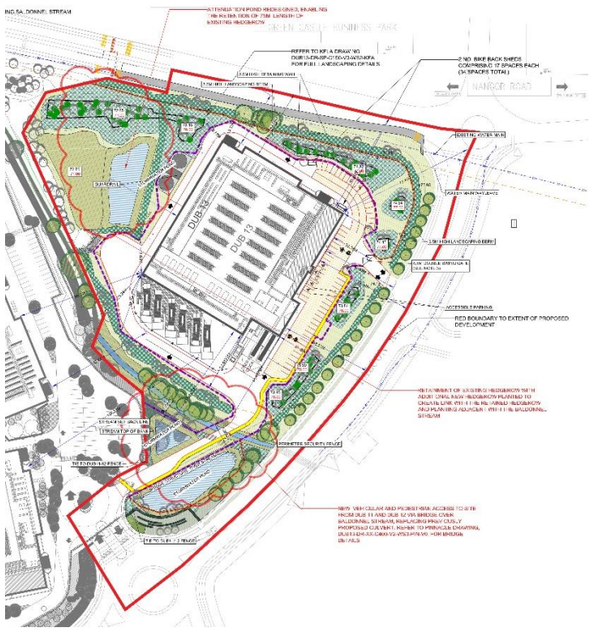
4 – Wetland Provision to the North and East		SuDS and Ecology This option incorporates wetland/attenuation areas in the north and along the eastern frontages of the site. Although a benefit from a flood risk reduction and stormwater attenuation perspective, this limits space for further landscaping and biodiversity improvements which would have been detrimental to visual impacts. An attenuation outfall from wetland would connect to the attenuation pond in the south.
5 – The November 2022 Proposed Development		This is the preferred outcome and best-balanced key environmental considerations including landscaping biodiversity, and surface water attenuation. The preferred development: • Incorporates high quality architectural material palette along the dominant facades visible along New Nangor Road and Falcon Avenue; • Avoids the riparian strip and will result in a significant improvement to landscaping and biodiversity; • Retains existing trees along the site boundary; • Additional planting of berm and large trees along the northern and eastern frontages to provide further visual screening; • Planting hedgerow is proposed to act as a biodiversity corridor linking habitats and creating ecological connectivity between the July 2022 DUB-1 consented development and the proposed development; • Attenuation of surface water is provided through the two attenuation ponds and a permeable paving sub-base; and • Wetland meadows in the north west corner of the site are integrated with the landscape strategy for the July 2022 DUB-1 permitted development, providing biodiversity benefits.

Table 3-1A: Proposed Development Design Evolution and Alternative Layouts

Concept Option	Concept Layout	Environmental Considerations

Table 3-1A: Proposed Development Design Evolution and Alternative Layouts

6 - Revised Proposed Development (the 'proposed development')		Redesign of the proposed development to: • Incorporate an updated material palette comprising high quality, lighter (in terms of colour) materials to improve the visual impact of the façade treatment along New Nangor Road and Falcon Avenue; • Move the north-west attenuation pond to the west of the site to allow for retention of the existing hedgerow; • Introduce new hedgerows to strengthen green infrastructure linkages – primarily connecting to Griffeen River Link and Grand Canal-Corkagh Link as identified in the SDCC GI Plan for the County; • Replace the Baldonnel Stream culvert with a bridge structure to allow for a continuous riparian strip; and • Extend the existing cycle lane along the north of New Nangor Road to the site entrance in order to promote workplace travel and safety. Further detail on the environmental considerations of the proposed development is presented below.

Revised Proposed Development

3.23N3 The revised proposed development has ben chosen for the reasons afore summarised in the upfront section of this chapter and Table 3.1A. This section of the chapter described in detail how the proposed development design has responded to environmental constraints and the outcome of these design changes.

Water Resource, Flood Risk and Rainfall

3.24 The site is at risk of flooding due to the location of the Baldonnel stream. The design has sought to minimise flood risk through incorporating natural solutions across the site through:

- Incorporating increased above ground attenuation ponds providing SuDs for flood water compensation and attenuation to aid the downstream culvert to reduce flood risk;
- Collection of rainwater from roof generator yard areas and discharge of this into a new on-site attenuation pond; and
- Hardstanding (where required) would be designed to collect and attenuate rainwater from the front road areas of the data halls to reduce flood risk.

3.25 The proposed development provides above ground surface water attenuation in the north-western section of the site and in the south western section of the site and SuDs to remove the need for below ground attenuation.

Landscaping

3.26A The site comprises mature trees and hedgerows. Trees located in the centre of the site would be removed as to not limit the layout of the site and building positions. The design has sought to protect existing trees and hedgerows as far as reasonably possible through:

- Retention of mature trees located near to the border of the site;
- Retention of hedgerows, including the north south running hedge in the centre of the site by the movement of the northwest attenuation pond;
- Implementation of a tree protection strategy; and
- Achieving a net gain of trees and hedgerow the planting.

3.27 During the phasing sequence of the proposed development, landscaping would be undertaken at the earliest opportunity in order to help the features to mature ahead of the proposed development being fully built out and operational.

Green Infrastructure Network Connectivity

3.28N4 The landscape proposals for the proposed development have been revised (as described in Chapter 4: Proposed Development Description) to strengthen connectivity to the wider green infrastructure network in South Dublin County. These measures include retaining and enhancing woodland belts, an improved riparian strip to the Baldonnel Stream and proposed SUDs features and meadows across the site. These strengthened linkages are primarily to secondary SDCC GI corridors via the Baldonnel Stream corridor to Corridor L5 (Griffeen River Link) and via the adjacent golf course hedgerows and trees to Corridor L6 (Grand Canal – Corkagh Link).

Biodiversity

3.29A The design has sought to create areas for biodiversity to thrive and create a network of habitats within an ecologically rich landscape. There will be significant habitat creation through the planting of woodland, hedgerows, wildflower meadow and wetland meadows which will support local flora and fauna, increasing local biodiversity, as well as connect to the existing vegetation around the site, enhancing green infrastructure links. In addition, a series of bird boxes, bat boxes and mammal passes are proposed at the site.

Landscape and Visual Impact

3.30 The built footprint of the proposed development has been orientated to reduce the landscape and visual impact through the reorientation of the data center so that the more "aesthetically pleasing" face of DUB-13 to be seen from New Nangor Road.

3.31 Additional planting of berm and large trees along the northern and eastern frontages will provide further visual screening. The inclusion of climbers up the stair towers creating 'green walls' contributes to the high quality landscaping along the dominant facades and provides further visual screening.

3.32A Through the AI response the façade design has been updated to incorporate lighter materials and more windows to improve the visual impact along New Nangor Road and Falcon Avenue. The introduction of additional glazing allows the elevation to become further animated, to that of that of the November 2022 proposed development.

Site Access

3.33 The layout of the site has been developed to allow segregated access for site operators and service HGVs from the data center workers. This would reduce disturbance and ease traffic management to/from the site, minimising impacts on the local road network.

3.34A Safe travel and sustainable transport have been encouraged through the extension of the existing cycle lane and footpath along the northern boundary, adjacent to New Nangor Road, to connect to the site.

Climate Change

3.35A Data centers are typically carbon intensive developments and therefore, the Applicant has looked to reduce climate impact through a variety of energy efficient measures, as well as the incorporation of PV panels to generate renewable electricity and the use of HVO fuel.

3.36 In addition, the applicant has designed the proposed development to incorporate the potential for a district heating provision in the future should there be demand in the area.

Policy Objective EE

3.37 During the design of the site, the Applicant looked to maximise efficiency in terms of net floor space and employment gain, further detail on which is contained in the Planning Report which accompanies the application.

4A PROPOSED DEVELOPMENT DESCRIPTION

Introduction

4.1 This chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the proposed development for the purposes of identifying and assessing the potential environmental impacts and likely environmental effects of the proposed development in the technical assessments of EIAR Volume 1 (Chapters 6-15) and EIAR Volume 2.

4.2 In accordance with the Regulations, this chapter sets out the physical characteristics of the built development, the proposed access arrangements, the landscaping strategy, utility requirements and estimated emissions and arising's.

4.3 A general description of the site is provided in Chapter 1: Introduction, with more detailed descriptions provided in each technical assessment within EIAR Volume 1 and EIAR Volume 2 and is therefore not repeated here.

4.4 Further detailed information on the proposed development can be found within the following application documents:

- Design Statement;
- Planning Report;
- Architectural Drawings;
- Landscape Masterplan and Drawings;
- Engineering Planning Report and Drawings;
- Energy Statement;
- Site Lighting Plan; and
- Flood Risk Assessment.

Planning Application

4.5 As indicated in EIAR Chapter 1: Introduction, the Applicant is submitting a full planning application for the proposed development, described as follows in the application form:

4.6 "We, Vantage Data Centers DUB11 Ltd. are applying for permission for development at this site that includes a two storey residential property on lands to the south of the New Nangor Road (R134), Dublin 22; and on land within the townlands of Ballybane and Kilbride within Profile Park, Clondalkin, Dublin 22 on an overall site of 3.79hectares. The development will consist of the demolition of the two storey dwelling (207.35sqm) and associated outbuildings and farm structures (348.36sqm); and the construction of 1 no. two storey data center with plant at roof level and associated ancillary development that will have a gross floor area of 12,893 sqm that will consist of the following:

- 1 no. two storey data center (Building 13) with a gross floor area of 12,893 sqm. It will include 13 no. emergency back-up generators of which 12 will be double stacked and one will be single stacked within a compound to the south-western side of the data center with associated flues that each will be 22.316m in height and 7 no. hot-air exhaust cooling vents that each will be 20.016m in height;
- The data center will include data storage rooms, associated electrical and mechanical plant rooms, loading bays, maintenance and storage spaces, office administration areas, and plant including PV panels at roof level as well as a separate house generator that will provide emergency power to the admin and ancillary spaces. Each generator will include a diesel tank and there will be a refuelling area to serve the proposed emergency generators;
- The data center will have a primary parapet height of 14.246m above ground level, with plant and screen around plus a plant room above at roof level. The plant room has an overall height of 21.571m;
- Construction of an internal road network and circulation areas, with a staff entrance off Falcon Avenue to the east, as well as a secondary vehicular access for service and delivery vehicles only across a new bridge over the Baldonnel Stream from the permitted entrance as granted under SDCC Planning Ref. SD21A/0241 from the south-west, both from within Profile Park that contains an access from the New Nangor Road (R134);
- Provision of 60 no. car parking spaces (to include 12 EV spaces and 3 disabled spaces), and 34 no. cycle parking spaces;
- Signage (5.7sqm) at first floor level at the northern end of the eastern elevation of the data center building; and
- Ancillary site development works will include footpaths, attenuation ponds that will include an amendment to the permitted attenuation pond as granted to the north of the Baldonnel Stream under SDCC Planning Ref. SD21A/0241, as well as green walls and green roof. The installation and connection to the underground foul and storm water drainage network, and installation of utility ducts and cables, that will include the drilling and laying of ducts and cables under the internal road network within Profile Park. Other ancillary site development works will include hard and soft landscaping that will include an amendment to the permitted landscaping as granted under SDCC Planning Ref. SD21A/0241, lighting, fencing, signage, services road, entrance gates, and sprinkler tanks.

4.8 An Environmental Impact Assessment Report (EIAR) has been submitted with this application. This application and EIAR may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of South Dublin County Council during its public opening hours of 9am – 4pm, Mon-Fri, and a submission or observation may be made to South Dublin County Council in writing and on payment of the prescribed fee (€20.00) within the period of 5 weeks beginning on the date of receipt by South Dublin County Council of the application."

4.9 In summary, the proposed development would comprise the following:

- Demolition of the existing double-story dwelling and associated outbuildings and farm structures;
- Erection of DUB-13 along with associated emergency generators and flues with a gross floor area of approximately 12,893 m^2; and
- Provision of 60 car parking spaces (includes 12 EV spaces and 3 disabled spaces) and 34 bicycle parking spaces provision.

4.11 The application redline boundary is shown in Figure 1.1 Chapter 1: Introduction and covers an area of 3.79 ha.

4.12 The proposed development site would deliver one data centre building: DUB-13. The detailed layout, scale, appearance, and landscaping of the proposed development are described within this chapter.

4.13 Accordingly, the figures that accompany the application are outlined in Table 4-1A and are presented in Figures 4-1 – 4-11.

Table 4-1A: Schedule of Figures

Figure No.	Name	Description
4-1R	Masterplan	Figure showing the layout of the Proposed Development

Table 4-1A: Schedule of Figures

Figure No.	Name	Description
4-2	Proposed Ground Floor General Arrangement Plan	Figure showing the ground floor plan of the Proposed Development
4-3	Proposed First Floor General Arrangement Plan	Figure showing the first floor plan of the Proposed Development
4-4	Proposed Roof General Arrangement Plan	Figure showing the roof plan of the Proposed Development
4-5R	Material Palette Detailing	Figure showing the material palette detailing
4-6R	DUB-13 North-East and South-East Elevations	Figure showing the north-east and south-east elevations, material palette and façade of DUB-13
4-7	DUB-13 East and West Elevations	Figure showing the east and west elevations, material palette and façade of DUB-13
4-8	DUB-13 South (Generators) Elevation	Figure showing the south elevation with generators, material palette and façade of DUB-13
4-9R	Landscape Masterplan	Figure showing the landscaping proposals
4-10N	Green Infrastructure Plan	Figure showing the green infrastructure network of the site and linkages to the surrounds
4-11R	Selected Sections of the Landscape Masterplan	Figure showing selected sections of the landscape masterplan
4-12R	Proposed Site Access Arrangement	Figure showing the vehicular, pedestrian and cycle access routes to the site

Proposed Development

Site Arrangement

4.14 The site masterplan, detailing the site layout, is presented in Figure 4-1R, overleaf.

4.15 As illustrated in Figure 4.1R, DUB-13 would be constructed broadly orientated in the center of the site. DUB-13 would be screened by proposed extensive berms, planting, and landscaping to the north and east, to reduce the visual bulk of the data center from New Nangor Road and Falcon Avenue.

4.16A The proposed development would be oriented to allow the alignment of the Baldonnel Stream, located within the southern portion of the site, to remain as existing whilst also including measures to enhance the ecological value of the Baldonnel Stream. ~~A box culvert would be installed at the proposed road crossing within the site.~~

4.17 The proposed landscaping in the north-western corner of the site, within the red line boundary, forms part of the proposed development. Proposed landscaping is consistent with the landscape approach adopted within the July 2022 DUB-1 permitted development, shown in in green to the west of the red line boundary and to the north of the Baldonnel Stream.

4.18 DUB-13 would comprise a two-storey data center of 12,893 m^2. The data storage facility would include:

- Data storage rooms;
- Associated electrical and mechanical plant rooms;
- Loading bay;
- Maintenance and storage space;
- Office administration areas;
- Plant at roof level;
- Sedum green roofs;
- 13 double stacked standby generators with integral fuel tanks for emergency power to the data halls, admin, and ancillary spaces, and with associate flues, each 22.3 m in height (95.95 m AOD), located to the south of the building;
- A house generator with integral fuel tanks that would provide emergency power to the admin and ancillary spaces; and
- A fuelling area to serve the proposed emergency generators.

4.19 The ground and first floor plans are shown in Figure 4-2 and 4-3 respectively, and the roof plan is shown in Figure 4-4.

4.20 New pedestrian and vehicle routes would be provided within the site. The proposed development would include the construction of an internal road network and circulation areas, dedicated pedestrian footpaths, provision of 60 car parking spaces (12 of which would be dedicated to electric vehicle (EV) charging, however all parking spaces would be ducted for future EV charging provision, and three for disabled users) and 34 bicycle parking spaces in double-stacked covered racks.

4.21A The two main entrances for the site would be from Falcon Avenue. One access/egress point would be from Falcon Avenue on the eastern border, for staff, pedestrians, and cyclists. HGVs, maintenance vehicles and delivery vehicles would access the site via the roundabout on Falcon Avenue, through the July 2022 DUB-1 permitted development, and cross over an attenuation pond and the Baldonnel Stream via a bridge structure. ~~road crossing.~~

4.22 Entry gates would be separated to provide safe division from pedestrian, cycle, and car access from large HGVs and construction traffic during the phased development and ongoing maintenance of the data centers.

Figure 4-1R: Proposed Development Masterplan (Source Burns & McDonnell)

Figure 4-2: Proposed Ground Floor General Arrangement Plan (Source Burns & McDonnell)

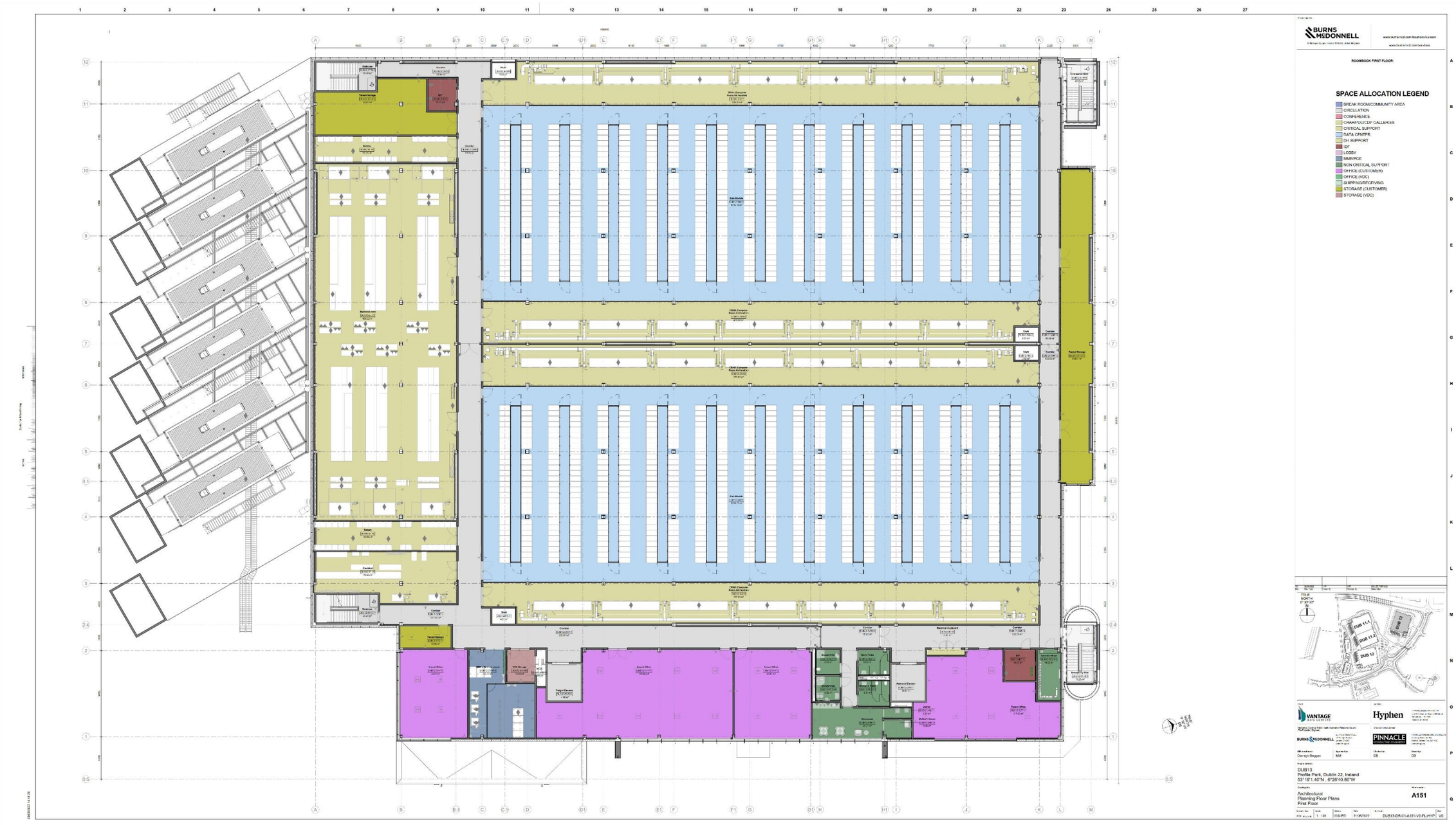


Figure 4-3: Proposed First Floor General Arrangement Plan (Source Burns & McDonnell)

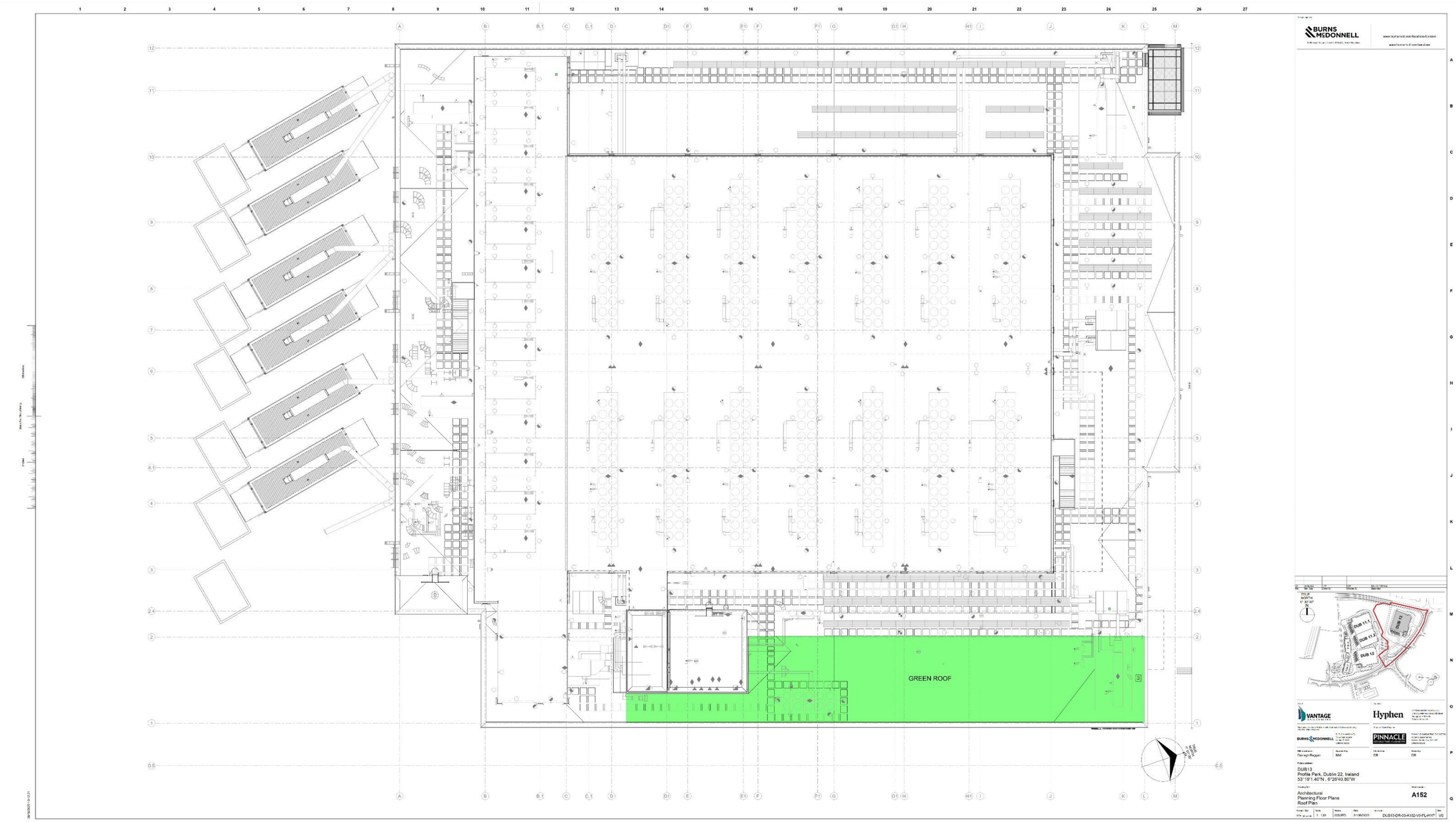


Figure 4-4: Proposed Roof General Arrangement Plan (Source Burns & McDonnell)

Power Generation Plant and Connection

Main Supply

4.23A The permanent power solution for the proposed development would be provided by the EirGrid connection. To increase resilience of the power network and ensure a power supply for the proposed development, DUB-13 would also connect to a Multi-Fuel Generation Plant (MFGP) ~~as a secondary power supply.~~

4.24A ~~This~~ The EirGrid connection would be provided from ESB via a network substation (subject to a separate SID application), south of the site, to a switch room on the adjacent July 2022 DUB-1 permitted development with a 20 kV distribution feed to DUB-13. The EirGrid connection is secured through an existing connection agreement with EirGrid.

4.25 Two 100 MVA 110/20kV transformers, housed within the EirGrid substation adjacent to the south of the site would provide 20kV power to the July 2022 DUB-1 permitted development. From the July 2022 DUB-1 permitted development 20 kV switchboards, four 20kV supplies are provided to DUB-13, entering on the west of the DUB-13 data center.

4.26A As outlined above, DUB-13 would ~~primarily~~ be powered via a grid connection and the on-site MFGP. The power network is known to be constrained in terms of providing electrical grid power to the area and therefore the proposed development would also connect to the MFGP which forms part of the July 2022 DUB-1 permitted development. The MFGP would have the capacity to provide equal energy to the amount consumed on-site and consumed through the July 2022 DUB-1 permitted development. The MFGP is scaled to ensure it has capacity to dispatch energy equivalent to or greater than DUB-13 and the July 2022 DUB-1 permitted development demand into the national grid.

4.27 DUB-13 would connect to the MFGP through an internal connection through the July 2022 DUB-1 permitted development.

4.28 The primary fuel for the MFGP is natural gas and the secondary fuel is hydrotreated vegetable oil (HVO). On site renewable energy generation is provided by the MFGP when powered with HVO. It is not possible for HVO to be used as the primary fuel for the MFGP due to volume of HVO required and it's current availability. Renewable energy would also be provided through photovoltaic panels (PV) installed at the site to generate renewable electricity up to a peak of 73.15 kW. Due to the size of the site it is not possible to facilitate other types of renewable energy generation such as wind turbines.

4.29N1 The natural gas would be supplied to the MFGP via the high-pressure GNI gas network for which the connection has been agreed with GNI. The natural gas supply and HVO would be supplied to the proposed development through a commercial provider.

4.30 Within the data center, equipment would be predominantly located indoors except for the lube oil tanks, lube oil pumps, air-cooled radiators, and exhaust fans. A control room would be in the new facility and would include workstations for the (engine) generators and balance of plant equipment. A new plant control system would be provided to integrate the generators and balance of plant equipment.

Back-Up Supply

4.31A In the event of a loss of power supply of the EirGrid connection and the MFGP, diesel powered back-up generators would be provided to maintain power supply i.e., emergency scenario assessed as part of this EIAR. The back-up generators are designed to automatically activate and provide power to the plant pending restoration of mains power. A total of 13 double stacked generators are provided which are fed by dedicated bunded diesel storage tanks. Fuel is stored under the genset in a double-walled belly tank with a capacity of 18 cubic meters. The back-up generators would be subject to periodic testing to ensure they remain serviceable and are only anticipated to be required in an exceptional event e.g., grid blackout.

Land Use

Area Schedule

4.32 The Gross Floor Area (GFA) of DUB-13 (including ancillary floorspace) is 12,893 m². The area schedule for DUB-13 is presented in Table 4-2A.

Table 4-2: DUB-13 Area Schedule

Use	Gross Floor Area (GFA) m²
Data Center	5,266
Office Space	603
Circulation	1,314
Loading Dock	221
Other	5,489
Total	**12,893**

4.33 The built footprint of the proposed development is presented in Table 4-3.

Table 4-3A: Proposed Development Built Footprint

Use	Area m²
Permeable Paving	759
Concrete Roads, Generator Yards, Externals Concrete Slabs	~~4,502~~ 4,368
Asphalt Road	2,395
Walkways (Concrete)	394
Attenuation Ponds	~~1,903~~ 1,623
Landscaping	15,305
Existing Roads and Walkways*	From the July 2022 DUB-1 permitted development
Total	~~25,258~~ 24,844
*Existing Roads and Walkways equal 6,264 m² and would total ~~31,522~~ 31,108 m²	

Built Form, Height, and Massing

4.34 The scale and massing of the proposed development seeks to respond to its surrounding context, in particular existing surrounding data centers, agricultural land, the Baldonnel Stream, all whilst maximising the sites potential for data center usage and employment generation. The overall scale of the data center is broken down by expressing each component of the building differently using materials and massing.

4.35 The topography of the site is relatively flat, with a general shallow fall from north-east to south-west. The topography ranges from approximately 75 m AOD in the north-east to approximately 73 m AOD in the south-west.

4.36 The maximum overall height of DUB-13, excluding the flues and plant at roof level is 15.70 m above finished floor level (FFL). Flues which are grouped in stacks of three flues would be 22.3 m in height (95.95m AOD) from ground level associated with the data center emergency generators.

4.37 Table 4-3 summarises the maximum heights of proposed development components within the application site which are also shown overleaf in Figures 4-6 – 4-8.

Table 4-3: Maximum Plot Heights

Proposed Development Component	Height Above Ground Level (m)	Maximum Height (m AOD)
DUB13 Parapet/Stair Tower	14.23/21.55	95.40
Genset Flues	22.30	95.95

Material Palette and Façade Detailing

4.38 For the proposed development, different options have been selected in respect of materiality, architectural style, and detailing, to be implemented through design codes.

4.39 DUB-13 would predominately comprise sandwich panels in white, light grey and dark grey, consistent with the July 2022 DUB-1 permitted development and other surrounding data centers. High quality insulated panels would be used for the main façade with a powder-coated finish and with a palette of colours that enlivens the façade in a graduated way.

4.40 Perforated metal panels are used around the staircases and with stainless steel wire mesh to allow planting to grow up the façade, thus adding texture and visual interest as well as contributing to the biodiverse habitat of the landscaping. Living green walls are introduced from ground level to increase biodiversity and soften the building at street level.

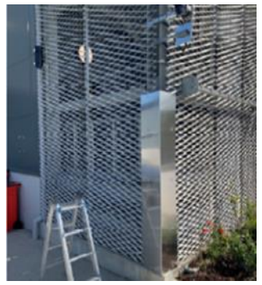
4.41 The revised proposed development would introduce additional glazing to the east, extended from the previous proposed first floor glazing on the east elevation, which would wrap around the buildings corner on to the northern elevation (as sown in figures 4.6R and 4.7R). In addition the glazing extension would provide additional views form the tenant office.

4.42 The approach to materials is to use good quality materials in a restrained way with a limited palette of colours and finishes.

4.43A Rooftop plant, including chillers and transformers, are masked by light grey mesh panels. Office entrances and generator plant would comprise a similar palette of light grey mesh and aluminium curtain wall. A sedum green roof is introduced over the office and non-critical areas of the data center.

4.44 The material palette detailing is displayed in Figure 4-5R.

Curtain Wall



Mesh and Green wall – to external stair cove

Grey Metal Panel

White Metal Panel

Acoustic Louvers

Green Wall

Figure 4-5R: Material Palette Detailing

4.45 The coloured panels on the façade are graded in colour from dark to light to reduce the visual bulk and a canopy has been added at first floor level to break up the massing from street level. The

4.46 The material palette and façade detailing of DUB-13 is presented overleaf in Figure 4-6 – 4-8 which shows the elevations of DUB-13.

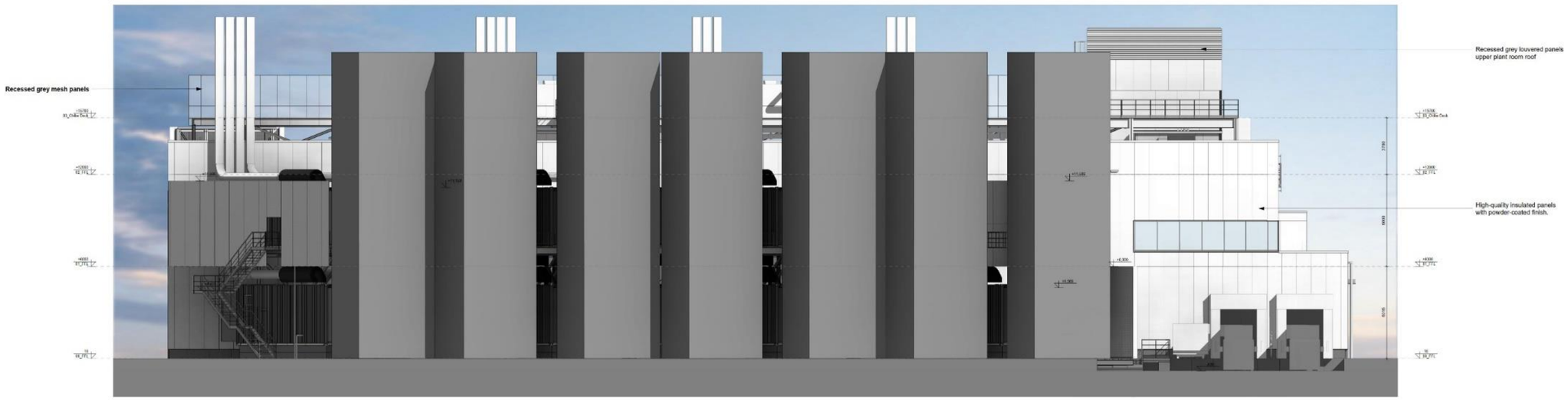
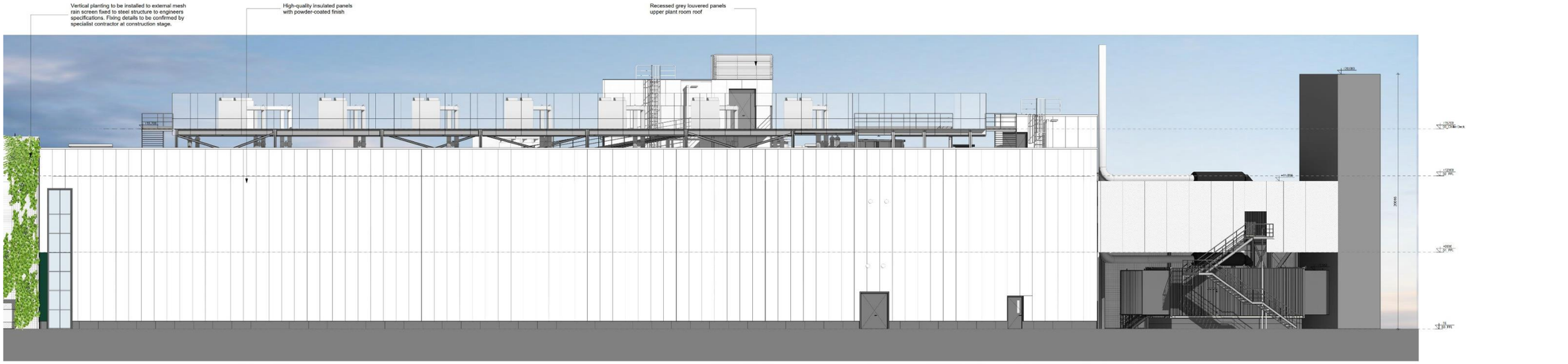


Figure 4-6R: DUB-13 North-East and South-East Elevations (Source Burns & McDonnell



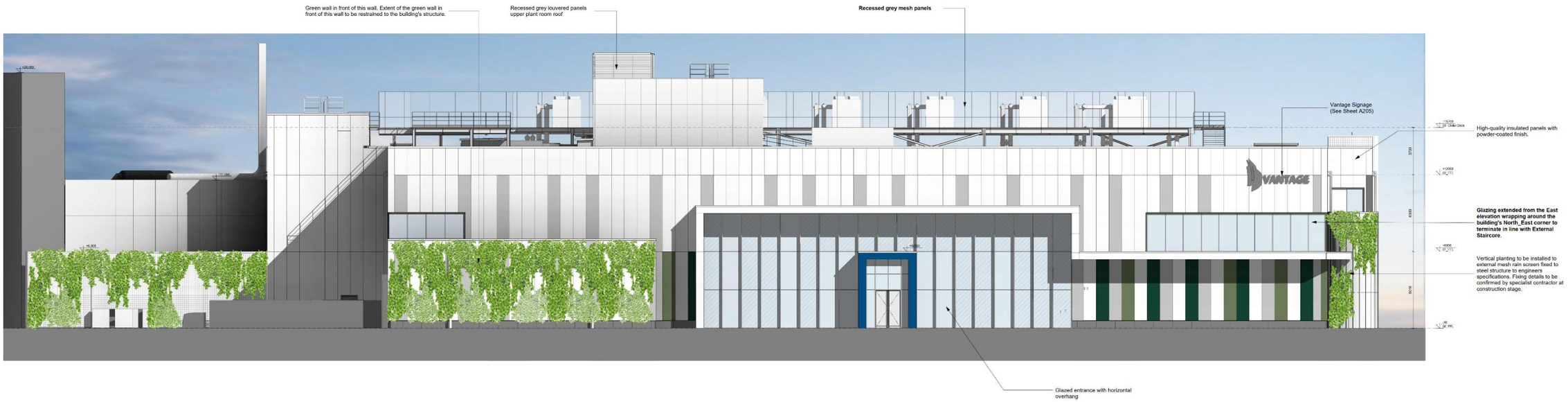


Figure 4-7R: DUB-13 East and West Elevations (Source Burns & McDonnell)

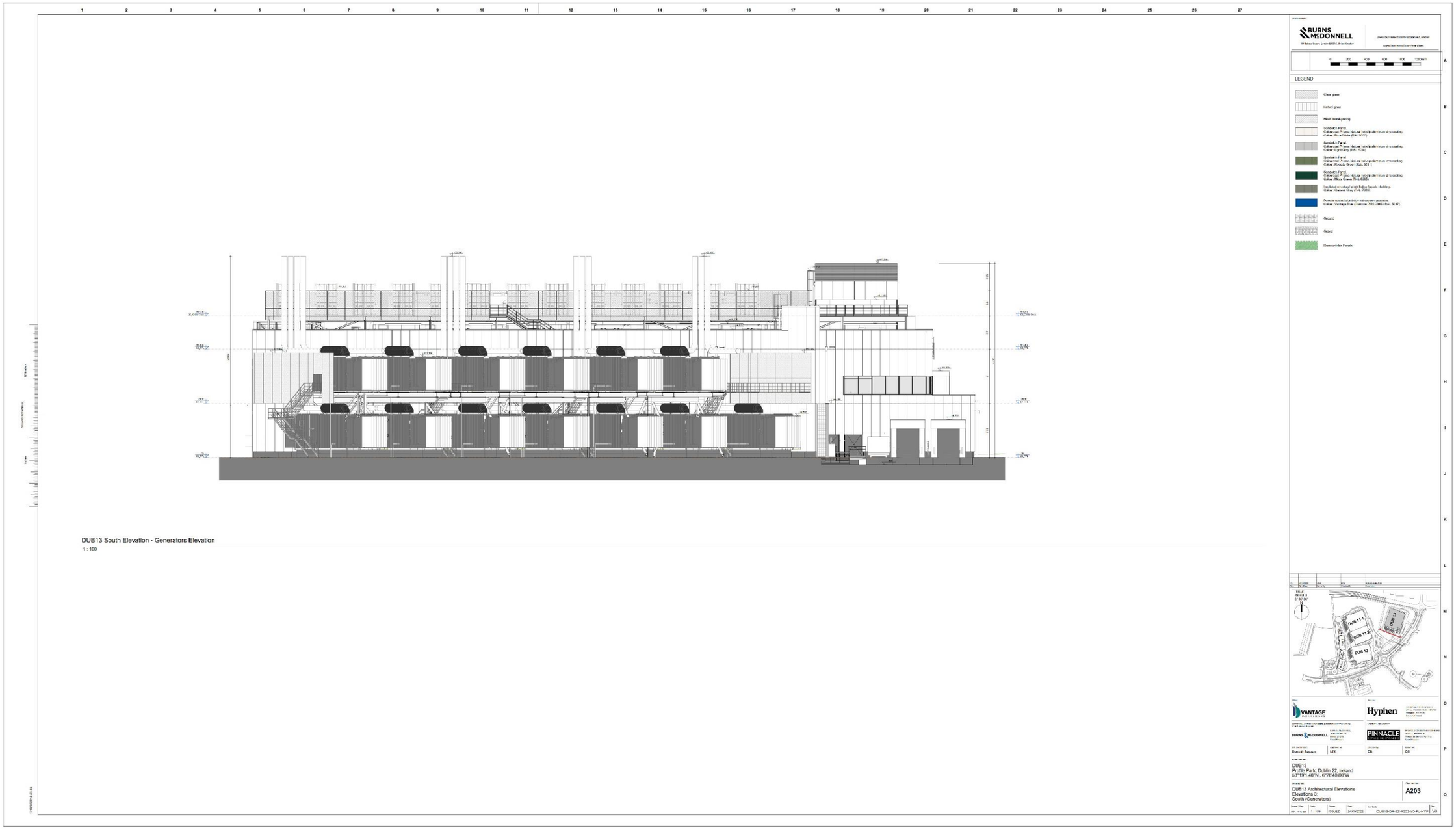


Figure 4-8: DUB-13 South (Generators) Elevations (Source Burns & McDonnell)

Phasing of Development

4.47 The proposed development would be constructed in a single phase. The works included are detailed below:

- Demolition of the existing double-storey dwelling;
- Site infrastructure works, landscaping and Baldonnel Stream enhancements;
- Sustainable Drainage System (SuDS) drainage;
- DUB-13 constructed and operational with 13 emergency generators; and
- Remaining external works.

4.48 Demolition and construction works are anticipated to commence in Q1 2024, with indicative completion targeted for Q4 2024 / Q1 2025. The works are anticipated to be undertaken over an 11-month period. Following a period of fit out and commissioning, the indicative start of operation is Q3 2025, with the proposed development fully operational by Q4 2025.

Landscaping and Public Realm

Landscape Masterplan

4.49A The landscape masterplan is displayed in Figure 4-9R and the green infrastructure plan is displayed in Figure 4-10N. A green infrastructure plan and a green space factor calculation has been prepared and will be submitted as part of this application.

4.50 The landscape strategy and green infrastructure proposals would integrate the new built development with the existing landscape and create a network of habitats within an ecologically rich landscape. The protection and enhancement of the existing landscape is an important aspect of the overall landscape strategy. As this site is not accessible to the public, landscaping would focus on creating areas for biodiversity to thrive and would not provide any public realm or open space.

4.51N2 In order to increase the green infrastructure network at the site and within the surrounding area, the landscape masterplan has incorporated additional hedgerows to act as habitat corridors. These have been incorporated along the northern boundary of the site creating a connection between on-site biodiversity and the July 2022 DUB-1 permitted development and the L5 Griffeen River Link; and along the eastern site boundary strengthening connections to L6 Grand Canal-Corkagh Link.

4.52A The key considerations of the landscape masterplan and green infrastructure plan are as follows:

- Providing sufficient measures to protect and enhance the existing landscape;
- The retention of existing perimeter landscaping and trees wherever possible, including a hedgerow in the north-west of the site;
- Maintaining and creating natural habitats for native flora and fauna, as well as creating ecological networks;
- Provide areas of soft landscaping and enhanced biodiversity throughout the site;
- Enhancement of the stream corridor to establish a unique ecological space. In response to the SDCC AI request, the previously proposed culvert has been replaced with a bridge design to allow for a continuous riparian strip along the Baldonnel stream;
- Selection of plant species to respect the local environment while providing suitable vegetation that is harmonious with the existing area and will be successful through all stages of its maturity; and
- Screening to provide internal privacy and security within the site, as well as contributing to landscape sensitivity by blocking undesirable views and sounds to users outside of the site.

4.53 The landscaping masterplan would incorporate the following elements:

- Berm and woodland planting;
- Native hedgerow;
- Stream habitat;
- Wetland meadows;
- Wildflower meadows; and
- Riparian strips.

Landscape and Biodiversity Enhancements

4.53A Figure 4.9 Landscape masterplan details the biodiversity enhancements that would be introduced through the landscaping masterplan. Figure 4-11R Landscape Sections details specific landscape sections of the proposed development to enhance the existing landscape and increase biodiversity.

4.54A ~~58~~ 51 trees are to be retained as part of the proposed development which are predominantly located around the perimeter of the site. However, ~~72~~ 79 trees located in the treeline adjacent to the existing residential property would be felled in order for the proposed development to be constructed. The design has sought to protect existing trees as far as reasonably possible. Substantial new planting of berm and woodland would be provided in the landscaping scheme with 443~~897~~ new trees proposed to be planted and 4,903~~4,449~~ transplanted as saplings. The hedgerow in the north-west of the site, adjacent to the east of the attenuation pond would be retained, with new hedgerow added to the southern length, where it meets hard standing areas.

4.56 Screening will be implemented through the use of undulating, naturally shaped earth berms and tree planting, and is an essential part of the landscape strategy. Berms will exist at varying heights, ranging from 1 to 5 m, depending on location, and are situated in specific locations relating to existing views. Large native trees have been selected to give an instant screening impact.

4.57 There will be significant habitat creation through the planting of woodland, hedgerows, wildflower meadow and wetland meadows which will support local flora and fauna, increasing local biodiversity, as well as connect to the existing vegetation around the site, enhancing green infrastructure links.

4.58 The existing alignment of the stream is to remain the same, therefore the proposed earthworks, planting proposals, attenuation areas and site layout have been designed around it. The landscape strategy proposes to enhance and strengthen the existing hedgerows along the stream using native hedgerow and woodland species, while retaining the existing trees and scrub. The stream will be enhanced with proposed native riparian planting.

4.59A Three attenuation ponds are proposed, one to the west and the two to the south of the data center. The attenuation pond to the west will incorporate a native wetland edge and will be surrounded by a wetland meadow to provide an ecologically rich and diverse habitat. In order to retain the hedgerow in the north-western portion of the site the attenuation pond has been amended to reduce the width and increase the length. In conjunction with the modifications made to the north-western area of the site, the southern most point has been amended to incorporate an additional attenuation pond.

4.60 The proposed security fencing has been positioned to help establish a continuous belt of woodland, hedgerow, wildflower, and wetland planting to allow the free movement of fauna through the site along fully connected green infrastructure links.

4.61 451 m^2 of green sedum roofs are proposed on the southern section of the data center building, as shown in Figure 4-4, and although not primarily for biodiversity enhancement, are expected to offer some biodiversity value.

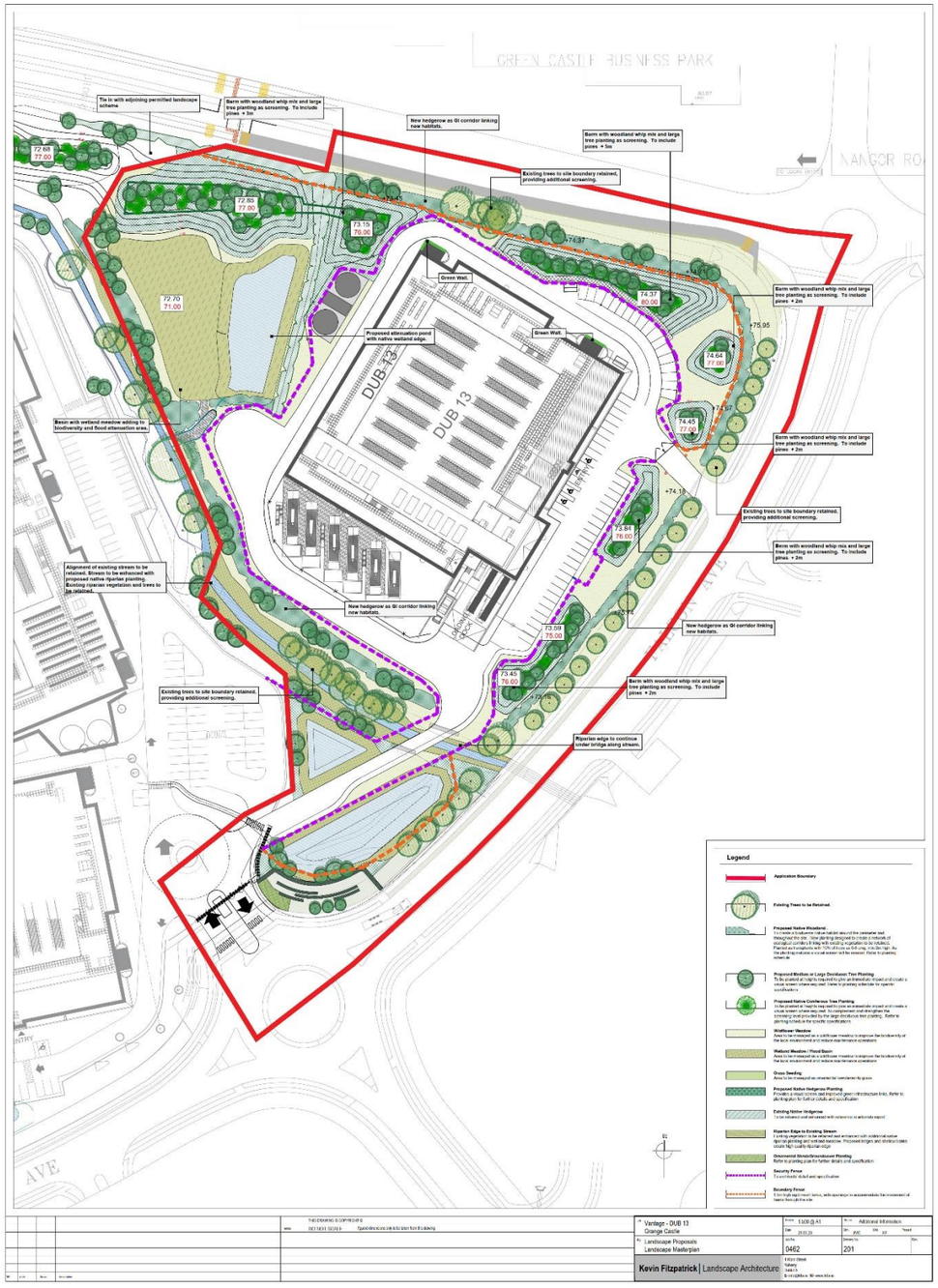
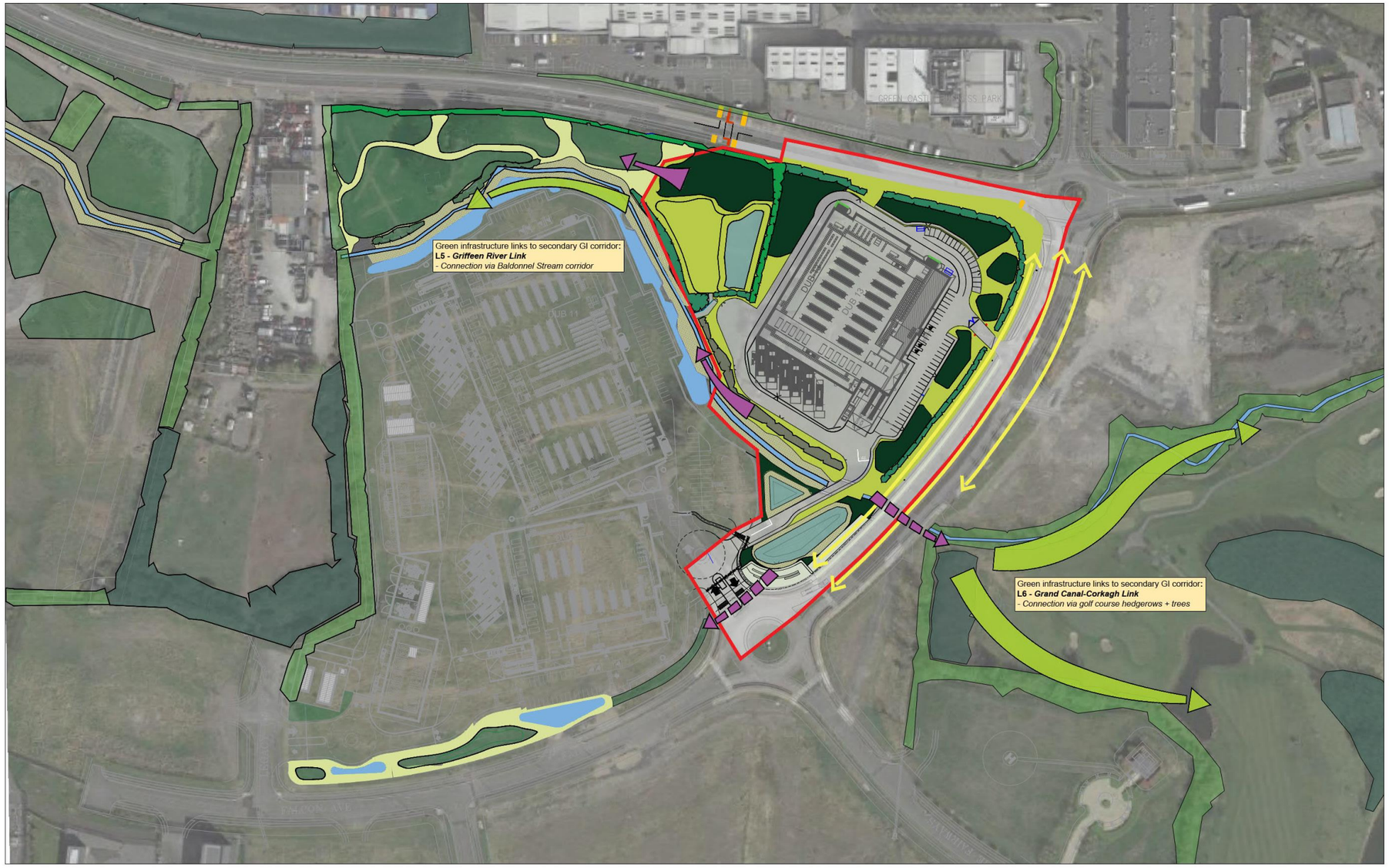
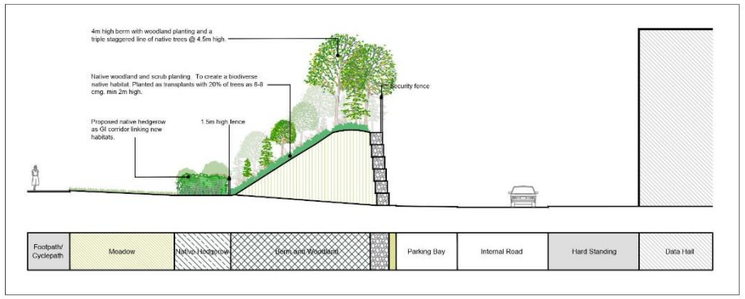


Figure 4-9R: Landscape Masterplan (Source Kevin Fitzpatrick Landscape Architects)

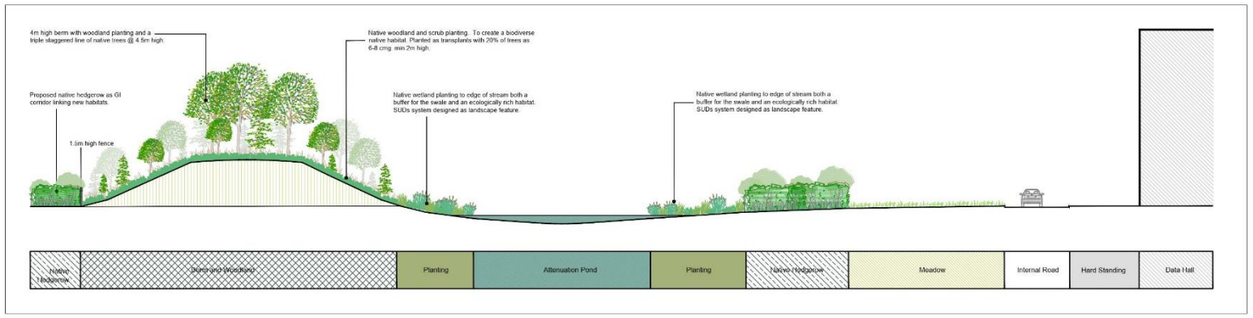


Site GI Diagram | N.T.S

Figure 4-10N: Green Infrastructure Plan (Source Kevin Fitzpatrick Landscape Architects)



Section A | 1:200



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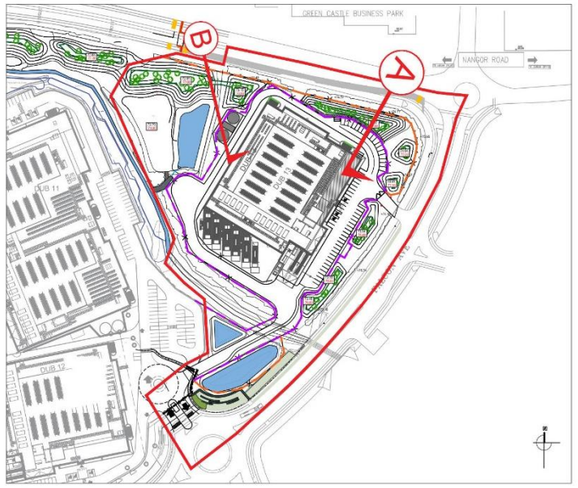
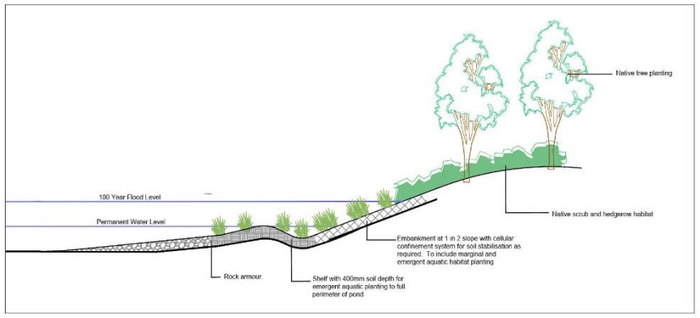
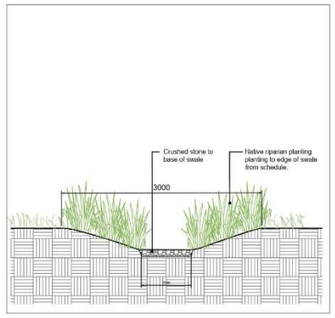


Key Plan | N.T.S



Typical Wetland Edge Detail | N.T.S



Typical Section through bio swale | N.T.S

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rev	date	drawn	description

JB Vantage - DUB 13 Grange Castle	Scales As shown @ A1	Status Additional Information	
	Date 20.03.23	Drn. JMcC Chd. KF Passed	
RS Landscape Proposals Landscape Sections	Job No. 0462	Drawing No. 202	Rev.
Kevin Fitzpatrick | Landscape Architecture	4 Main Street Rathfarnham Dublin 5 E- info@kfla.ie W- www.kfla.ie		

Figure 4-11R: Selected Sections of the Landscape Masterplan (Source Kevin Fitzpatrick Landscape Architects)

Access Arrangements

Vehicular Access

4.62A The application site would be accessed via two entry points on Falcon Avenue, as displayed in Figure 4-11. HGVs, maintenance vehicles and delivery vehicles would access the site via the roundabout on Falcon Avenue, south of the proposed development through the July 2022 DUB-1 permitted development. HGV, maintenance vehicles and delivery vehicles would cross over an attenuation pond and stream via a bridge structure ~~road crossing~~ to access the southern portion of the site.

4.63 Cars would access the site via Falcon Avenue from the east, through the main gate. This would keep daily office traffic separate from HGV, maintenance vehicles and delivery vehicles.

4.64 Internal roads are proposed to be constructed to provide access, around the development in a clockwise direction, to the data center and to allow vehicles to access the proposed parking to the east of the buildings. These would be designed to accommodate the largest expected vehicle to access the application site.

Cycle and Pedestrian Access

4.65 As displayed in Figure 4-11, pedestrian and cycle access to the site would be via the controlled pedestrian and cyclist entry gate on Falcon Avenue from the east.

4.66N3 The existing cycle lane to the northern boundary on New Nangor Road (R134) would be extended to Falcon Avenue. This will match the existing cycle lane further west along the R134.

4.67 Roads within Profile Park comprise cycle paths on both sides of internal roads and afford good connections to the wider public cycle network.

4.68 The proposed development has been designed to encourage cycling and pedestrian movements through designated cycle and pedestrian paths. Showers would be included in the building for staff.

Emergency Access

4.69 The internal roads would provide emergency vehicle access around DUB-13 and provide service access to the service areas. Perimeter access roads would be provided around the building for emergency access and to accommodate crane access for the replacement of rooftop plant.

Car and Cycle Parking

4.70 The proposed development would operate with approximately 45 Full Time Equivalent (FTE) members of staff.

4.71 A total of 60 car parking spaces would be provided within the proposed development, which would provide parking for site staff and visitors. Of these, 12 would be electric vehicle charging points, three would be disabled parking provision and two would be delivery vehicle spaces in the loading dock.

4.72 There would be 34 double-stacked spaces for covered cycle storage.

4.73 Car and cycle parking would be provided along the east and north-east corner of the data center as shown in Figure 4-1. All employee spaces would be provided within a secure car park that would not be accessible to the general public. Visitor spaces would be located within this car park.

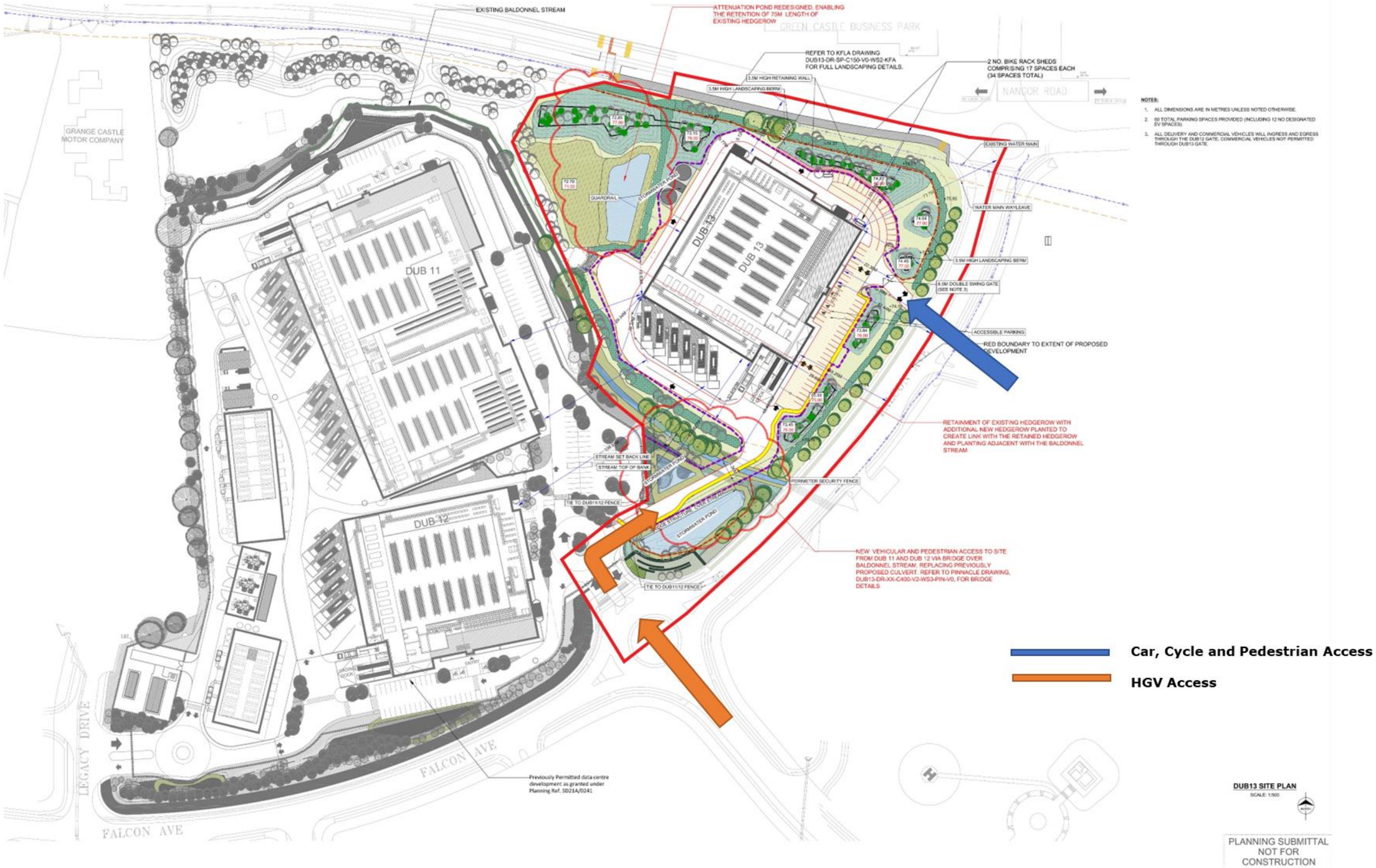


Figure 4-11R: Proposed Site Access Arrangement (Source Burns and McDonnell)

Servicing and Deliveries

4.74 The site layout is designed to support the delivery and replacement of equipment and primary plant and to enable access for appliances in the event of fire.

4.75 Deliveries would come to a two-bay truck loading dock during the initial deployment of IT and mechanical equipment and would be issued for periodic replacement of equipment.

Waste Management

4.76 Deliveries of equipment to site may generate limited quantities of rubbish, which for the most part would be packaging material. This rubbish would be managed on site.

4.77 The buildings primary waste stream would come from the toilets, which is calculated at 45 permanent staff once operational.

4.78 Refer to EIAR Volume 1, Chapter 15: Waste, for further information regarding waste generation volumes.

Plant and Ventilation

Heating

4.79 Heating to the office areas would be provided by heat pumps that would recover heat from the data module cooling system. This would allow the heat pump system to operate at higher efficiencies compared to air cooled systems operating at standard ambient conditions.

4.80 The heat load of the office areas is a very small percentage of the energy that is available from the DUB-13 cooling process heat rejection systems, and thus the chilled water system can also offer the potential to reject heat into a local heat network later should a there be a local demand in the future.

4.81 To ensure that the system has the flexibility to connect into such a system whilst also maintaining a live data centre, valved, and capped off connections will be provided on return water risers, ready for future connection to a district heating network.

4.82 The above provisions could allow the supply of heat energy to a future district heating scheme developed by others, external to the site boundary. At present there are no available projects within reasonable proximity to the site location for connecting this potential low grade heat energy.

Cooling

4.83 The data storage modules would be cooled with air handling units that are provided with chilled water via roof mounted free cooling magnetic bearing chillers.

4.84 Chilled water would be pumped around the building using variable volume pumps, chilled water flow is limited by two port control valves to match the demand.

4.85 The cooling systems utilises variable volume Electrically Commutated fans to match cooling capacity to load requirements from the data storage rooms.

4.86 Hot Aisle containment is used to separate supply and return air paths and maximize system efficiency by allowing elevated supply air temperatures.

4.87 Further information of heating, cooling and ventilation, including mechanical systems information is provided within the Energy Statement which accompanies this planning application.

4.88 Cooling to the office and ancillary areas would be provided by roof mounted air-cooled free cooling chillers. The free cooling chillers would utilize compressor free cooling when the ambient conditions are satisfactory, thus maximizing system efficiency.

Ventilation

4.89 Dedicated outside air-handling units (DOAS) would provide outside air into each data module and Meet-Me-Room (MMR), main point of entry (MPOE) and intermediate distribution frame (IDF) rooms.

4.90 The fresh air ventilation system for the office area would be served using energy efficient Heat Recovery Units (HRU) which would recover waste heat from the office spaces and re-use to pre-heat the air with the HRU. This would reduce the overall energy consumption for this system.

Utilities

Electricity

4.91A The main power supply to the Business Park is from the EirGrid. This power network is known to be constrained in terms of providing electrical grid power to the area. The permanent power solution for the proposed development would be provided by the EirGrid connection and the MFGP. To increase resilience of the power network and ensure a power supply for the proposed development, DUB-13 would also connect to a Multi-Fuel Generation Plant (MFGP).

4.92 The power requirements for the proposed development would be provided via a connection to a 110 kV EirGrid substation, which is subject to a SID application to ABP [An Bord Pleanála Ref - 312793]. The substation would then provide a 20 kV electrical power distribution at medium voltage throughout the site. The site distribution system supplies all electrical rooms where stepdown transformers are deployed to provide 400/230 V electricity to all loads.

4.93 To reduce electrical losses between HV/MV/LV conversions, the Applicant would install low loss transformers which comply with the Ecodesign directive 2009/125/EC[1] as a minimum.

4.94A ~~The MFGP permitted under the July 2022 DUB-1 permitted development would provide some supply to DUB-13 until the full electrical load is provided by the grid connection and then would be called upon for use on the local network drops in response to EirGrid Data Centre Connection Offer Process and Policy (DCCOPP) regulations.~~ The MFGP would have the capacity to provide equal energy to the amount consumed on-site and consumed through the July 2022 DUB-1 permitted development. The MFGP is scaled to ensure it has capacity to dispatch energy equivalent to or greater than DUB-13 and the July 2022 DUB-1 permitted development demand into the national grid.

4.95 Photovoltaic panels (PV) would be installed at the site to generate renewable electricity up to a peak of 73.15 kW, to be compliant with Part L of the Building Regulations.

Gas

4.96A The Business Park is served by the GNI network, which is a natural gas network. The MFGP, permitted under the July 2022 DUB-1 permitted development would be served by the high-pressure gas network for

[1] European Environment Agency, 2021. Policy Document: 2009/125/EC - Ecodesign Directive. Online. Available at: 2009/125/EC - Ecodesign Directive — European Environment Agency (europa.eu) [accessed 20/09/2022]

which a connection to the GNI network has been agreed. The natural gas supply would be supplied to the proposed development through a commercial provider.

Water

4.97 Detailed information regarding water can be found within the engineering report, which accompanies the planning application submission.

4.98 Hydrants would be installed in accordance with the requirements of the Building Regulations and in accordance with the recommendations contained in the Technical Guidance Documents, Section B – Fire Safety[2].

4.99 The projected peak flow rate for DUB-13 would be 0.083 litres/sec and the peak flow rate would be from fixture demand to BS 6700(2006). The sprinkler tank requirements are 2 x 240 m^3.

Potable Water

4.100 It is intended to serve the proposed development via a connection on Falcon Avenue.

4.101 Water demand for the development has been based of Irish Water Criteria, calculated based on 48 PE at 0.083 litres/sec.

Foul Water

4.102 It is proposed to discharge foul water from the proposed development via a gravity foul sewer outfall and discharge into an existing spur connection laid along Falcon Avenue, which then runs in a southerly direction. This is connected to the existing foul sewer network, laid along the western edge of Falcon Avenue.

Surface Water Management

4.103A The total attenuation volume required for the site is approximately 1,804 m^3 ~~1,084 m^3~~. The two attenuation ponds provide a combined storage volume of 1,640 m^3 ~~970 m3~~ and the permeable paving sub-base provides a storage volume of 114 m^3.

4.104 The SuDS measures to be adopted for the proposed development would comprise:

- The Baldonnel stream;
- ~~Two~~ Three attenuation ponds;
- Attenuation basin with wetland meadow (west of the northern attenuation pond) to provide compensatory storage to replace the displaced storage;
- Data hall roof attenuation;
- Permeable paving; and
- Gullies and channels.

4.105 The storm water drainage within the entire development has been designed to accommodate a 1:2 year storm frequency. The proposed ponds, compensatory storage and permeable paving areas have been designed to accommodate a 1:100-year storm event + 20% climate change.

4.106 Surface water drainage from the proposed development has been designed in accordance with Greater Dublin Strategic Drainage Strategy (GDSDS)[3] and ensures that best management practice has been incorporated into the design.

4.107 The results of the flood risk assessment (FRA) conclude that the proposed development of the site by the Applicant, for use as a Data Center development, is considered a suitable use of the site. Local infrastructure has the capacity to serve the proposed development. The proposed development would not be at risk of flooding from fluvial sources and will not give rise to fluvial flood risk elsewhere.

Telecommunications

4.108 A telecommunications network would be installed at the site which would serve DUB-13. The connection to the regional network would be implemented by the statutory network operator.

Resources, Emissions and Residues

Resource Use

Energy

4.109 An Energy Statement would be submitted accompanying the application, demonstrating how the proposed development would reduce the energy consumption and operation cost of the proposed development.

4.110 The proposed development would provide provision for an array of PV panels that would generate on site renewable energy up to a peak of 73.15 kW, to comply with Nearly Zero Energy Building (nZEB) requirements[4]. The on-site renewable electricity generation would be backfed to the electrical general supply for the building, serving lighting, office area general services and office IT equipment. The total amount of panels would cover 150 m^2 and would be located at the plant roof area.

Emissions

To Air

4.111 Please refer to EIAR Volume 1, Chapter 8: Air Quality for more detail.

4.112 The potential exists for dust deposition and increased particulate matter concentrations to occur during the demolition and construction stage, as well as increased air emissions resulting from the operational phases of the proposed development. The main air pollutants of concern are dust and particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}), typically generated during demolition and construction activities, and nitrogen dioxide (NO_2) typically generated by combustion engine emissions i.e., the back-up diesel generators and road traffic.

To Water

4.113 A new surface water drainage network is to be designed and installed to serve the proposed development as detailed below and would be presented within an Engineering Planning Report[5]. Therefore, surface water runoff within the proposed development would be managed such that internal or vulnerable areas of the site are at low risk of flooding from pluvial sources.

4.114 Due to a variety of measures such as the design of the car park with hydrocarbon interceptors, permeable paving drainage and attenuation, speed restrictions, and the fact that no refuelling would be carried out on site aside from on rare occasions to generators, the likelihood of any emissions into the water environment from vehicles on site would be unlikely.

4.115 Additionally, please refer to surface water management above for detail on SuDS infrastructure.

[2] Government of Ireland. 2020. Technical Guidance Documents. Online. Available at: gov.ie - Technical Guidance Documents (www.gov.ie) [accessed 20/09/2022]
[3] Government of Ireland, 2005. Greater Dublin Strategic Drainage Strategy. Online. Available at: Greater Dublin Strategic Drainage Strategy | Greater Dublin Drainage [accessed 20/09/2022]
[4] Irish Green Building Council, Nearly Zero Energy Building Standard. On/line. Available at: Nearly Zero Energy Building standard - Irish Green Building Council (igbc.ie) [accessed 20/09/2022]
[5] DUB13-RP-00-C001-V0-PL-PIN

To Sewers

4.116 It is proposed to discharge foul water from the proposed development via a gravity foul sewer outfall and discharge into a spur connection laid along Falcon Avenue, which is connected to the existing foul sewer network, laid along the western edge of Falcon Avenue. Foul drainage is ultimately treated at the Dublin City Wastewater Treatment plant at Ringsend.

Operational Management Controls

Operational Management

4.117 Once fully operational the proposed development would operate 24 hours a day.

4.118 When operational approximately 45 full time equivalent staff members would be onsite in DUB-13. Additional to this would be the ad-hoc attendance of maintenance contractors and visitors. It is anticipated that the data center would be in operation on a shift basis with reduced numbers presented during night shifts.

External Lighting

4.119 The proposed development would require suitable illumination to ensure a safe environment for site users.

4.120 External lighting would be required for security purposes. CCTV would be required for security purposes, requiring external security lighting.

4.121 Any external lighting would comply with the I.S. EN 12464 part1 and IS 3217:2013+A1:2017. The external lighting would make use of high efficiency, low energy LED luminaires. The proposed development would also seek to minimise upwards light and obtrusive light and avoid light spill onto trees, hedgerows, the Baldonnel Stream and bird and bat boxes wherever possible to 1 lux and is cognisant of Bat Conservation Ireland guidance notes for consideration in the design of bat sensitive lighting schemes.

4.122 Secondary external lighting in areas such as the generator compound would be operated via daylight detection to minimise hours of operation and thus keep energy usage to a minimum.

4.123 A Site Lighting Report6 has been prepared to accompany the application, in which more detail can be found.

Internal Lighting

4.124 Internal lighting with occupancy and daylight controls would be required for office and ancillary areas.

4.125 Internal lighting would be provided by high efficiency, low energy light-emitting diode (LED) luminaires combined with presence detection controls or local switching where appropriate. The lighting design meets the illumination level requirements as outlined in I.S. EN 12464 part1 and IS 3217:2013+A1:2017.

4.126 LED luminaires are also to be used for the emergency lighting installation, which is designed to comply with the requirements of EN 1838 and IS 3217:2013+A1:2017.

Security & CCTV

4.127 Access points to the site are gated, lit, and covered by security cameras. Security staff would be responsible for ensuring that security procedures are implemented on the site and would maintain a record of all visitors to the site.

4.128 A 3.0 m high security fence would be constructed around the perimeter of the proposed development. A series of landscaping berms and planting would also provide partial screening of the site from the R134 New Nangor Road to the north and Falcon Avenue to the east.

4.129 CCTV cameras would be installed at appropriate locations around the proposed development and their locations have been coordinated with the lighting and intruder detection systems to ensure that the site, site boundaries and access points are appropriate monitored.

Firewater System

4.130 The building would include fire protection, sprinklers, and smoke detection systems to provide early warning of any combustion events. A dedicated fire water ring main would be installed as part of the Proposed Development to provide supply to fire hydrants in the event of the fire.

Sustainability

4.131A The Application is accompanied by a standalone Energy Statement which sets out the strategy for the proposed development in response to current planning requirements and demonstrates that there is a clear commitment to sustainable development principles within the proposed development. A number of embedded mitigation measures address several principles of sustainable development, including the following:

- Use of HVO as the secondary fuel for the MFGP as described above;
- PV panels would be installed on the roof to generate onsite renewable electricity;
- Internal and external lighting would make use of high efficiency, low energy LED luminaries combined with presence / daylight detection controls to reduce operational energy demand;
- Energy efficient cooling, ventilation, and heating systems, as detailed in the sections above and Energy Statement;
- To reduce electrical losses between HV/MV/LV conversions, the applicant would install low loss transformers which comply with the Ecodesign directive 2009/125/EC1 as a minimum;
- Waste heat from the data modules would be used to heat the administration office areas, assisted by heat pump technology. The provisions as set out above could allow the supply of heat energy to a future district heating scheme developed by others, external to the site boundary;
- There would be 12 electric vehicle charging points, and all parking spaces would be ducted for future EV charging provision. There would also be an ample amount of cycle storage provided within the proposed development. This would encourage the use of low carbon transport during the proposed development's operation;
- A variety of SUDs are proposed, including the creation of two attenuation ponds which would have the added benefit of biodiversity improvements; and
- Existing landscape and natural habitats will be maintained and enhanced, creating further habitat for local flora and fauna as well as creating ecological networks.

Major Accidents and Disasters

4.132 Whilst there is no recognised guidance on the assessment of major accidents and disasters within the 2014 EIA Directive, the associated EPA EIA Report Guidelines 2022[7] requires that the vulnerability of the project to major accidents, and/or natural disasters (such as earthquakes, landslides, flooding, sea level rise etc) is considered.

4.133 It is considered that the proposed development would not give rise to significant environmental effects in relation to Major Accidents and Disasters as the site is not located within a geographical region that has historically been subject to natural disasters.

6 Site Lighting Report - DUB13-CL-XX-E009-V0-PL-BMD

[7] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

4.134 It is considered that the majority of major natural disasters, such as epidemics, earthquakes, volcanic eruptions and droughts are not of relevance to the site or proposed development; however, vulnerability to flood risk and storm events are considered to be relevant.

4.135 Flood risk would be considered within Chapter 10 of this EIAR, where best-practice mitigation measures are outlined.

4.136 The site does not lie within the consultation zones of the COMAH Establishment and there are no Control of Major Accident and Hazard (COMAH) establishments within 2.5 km of the site. Therefore, there is no need to consult with the Health and Safety Authority (HSA) regarding the proposed development.

4.137 It is considered that no further assessment in respect of natural disasters is necessary.

5A DEMOLITION AND CONSTRUCTION ENVIRONMENTAL MANAGEMENT

Introduction

5.1 This chapter sets out the demolition and construction works of the proposed development and the key activities that would be undertaken during the works. This chapter also describes the management controls that form part of the development proposals that would be implemented to avoid, minimise and where not possible, mitigate the magnitude of potential environmental impacts.

5.2 Impacts arising during the demolition and construction processes are temporary, generally short-term and intermittent. Nevertheless, they can be sources of potentially significant effects on environmental resources and residential amenity.

5.3 It is not possible to predict in detail the specific environmental impacts and effects that may arise from the proposed development's demolition and construction works as detailed construction method statements and specifications have not yet been prepared and construction contractors not yet appointed. However, it is possible to establish the potential broad environmental impacts associated with the proposed development's demolition and construction works and to determine a framework for the management of these impacts to ensure that significant adverse effects are avoided. The framework would form the basis for a Construction Environmental Management Plan (CEMP) to be implemented during the works. It is anticipated that the CEMP would be secured by means of an appropriately worded planning condition.

5.4 The CEMP would be prepared in accordance with standard industry practice and regulatory requirements and would include a traffic management plan, as well as a Construction and Demolition Waste Management Plan (CDWMP). More specifically, the CEMP would set out policies, legislative requirements, thresholds/limits, procedures, roles and responsibilities relevant to the implementation of environmental and management controls throughout the duration of the works. The CEMP would be discussed and agreed with SDCC in advance of works commencing on site.

5.5 An outline of the anticipated environmental issues and necessary management controls that would be included within the CEMP is provided within this Chapter.

5.6 It is standard practice to allow the appointed principal contractor (or equivalent) substantial input into documents such as the CEMP, traffic management plan and CDWMP; however, at this stage of planning, contractors have not yet been appointed and detailed method statements have not yet been prepared. Nevertheless, the likely content of such documents can be reasonably predicted. As such it is considered that the identification and assessment of likely environmental effects is still achievable in the EIA.

5.7 It is important to note that while this Chapter does not assess the magnitude of potential impacts, nor the significance of likely effects during the construction works, as this is dealt with in individual technical assessments within this EIAR Volume (Chapters 6 to 15) and EIAR Volume 2 (Chapter 1-2). Controls set out in this Chapter are considered within the 'Embedded Mitigation' and 'Mitigation' sections of each technical assessment to enable the assessment of residual construction effects within a particular technical assessment.

Programme of Works

5.8 A detailed development programme has not yet been prepared; however, to enable assessment of likely environmental effects within this EIAR, an indicative, but feasible, programme has been developed by the Applicant based on a number of assumptions. These assumptions have been informed by an understanding of current and future projected market conditions, technical considerations and professional experience, all of which are considered to be reliable.

5.9 Based on the assumption that planning consent is secured in Quarter 4 (Q4) 2023 / Quarter 1 (Q1) 2024, the demolition and construction works would commence in Quarter 1 in 2024, with indicative completion targeted for Quarter 4 2024 / Quarter 1 2025. Overall, the works are anticipated to be undertaken over an 11-month period. Following a period of IT fit out and commissioning within three months of construction completion, the indicative start of operation is Quarter 3 2025, with the proposed development becoming fully operational by Q4 2025.

5.10 For the purposes of the EIA, it is assumed that 2024 would be the peak year for the demolition and construction works as this would include the site wide enabling works, groundworks and associated landscaping and biodiversity improvements and would result in: noisiest works; majority of waste generation (such as from excavation and demolition) and import associated with cut and fill; and associated heavy good vehicles (HGV) trips.

Description of Works

Background

5.11 Once a contractor is appointed, early discussions would be held with SDCC and other relevant statutory consultees on site logistics, management, access and egress and hoarding arrangements.

5.12 Prior to work starting on site, the CEMP, traffic management plan and CDWMP would be produced and agreed with SDCC. This will include roles and responsibilities, details on the control measures and actions to be taken to minimise the potential environmental impacts of the proposed development. Monitoring and record-keeping requirements will also be addressed in the CEMP.

5.13 In addition to the above, a key aspect of the successful management of the proposed development would be the maintenance of good relations with the site neighbours and the general public. The Applicant would consider other developments that may proceed at the same time and ensure close liaison with the other parties to co-ordinate and minimise potential impacts from the demolition and construction works.

Phasing

5.14 The proposed development would be constructed in a single phase over an 11-month period.

5.15 Following the completion of construction in Q4 2024/Q1 2025 there would be a period of internal fit out and commissioning. This fit out and commissioning process would be phased with half of DUB-13 being fit out, commissioned and operational, then followed by the fit out, commissioning and operation of the remaining data centre modules. The proposed development would be fully operational by Q4 2025.

Site Enabling Works

5.16 Following the successful grant of planning permission, and receipt of other required statutory permissions, on-site works would commence with the following enabling works:

- Preparation of a Pre-Tender Health and Safety Plan and Construction Tender Document (or equivalent) concluding in the appointment of a principal contractor (or equivalent);
- Diversion, capping, and/or isolation of existing services running through or in close proximity to the proposed development; and
- Site wide earthworks, Baldonnel Stream enhancements and associated landscape and biodiversity enhancements.

Site Offices/Welfare Facilities and General Site Access

5.17 A 2.4 m high security fence/hoarding and access/egress gates would be installed and maintained throughout the duration of the works programme. This would segregate pedestrians and the general public from works and contain the work within the site boundary.

5.18 Construction compounds, including welfare facilities and offices for construction staff, would be located on land south of Falcon Avenue and the ESB substation. The location of which would be confirmed in the CEMP and traffic management plan.

5.19 Site access arrangements and locations would be confirmed in the CEMP and traffic management plan. However, for the purposes of the EIAR it is anticipated that construction traffic would access the site from New Nangor Road and Falcon Avenue.

Demolition Works

5.20 Demolition works would comprise the removal of the existing on-site residence and outbuildings in the north-west, an area of hardstanding in the south-west and any below ground structures and foundations.

5.21 Any asbestos identified from the Asbestos Register would be removed and disposed of by a fully licensed and qualified contractor before any other works are undertaken in accordance with the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2010[1] and under an appropriate license from the Health and Safety Authority. During the internal strip-out and removal of asbestos, protection would be put in place.

5.22 Building demolition is expected to be undertaken using excavators fitted with crushing attachments and where practically possible, machinery would be located as far as possible from or shielded from sensitive receptors. This would ensure the safety of the operatives carrying out the demolition work, help to keep noise and dust to a minimum and reduce the impact of operations on sensitive receptors.

5.23 Material loads removed from application site following the demolition works would be covered and appropriate wheel washing facilities would be located at the application site egress to prevent material spreading onto the road network. The road network would also be cleaned, when necessary, with the use of a street sweeper to remove any build-up of material on the road network.

Excavation Works

5.24 Following the completion of site enabling works, all structures will require foundations to structural engineer specifications. These would require moderate scale excavations.

5.25 Where possible, noting the low risk of contaminants identified on site following the site investigation works, appropriate material excavated during ground works would be re-used as part of earthworks and as temporary back-fill where necessary. It is proposed that some of the spoil generated will be reused under and as part of landscaped areas (including bunds) where suitable.

5.26 Any temporary storage of spoil would be managed, as set out under the CEMP to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment and other contaminants.

5.27 Waste arising from the site clearance, primary infrastructure and earthworks is expected to comprise made ground/topsoil, rubble, bricks, concrete, gravel and clay/silt material, and would be either re-used onsite or removed offsite for appropriate reuse, recovery and/or disposal as required, as described in EIAR Volume 1, Chapter 14: Waste.

5.28 Any clean (i.e. uncontaminated) excavated material that cannot be reused on site would be removed by licensed waste carriers and sent for reuse at another development site or sent for disposal at appropriately licensed facilities (expected to be inert waste landfill sites).

Temporary Works

5.29 Some temporary works would be necessary during the development works, to protect the public and ensure the structural integrity of the works as they progress. These would range from propping of hoardings to scaffold protection fans, temporary propping of walls and other temporary structures such as loading platforms. In all cases these works would comply with legislation and would be designed and managed by the principal contractor.

Substructure Works

Foundations and Structure

5.30 Following the completion of enabling works, all structures will require foundations to structural engineer specifications. The structures are likely to mprise either precast concrete elements or a standard structural steel frame.

5.31 Foundations would be formed of pads and strips that would be founded on the bedrock underlying the site at an anticipated depth of three to four m below ground level. Foundations would be advanced taking account of the ground conditions and environmental considerations.

5.32N1 For the bridge structure, which crosses over the attenuation pond and the Baldonnel Stream, piled foundations will be required which would be founded on the bedrock. Foundations would be advanced taking account of the ground conditions and environmental considerations.

5.33 Based upon investigations of the site (Chapter 12: Ground Conditions of this EIAR Volume), there is a low to moderate potential for significant soil and groundwater contamination on site. Opportunities for the storage and re-use of excavated material would be considered.

Building Cores

5.34 The core of the proposed facilities (i.e. DUB 13) would incorporate the lifts, stairs and service risers and would be designed to provide the main lateral stability system for the building.

5.35 The concrete walls would be constructed from reinforced concrete.

Superstructure Works

5.36 It is anticipated that the proposed development buildings would be constructed of a steel frame with reinforced concrete floor slabs.

5.37 The proposed data center may require long clear spans in the data hall and therefore deep structural floor systems in steel and/or concrete may be required. Steel-framed systems would be stabilised

[1] Government of Ireland, 2010. Safety, Health and Welfare at Work (Exposure to Asbestos) (as amended) Regulations 2010.

through vertical bracing located in walls and around cores. Concrete-framed systems would be stabilised through concrete shear walls and/or core walls located around lifts, stairs and service risers.

Fit-out

5.38 Internal fit out and services would include data halls, generator sets and associated offices.

5.39 Typically, the contractors would build from the inside out.

Landscaping Works

5.40 Installation of the proposed landscaping and SuDS would commence at the beginning of construction of the proposed development and would include enhancements to the existing alignment of the Baldonnel Stream through strengthening the existing hedgerows along the stream and proposed native riparian planting. Landscaping would be constructed as early as possible to allow the establishment of new species. Topsoil would either be reused or imported to fill and shape landscaped areas.

5.41A Construction of access roads, internal roads and surface parking would be undertaken following the site enabling works, demolition and site preparation. Works would also include excavation to create development platforms and the sustainable drainage system (SuDS) drainage features; layering of road fill material; and levelling, compaction and finishing off with specified material (e.g.) bitumen tarmac. HGVs, maintenance vehicles and delivery vehicles would access the site via the roundabout on Falcon Avenue, through the July 2022 DUB-1 permitted development, and cross over an attenuation pond and the Baldonnel Stream via a bridge structure. The Baldonnel Stream would remain in its current configuration. ~~however a box culvert would be installed, which the Baldonnel stream would pass though. A road would be built over the culvert to allow access from the July 2022 DUB-1 permitted development entrance of Falcon Avenue to the proposed development site.~~

Utilities and Service Installation

Utility Supply

5.42 The main power supply to the Business Park is from the EirGrid. This power network is known to be constrained in terms of providing electrical grid power to the area.

5.43 The power requirements for the proposed development would be provided via a connection to a 110kV EirGrid substation, which was subject to a separate strategic infrastructure development (SID) application to An Bord Pleanála (ABP) (due to be decided 18/10/2022). The substation would then provide a 20kV electrical power distribution at medium voltage throughout the site. The site distribution system supplies all electrical rooms where stepdown transformers are deployed to provide 400/230 V electricity to all loads.

5.44 The MFGP, consented as part of the July 2022 DUB-1 Consented Development, will connect to the network via a step-up transformer and then distribute to the EirGrid substation and would be called upon for use on local network drops in response to EirGrid DCCOPP regulations.

5.45 The distribution system described above is chosen as it represents the safest, most efficient, and most economical method for site wide electricity distribution and in agreement with EirGrid.

Transformers

5.46 To reduce electrical losses between HV/MV/LV conversions, the Applicant would install low loss transformers which comply with the Eco-design Directive 2009/125/EC[2] as a minimum.

[2] European Union, 2009. Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (Text with EEA relevance). Document 32009L0125.

Emergency Back-Up Generators

5.47 In the event of a loss of power supply, diesel powered back-up generators would be provided to maintain power supply to the data center. The back-up generators would be subject to periodic testing to ensure they remain serviceable and are only anticipated to be required in an exceptional event e.g. grid blackout.

Water

5.48 The proposed development via connection off the 150 mm diameter network, as located in Falcon Avenue. Water meters, sluice valves and hydrants, in line with Irish water requirements and specifications, will be installed at the connections onto the aforementioned existing water mains, as required. It is understood that there is adequate capacity within the existing water main network to supply the proposed development.

Foul Water Drainage

5.49 Foul water will discharge via a 225 mm diameter gravity foul sewer outfall into the existing 225mm diameter spur connection laid across Falcon Avenue, which is connected to the existing foul sewer network laid along the western edge of Falcon Avenue. It is understood that the foul water drainage network has sufficient available capacity for the wastewater discharges during operation.

Telecommunications

5.50 Multiple connection service lines currently exist along Falcon Avenue and Concorde Drive, including

- Virgin Media fibre cable;
- BT fibre cable;
- Colt fibre cable; and
- EU Network fibre cable.

5.51 A telecommunications network would be installed at the site which would serve the data center building on the site. The connection to the regional network in Falcon Avenue would be implemented by the statutory network operator.

Vehicles and Plant

Vehicle Trips

5.52 Deliveries and removals would be scheduled to take place out of peak hours when congestion on the local road network is lower. Likely numbers of trips associated with on-site works are provided in Table 5.2 and is based on professional judgement that the demolition and construction traffic for the proposed development of 12,893 m^2 would be proportional (approximately 33%) to the construction traffic used for the site in the previous approved application (Planning Ref SD20A/0121) of 80,269 m^2. Refer to Chapter 7: Transport of this EIAR Volume and Technical Appendix 7.3 of EIAR Volume 3 for further details.

5.53 As previously stated, the most intensive ('peak') period for demolition and construction vehicle activity would occur in 2024.

5.54 Accordingly, it has been assumed that up to approximately three HGV trips would be made to the site each hour during the demolition and construction phase (one HGV arrival and one HGV departure every 20 minutes). It has also been assumed that up to 156 vehicular trips per day in either direction to and from the site would be made by construction personnel commuting to and from work.

5.55 Accordingly, it is considered that the maximum number of HGV trips that would be associated with the demolition and construction stage would be a maximum of 44 HGV movements and 56 car or light goods vehicles (LGV) movements per day (not week).

Typical Construction Plant and Machinery

5.56 The types of plant and machinery that are likely to be used on site per development works activity are provided in Table 5-2.

Table 5-2: Indicative Plant and Machinery

Plant	Site Enabling Works	Demolition	Substructure	Superstructure	Internal works /Fit-out	External Works
Excavator (wheeled and tracked)	✓	✓	✓			✓
Dumper	✓	✓	✓			✓
Hydraulic cutters. Breaker	✓	✓	✓	✓		✓
Loading lorries	✓					
Scaffold construction	✓					
Generator	✓	✓	✓	✓	✓	✓
Electric drills	✓			✓	✓	
Metal cutter	✓			✓		
Electric bolter	✓			✓		
Road sweeper	✓	✓	✓	✓		✓
Lorries	✓	✓	✓	✓	✓	
Dozer		✓				
Pneumatic breaker		✓				
Compressor		✓				✓
Wheeled loader		✓				
Hand-held breaker		✓	✓			
Forklift		✓	✓	✓		✓
Water pump		✓	✓			✓
Air compressor		✓	✓	✓		
Lorry-mounted concrete pump			✓	✓	✓	✓
Hydraulic vibratory compactor			✓			
Scabbler			✓			
Crane			✓	✓		
Hydraulic access platforms				✓		
Welding plant				✓		
Motor batching plant					✓	
Hydraulic bender						✓
Breakers and crunchers						✓

Construction and Contracting Strategy

5.57 The principal contractor (or equivalent) would be responsible for a number of sub-contractors (e.g. foundations, concrete, cladding) and ultimately for the environmental management during the construction process.

Demolition and Construction Employment

5.58 The demolition and construction stage of the proposed development would generate employment; a proportion of the employment is expected to be generated on site, with the rest being elsewhere in the construction supply chain, possibly including modular unit production facilities. From a review of other data center developments in the area it is expected that the proposed development would generate in the region of 67 direct workforce jobs, with approximately 34 additional jobs during the peak construction phasing period. The demolition and construction works would have local benefits through construction training and targeting the local labour force.

Hours of Work

5.59 Working hours would be agreed with the SDCC but are expected to be:

- 07:00 to 19:00 hours Monday to Friday;
- 08:00 to 13:00 hours Saturday; and
- No working on Sundays or Bank Holidays.

5.60 In order to maintain the above working hours, the principal contractor may require, at certain times, a period of up to one hour before and after normal working hours, to undertake start and close down activities (this would not include works that are likely to exceed agreed maximum construction works noise levels).

5.61 Although working outside the stated hours would not normally be undertaken, it is possible that some deliveries may take place at night, and that certain works may have to be done during this period for safety or other considerations. If required, such works would be subject to reasonable notice and either securing the required licenses or obtaining prior agreement with SDCC, who may impose certain restrictions.

5.62 All work which is intended outside of these hours, excluding emergencies, would be subject to prior agreement, and/or reasonable notice to SDCC.

Health and Safety

5.63 All works on site would be undertaken in accordance with relevant health and safety regulations and a dedicated health and safety coordinator would be appointed by the Applicant to work with the Project Team and principal contractor to ensure compliance with these regulations.

5.64 All method statements would incorporate regulatory safety matters and a Health and Safety File would be maintained on site for inspection by the Health and Safety Authority, SDCC and others as appropriate.

Access and Parking Management

5.65 At this stage it is anticipated that all demolition and construction stage traffic would enter and exit the site via the existing access points on New Nangor Road or the proposed new access from Falcon Avenue. However, site logistics are indicative at this stage as the principal contractor may consider alternative options that would further minimise adverse impacts from vehicles during the demolition and construction process. Any alternative arrangements proposed by the principal contractor would be subject to the prior approval of the SDCC. All contractors would be supplied with a vehicle route card and details of all access routes would be provided.

5.66 If in the unlikely event that any temporary stopping-up notices are required on the surrounding roads, specific applications would be made to the SDCC relating to road closures and would be implemented by the principal contractor in accordance with all statutory notice periods.

Materials Management

Material Selection

5.67 Construction materials would be selected following the BRE 'Green Guide to Specification'. These include the following:

- Minimising embodied energy content (the energy used in manufacture);
- Using recyclable materials where they have high embodied energy; and
- Maximising the recycled content of the material, ease of maintenance, appropriate sourcing of materials and totally excluding deleterious and hazardous materials.

Materials Storage and Handling

5.68 All construction materials would be appropriately stored on site to minimise damage by vehicles, vandals, weather or theft.

5.69 Due to the limited amount of space on site, where practical, contractors would be expected to operate a 'just-in-time' policy for the delivery and supply of construction materials, and packaging would be returned. This means that materials would be brought to the site just before their incorporation into the work, thereby minimising the need for on-site storage.

5.70 Where possible, prefabricated elements would be lifted directly into position from delivery vehicles. This would assist in reducing on site storage and labour requirements and construction noise levels, thereby reducing potential nuisances to surrounding receptors.

Materials Waste Volumes and Management

5.71 Table 5-3 presents the estimated excavation, demolition and construction waste and end destination. Note that values presented in Table 5-3 have been rounded to the nearest tonne.

Table 5-3: Estimated Construction and Excavation Waste and End Destination

Waste Type	Estimated Quantities	Reuse		Recycle/ Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D Waste	258	0	0	90	233	10	26
Timber	219	0	0	90	197	10	22
Plasterboard	78	0	0	90	71	10	8
Metals	63	0	0	100	63	0	0
Concrete	47	100	100	0	0	0	0
Other (including cabling, ducting, conduits, packaging, and plastic	117	0	0	80	94	20	23
Topsoil	8,215	100	8,215	0	0	0	0
Excavated materials	5,943	100	5,943	0	0	0	0
Total	**14,941**	**-**	**14,205**	**-**	**657**	**-**	**79**

5.72 Site preparation, excavations and levelling works required to facilitate construction of foundations, access roads and the installation of services would generate approximately 5,943 m^3 of clean excavated materials. It is proposed that all excavated material would be reused on site.

5.73 The importation of approximately 12,500 m^3 of fill materials would be required for construction of foundations and other ground preparation works.

Sensitive Receptors

5.74 A review of adjacent properties and open spaces has identified the following sensitive receptors in close proximity to the site:

- Existing residential occupants in proximity to the site;
- Existing industrial and commercial properties in proximity of the site;
- Baldonnel Stream; and
- Local air quality.

Potential Environmental Impacts

5.75 A review of the potential environmental impacts associated with the demolition and construction works has been undertaken to proactively inform the development proposals and agree appropriate mitigation measures. Potential impacts can arise from day to day works or from individual instances of accidents, poor operation or management. They are, however, largely dependent on the implementation of effective controls (e.g., the employment of dust suppression methods, use of a well-trained workforce and properly maintained plant).

5.76 A summary of the potentially significant environmental impacts that could arise during the demolition and construction stage and mitigation measures integral to the development proposals are provided in Table 5-4. Further detail and assessment of these likely impacts are provided in Chapters 6 to 15 in this EIAR Volume and EIAR Volume 2.

5.77 Demolition and construction plant specifications have been defined allowing noise and other implications to be assessed. Potential impacts in many areas are largely dependent on attention to management control (e.g., watering to control dust, use of noise attenuated plant), which would be under the control of the contractor(s) required, by tender requirements, to adhere to management controls and measures detailed in the CEMP.

Table 5-4: Summary of Potential Environmental Impacts during Demolition and Construction

Receptor	Potential Impacts	CEMP Mitigation
Transport and Pedestrian Infrastructure	• Temporary traffic disruption caused by site traffic and an increase in HGV movements	• Implementation of a traffic management plan. • Use of Profile Park access points and routes to the site, with deliveries outside peak hours where possible (and abnormal loads at quiet times).
	• Transfer of mud and materials from vehicles onto public highways causing the potential for pollution hazards	• On-site wheel washing facilities.

Table 5-4: Summary of Potential Environmental Impacts during Demolition and Construction

Receptor	Potential Impacts	CEMP Mitigation
	• Temporary disruption to pedestrian access and routes within the locality of the site.	• Implementation of a traffic management plan. • Maintenance of footpaths around the site, where possible, ensuring access is maintained for all.
Noise and Vibration	• Temporary increased noise levels at surrounding residential, industrial and commercial properties, from HGV vehicle movements and demolition and construction activities (e.g. breaking out, crushing, foundation installation, cutting, etc).	• Installation of 2.4m site hoarding. • Agreement of working hours with SDCC, careful selection of quiet plant. • Appropriate siting and regular maintenance of plant. • Use of silenced and well-maintained plant conforming with the relevant EU directives relating to noise and vibration.
	• Vibration impacts on local buildings, due to (e.g.) increased vibration from demolition works, foundations and use of HGVs within the site.	• The construction techniques proposed are considered unlikely to result in significant vibration impacts but the need for vibration monitoring and/or setting of vibration action levels would be discussed and agreed with SDCC.
Air Quality	• Windblown dust generated from (e.g.) demolition works, earthworks, stockpiles, construction vehicle movements on unpaved surfaces and crushing.	• Dust suppression techniques, such as damping down, use of temporary screens and covering of stockpiles. • Preparation and implementation of a CDWMP. • Appropriate sourcing of materials.
Soil and Groundwater	• Pollution incident through spill of fuels or chemicals, or discharge of sediment laden water and runoff.	• Appropriate storage of fuels and potentially hazardous construction materials within a secure site compound. • Provision of on-site pollution control kits. • Use of settlement system prior to discharge.
	• Siltation and contamination of surface water runoff and ground water.	• Use of settlement tanks, bunding and street sweeping to prevent contamination of the stormwater system.
	• Potential for soil contamination.	• Site investigations that have been undertaken have identified a low potential for soil and groundwater contamination at the application site. In the event that contamination is found, soil would be managed and an appropriate Remedial Strategy developed in conjunction with SDCC and the EPA.
Ecology	• Accidental spills and discharges from the storage of fuels and construction materials which may create pollution hazards. • Accidental release of surface water runoff containing elevated levels of suspended sediments or other contaminants	• Appropriate storage of fuels and potentially hazardous construction materials within a secure site compound. • Provision of on-site pollution control kits. • Use of settlement system prior to discharge.

Table 5-4: Summary of Potential Environmental Impacts during Demolition and Construction

Receptor	Potential Impacts	CEMP Mitigation
	• Permanent damage and loss of habitats. • Injury or death of protected birds and animals.	• Works to remove trees to be undertaken outside of the bird breeding season of March to August in the event that nesting birds are encountered.
Natural Resource Use	• Waste generation and disposal of materials to landfill.	• Preparation and implementation of an CDWMP. • Waste minimisation at source, with segregation and recycling of waste generated.
	• Use of natural resources	• Preparation and implementation of an CDWMP. • Appropriate sourcing of materials.
Site Workers	• Release of asbestos during demolition	• Completion of asbestos surveys and removal of all identified asbestos materials by a specialist contractor as part of the demolition works.
	• Exposure of construction staff to contamination, if confirmed during planned site investigations works.	• Use of Personal Protective Equipment (PPE).
Local Amenity	• Temporary visual intrusion for nearby residents, occupiers of other land uses, pedestrians and passers-by. • Temporary visual intrusion of construction works on views into and out of the application site. • Temporary increases in road noise and vibration generated from construction vehicles. • Temporary increases in noise and vibration levels generated from the use of site plant and machinery. • Temporary generation of wind-blown dust nuisance from ground surfaces, stockpiles, vehicles, work faces and cutting and grinding of materials. • Temporary generation of exhaust emissions from lorries and plant delivering and removing materials including dust and particulates which may impact upon local air quality.	• Installation of 2.4 m site hoarding. • Standard, good site housekeeping. • Appropriate construction site layout. • On-site wheel washing facilities. • Dust management. • Demolition and construction traffic management. • Agreement of working hours with SDCC careful selection of quiet plant, appropriate siting and regular maintenance, use of temporary acoustic barriers around specific activities etc. • Setting of noise and vibration limits with associated monitoring during the works.

Mitigation and Scope of Environmental Management Controls

5.78 The following mitigation controls would be committed to and delivered pursuant to either planning conditions, obligations contained in a legal agreement and supported as necessary by contractual

obligations between the Applicant and the main contractor(s) or regulatory provisions in force from time-to-time.

Proposed Site Management Controls

Construction Environmental Management Plan (CEMP)

5.79 A CEMP would be prepared, to include a traffic management plan and CDWMP, and submitted for review and approval by SDCC prior to commencement of works on site. It would include:

- A commitment to environmental protection (all consultants and trade contractors would be invited to declare their support for this at tender stage);
- Documentation of measures to comply with environmental aspects of any planning conditions;
- Detailed control measures and activities to be undertaken to minimise likely environmental impacts, as well as associated roles and responsibilities;
- Target criteria for environmental issues, where practical, such as water and energy consumption;
- Any requirements for monitoring and record keeping;
- A dedicated point of contact during normal working hours and in emergencies with responsibility to deal with environmental issues if they arise; and
- A review and monitoring regime of on-site performance against the CEMP provisions by the project team and regular environmental audits of its implementation.

5.80 The CEMP would provide the necessary level of management and control of demolition and construction practices. This includes advance notice of operations and duration of work that may cause noise, disruption to access, or other effects.

5.81 The CEMP would form part of tender documentation and contractors would be required to demonstrate how they will work within these provisions, identify communication channels for exchange of information and set out programmes for monitoring and auditing of environmental control systems.

5.82 Where departures from the CEMP are inevitable, prior identification is required, such that other mitigation measures can be considered.

Considerate Constructors

5.83 All contractors would seek to register the site under the relevant Considerate Constructors Scheme.

Principal Contractor (or equivalent) and Management of Subcontractors

5.84 All contractors would have responsibility for monitoring any subcontractors' environmental performance; acting as a point of contact for consultation and feedback and for developing mechanisms to solve on-site issues as and when required.

Environmental and Communication/Liaison Strategy

5.85 The Applicant would be expected to nominate a manager who would act as the Project Environmental Manager (PEM) (or equivalent), who would be named at all site entrances, with a contact telephone number. The contact name and details would be provided to all the relevant stakeholders by the Applicant prior to the start of the demolition and construction works.

5.86 The PEM would have primary responsibility for dealing with SDCC and other stakeholders on environmental matters, and all key stakeholders would be notified whenever a change of responsibility occurs for the PEM role. The PEM would keep neighbours, SDCC and other relevant parties informed of the nature of the on-going works, their duration and programme to establish and maintain good relationships with them.

5.87 It is anticipated that regular meetings would take place between the PEM and SDCC to review progress and to agree any necessary actions. The PEM would also deal with enquiries from the general public, including any complaints. Any complaints would be logged and reported to the relevant individual within SDCC (and vice versa) as soon as practicable.

5.88 The PEM would coordinate responses to queries and address issues in a timely and satisfactory manner.

Emergencies and Environmental Incidences

5.89 Protocols to be implemented on site in instances of emergencies and environmental incidents would be set out within the CEMP for approval by SDCC.

Housekeeping and General Site Management

5.90 Hoardings/security fencing would be erected around the site to provide a clear and secure demarcation between operational activities and other areas and to provide information regarding the proposed development and its progress. Particular attention would be paid to locations supporting high volumes of pedestrian movement, demolition and construction routes, access gates and security arrangements.

5.91 A 'clean site' policy would be maintained and contractors and their subcontractors would be expected to maintain a tidy site. A street sweeper would be employed as required during the demolition, foundation, and excavation periods of the construction programme to make sure that the streets around the site would be kept clean during the works.

Nearby Residential Properties and Other Neighbours

5.92 The following mitigation and environmental controls would collectively limit potential visual, noise, vibration, traffic and dust impacts associated with the proposed development's construction works:

- Maintaining aesthetically appropriate site hoardings/fencing;
- Agreeing working hours with the SDCC;
- Undertaking regular road sweeping;
- Arranging and locating potentially high impact site activities and plant away from neighbouring residential receptors;
- Selecting quiet plant and regularly maintaining plant;
- Implementing good site housekeeping measures;
- Directing site lighting away from sensitive receptors;
- Turning site lighting off outside of normal working hours;
- Screening scaffolding and active construction activities above hoarding levels, where practical;
- Implementing construction traffic management measures as agreed with SDCC;
- Implementing and monitoring dust management measures;
- Implementing and monitoring noise and vibration measures; and
- Using temporary acoustic barriers around potentially noisy activities.

Population and Human Health

5.93 If feasible, and available, it is encouraged that the applicant considers using local suppliers for goods and services; demolition and construction stage jobs created should be advertised and made available in the local area initially in order to maximise this opportunity. This would result in a more positive effect on local employment and the local economy.

Archaeology

5.94 There is no potential for impacts on the archaeological resource beneath the ground surface of the site. A detailed scheme of test trenching would be undertaken pre-commencement. Test trenching on the

adjacent July 2002 DUB-1 Consented Development failed to reveal any archaeological deposits, finds or features and no further archaeological investigations are necessary prior to the commencement of construction.

Contaminated Soil

5.95 The following management and control measures would be included in the CEMP in order to control ground contamination:

- Incorporate the reduction, reuse and recycle approach in terms of on-site soil excavations. The proposed works will be carefully planned to ensure only material required to be excavated will be, with as much material left in situ as possible. Reuse of on-site excavated soil and capping with hardstand will minimise any increase in aquifer vulnerability.
- Excavation works will be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil should be tested and classified as hazardous or non-hazardous in accordance with the EPA's Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous'[3] publication, HazWasteOnline tool[4] or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with EC Decision 2003/33/EC[5]. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.
- The effects of soil stripping and stockpiling will be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body.
- Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment is free of nuisance dust and dirt on roads.
- EPA agreement will be obtained before re-using the spoil as a by-product. However, it is not currently anticipated that any excavated material will be removed offsite or imported onto the site for reuse as a by-product. Where material cannot be reused off site it will be sent for recovery or disposal at an appropriately authorised facility.
- All fill and aggregate for the proposed development will be sourced from reputable suppliers. All suppliers would be vetted for:
  - Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development;
  - Environmental Management status; and
  - Regulatory and Legal Compliance status of the Company.
- In order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:
  - Designation of a bunded refuelling areas on the site;
  - Provision of spill kit facilities across the site;
  - Where mobile fuel bowsers are used the following measures would be taken:
    - Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
    - The pump or valve would be fitted with a lock and would be secured when not in use;
    - All bowsers to carry a spill kit;
  - Operatives must have spill response training; and
  - Drip trays used on any required mobile fuel units.
- In the case of drummed fuel or other potentially polluting substances which may be used during the demolition and construction stage the following procedures will be adopted:
  - Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
  - Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
  - All drums to be quality approved and manufactured to a recognised standard;
  - If drums are to be moved around the site, they would be secured and on spill pallets; and
  - Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.
- Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations will be carried out with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management, as set out in the CEMP, will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation.
- Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any off-site impacts. All run-off will be prevented from directly entering into any water courses or drainage ditches.
- Should any discharge of demolition or construction related water be required, discharge would be to foul sewer. Pre-treatment and silt reduction measures on-site would include a combination of silt fencing, settlement measures (e.g. silt traps, 20m buffer zone between machinery and watercourses, off-site refuelling of machinery) and use of hydrocarbon interceptors. Active treatment systems such as Silbusters, or similar, may be required depending on turbidity levels and discharge limits.

5.96 Construction vehicles would be properly maintained to reduce the risk of hydrocarbon contamination and would only be active when required. Construction materials would be stored, handled and managed with due regard to underlying soil and thus the risk of accidental spillage or release would be minimised.

Water Resources

5.97 To ensure that no contaminant-pathway-receptors pathways are created and to reduce the potential for contamination to occur during the demolition and construction stage, all site activities would be undertaken in accordance with the relevant pollution control requirements and guidance. The Applicant would also be responsible for obtaining all necessary consents and ensuring compliance with the conditions of the consents.

5.98 The following procedures will be included in the CEMP in order to prevent any spillages of fuels to the Baldonnel Stream, or groundwater, and to prevent any resulting water quality impacts:

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures would be taken:
- Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;

[3] EPA, 2018. Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous. July 2018 EPA.
[4] HazWasteOnline, 2012. Waste Assessment Tool [online]. Available at: https://www.hazwasteonline.com/ [Accessed 28/09/2022].

[5] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

- Pumps or valves would be fitted with a lock and would be secured when not in use;
- All bowsers to carry a spill kit;
- Operatives must have spill response training; and
- Drip trays used on any required mobile fuel units.
- In the case of drummed fuel or other potentially polluting substances which may be used during the demolition and construction stage the following procedures will be adopted:
- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they would be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

5.99 Potential pathways for contamination could be minimised as follows:

- Groundwater would be prevented from entering excavations by dewatering, if required;
- Surface water would be prevented from entering excavations by using cut-off ditches, covering the excavation, or captured within the groundwater pumping system;
- Potentially contaminating activities such as concrete preparation, vehicle washing and fuelling etc. are constrained to dedicated protected areas where contaminated water can be collected; and
- Contaminated water from excavations would be collected within a settlement tank or lagoon to enable treatment prior to release.

5.100 Subsoil would be excavated to facilitate the proposed development. Such works would be carefully planned to ensure as much material is left in situ as possible. Reuse of on-site excavated soil and capping with hardstand will minimise any increase in aquifer vulnerability. Construction works will require local removal of soil cover where levelling of the site is required and its use for re-instatement elsewhere on the site. It is envisaged that any soil excavated will be retained on site and reused as fill material or landscaping. Excavation works will be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil.

5.101 Stockpiles have the potential to cause negative impacts on and water quality through increased potential for sediment release to watercourses. The effects of soil stripping and stockpiling would be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body.

5.102 In addition, the construction drainage system for the proposed development would be designed and managed to comply with Irish requirements, which details methods that should be considered for the general control of drainage on construction sites.

5.103 Wherever possible, the Applicant would minimise the amounts of wastewater discharged from the site. Surface drainage and wastewater would pass through settlement tanks and oil interception facilities before discharge to sewer. The Applicant would ensure that all potentially contaminated water, e.g. dewatering effluent, is disposed of in accordance with relevant pollution control requirement and guidance.

5.104 An Emergency Incident Plan would be in place for the site to deal with potential spillages and/or pollution incidents. This would include the provision of on-site equipment for containing spillages, such as emergency booms and chemicals to soak up spillages.

5.105 Any pollution incidents would be reported immediately to SDCC and the regulatory bodies such as the EPA.

5.106 In order to reduce the flood risk to the proposed development, it is proposed that finished floor levels (FFLs) be raised above the peak modelled flood levels for the Baldonnel Stream. In the absence of mitigation, this could create the potential for the proposed development to displace floodplain storage and thereby increase flood risk elsewhere. To prevent this, it is necessary to provide compensatory storage within the site and the FRA sets out that the proposed development includes embedded mitigation in the form of compensatory storage (provided by reducing the ground level in the landscape area in the northwest of the site) to replace the displaced storage. The volume of compensatory storage exceeds the volume of existing floodplain storage that is being lost and so the proposed development will lead to a slight reduction in flood risk elsewhere.

Ecology

5.107 Pollution prevention measures as outlined in the preceding sections.

5.108 In relation to badgers and otter all excavations are to be securely covered or closed off at the end of each working day to prevent the accidental trapping of badgers. Where this is not possible, a means of escape (for example a ramp) must be included to allow safe exit from the excavation. Checks of any open excavations should be performed by site staff prior to each day's works. The proposed security fencing will have mammal gates or a gap of at least 10cm at the bottom to allow free movement of badgers through the site.

5.109 Breeding birds are highly susceptible to disturbance, and therefore where works are to commence during the breeding season (March to August inclusive), bird surveys should be undertaken prior to the initiation of construction works. If breeding birds are identified within the site at this time, species-specific buffers will be implemented to protect nesting birds during construction.

5.110 Dust generated from construction works would be managed by means of 2.4 m high site hoarding and dust suppression measures, such as the use of water sprays, dampening down of roads and covering of storage areas, such that the potential for adverse dust generation is reduced.

5.111 Construction drainage, air quality and noise management controls would be actively implemented at the site to minimise potential construction impacts.

5.112 All lighting would appropriately be aimed, controlled and switched off when the site is not operational (where practicable).

Landscape and Visual

5.113 Measures would be undertaken to protect existing vegetation (such as trees and hedgerows) throughout the demolition and construction stage, such as exclusion zones around trees to avoid root damage as outlined in the Tree Space Arboricultural Impact Assessment and Tree Protection Plan for the site which accompany the application.

5.114 The demolition and construction site would be surrounded by 2.4 m high hoarding to reduce negative visual impacts from the activities.

Transport

5.115 A Construction Management Plan (CMP) would be prepared by the contractor, when appointed, that would require construction traffic including both construction plant and materials deliveries to be programmed to avoid peak traffic periods on the surrounding local and strategic road network. The Traffic Management Plan would be reviewed and updated in line with the construction programme and would typically include details of the following:

- preferred hours of deliveries and removals (out of peak hours);

- agreed demolition and construction traffic routing and site access points;
- road cleaning facility provisioning;
- temporary traffic control measures;
- temporary and permanent access to the works – for personnel/vehicles;
- off-loading and storage areas;
- traffic management procedures for waste disposal vehicles;
- personnel and vehicle segregation;
- equipment, e.g. temporary fencing, signage, etc.;
- temporary and permanent closures and diversions of footpaths; and
- site inductions.

5.116 Wheel cleaning facilities with adjoining hard standings would be located at the access and egress points of the site. These wheel cleaning facilities would be supplemented by regular road cleaning during the excavation and would have appropriate catchment areas.

Vehicle Routing

5.117 Vehicles making deliveries to the application site or removing spoil material would travel via designated routes which would be agreed with SDCC as required. The principal contractor would liaise with SDCC to provide directional signage on the principal routes on the highway network surrounding the application site, if required, in order to improve navigation.

5.118 Where possible vehicle movements would be scheduled out of peak hours (i.e. 08:00-09:00 and 17:00-18:00 during the weekdays.).

5.119 Vehicles coming to the site would have specific timeslots booked. It would be the responsibility of the driver and company to ensure they arrive on site at the designated time.

5.120 The construction sequence for the site would be programmed to minimise the need for road closures. However, there may be instances when they are unavoidable. Where this is the case, road closures would be requested weeks in advance and authorised by SDCC.

5.121 The principal contractor would co-ordinate all deliveries and collections to/from the site, and ensure that as far as possible that:

- all delivery and collection vehicles are aware of the proposed routing;
- prior to a delivery or collection, haulers would notify the relevant authorities;
- liaison would be undertaken with occupants of adjacent buildings to avoid delays to service deliveries due to construction vehicles; and
- deliveries would be made on a 'just in time' basis.

5.122 Larger vehicle movements would be scheduled to avoid peak hours on the local road network if at all possible. If an alternative construction traffic route is required, this would first be agreed with SDCC.

5.123 Suppliers would be encouraged to consolidate deliveries where feasible. Where possible all deliveries would be made to designated areas within the application site. If for any reason it is necessary to load and unload outside site boundaries, the details and procedure for this would be agreed in advance with SDCC.

5.124 There would be no waiting areas for site vehicles in the roads around the site.

HGV Management

5.125 The most intensely used HGVs on the site would be ready mix concrete trucks for the delivery of concrete and articulated lorries for the delivery of fabricated steelwork.

5.126 It is assumed that HGV construction traffic would be spread evenly over an 8 hour long working day (to avoid peak periods), although there may be slight peaks.

5.127 Loading and unloading of vehicles, dismantling of equipment such as scaffolding or moving equipment or materials around the site would be conducted in such a manner as to minimise noise impacts to existing surrounding residential properties.

Parking Management and Staff Travel

5.128 A key aspect of the demolition and construction process would be the management of demolition and construction worker travel to and from the site. Construction workers would be encouraged to access the site by public transport, walking and cycling in order to reduce the potential impact of vehicle traffic during this temporary period. A series of measures would be implemented to encourage workers to travel using sustainable modes, which would form part of the traffic management plan. These may include:

- Cycle parking would be provided, and this would be covered and secure;
- Facilities for changing and storing cycling clothes would be provided;
- The developer would investigate the provision of public transport vouchers to encourage workers to travel to the site by public transport;
- The contractor would encourage workers to car share where possible and would set up a car sharing database to identify where matches could be made;
- Incentives such as a free breakfast once a week for those walking, cycling, car sharing or using public transport would be provided; and
- Travel information packs would be provided to all workers. These would be provided in either paper form or electronically and would include public transport timetables and information on cycling routes.

5.129 Parking provision would be provided on site; however this would be limited and spaces would be managed.

5.130 Vehicle movements would be managed to avoid queuing outside the site access points.

Noise and Vibration

5.131 Effective co-ordination and time management of demolition and construction activities would be used to avoid adverse effects from noise and vibration to surrounding areas. Early and helpful communications with the surrounding and on-site receptors would assist in managing any complaints arising during the demolition and construction works of the proposed development.

5.132 Contractors would be required to ensure that works are carried out in accordance with best practicable means. A full explanation of measures to control construction noise would be incorporated within the CEMP and detailed in all construction method statements.

5.133 As set out in Chapter 9: Noise and Vibration, noise levels from the demolition and construction of the proposed development have been predicted at noise-sensitive properties on site and in close proximity to the site and the impact of the noise assessed. Noise levels likely to be generated by the demolition and construction works have been predicted based on the type and number of plant likely to be in operation.

5.134 The CEMP will include the following Best Available Techniques (BAT):

- Demolition operations will be organised with regard to positioning of plant and movement of vehicles so as to minimise noise adjacent to properties.
- Use of plant conforming with relevant Irish standards, directives or recommendations on noise or vibration.

- Works will only be carried out within agreed working hours. Restricted working hours (including Monday to Friday: 07:00 to 19:00, Saturday: 08:00 to 13:00, and no working on Sundays or Bank Holidays). Planning of working hours to take account of the effects of noise and vibration upon persons in areas surrounding site operations and upon persons working onsite.
- Construction plant will be maintained in good condition with regards to minimising noise output and workers exposed to harmful noise and vibration.
- All drivers to site, including deliveries, will drive vehicles in a considerate manner in accordance with the specified speed limits with any failure to comply addressed as per infringements of the contractor's Project Health and Safety Plan.
- Construction plant will be operated and maintained appropriately, having regard to the manufacturer's written recommendations and maintenance programmes.
- Starting plant and vehicles sequentially rather than all together. Plant, equipment and site vehicles will be switched off when not in use.
- Construction traffic will only use the designated routes as per the construction traffic management plan as outlined in Chapter 5: Construction Description.
- The transport of construction materials, spoil and personnel will be programmed and routed to reduce the risk of increased noise and vibration impacts.
- Adoption of quiet working methods, using plant with lower noise emissions, where reasonably practicable.
- Use of silenced and well-maintained plant conforming with the relevant Irish directives relating to noise and vibration. Vehicle and mechanical plant used for the purpose of the works will be fitted with effective exhaust silencers and/or mufflers, maintained in good working order and operated in such a manner as to minimise noise emissions.
- Construction plant and activities will be positioned to minimise noise at sensitive locations.
- Equipment that breaks concrete by munching or similar, rather than by percussion, will be used as far as is practicable.
- Mufflers will be used on pneumatic tools.
- Avoiding breaking out hard surfaces using percussive techniques, where reasonably practicable. Where practicable, rotary drills actuated by hydraulic or electrical power will be used for excavating hard materials.
- Controlled demolition techniques: In order to reduce the noise and vibration impacts associated with the demolition activities across the site, the works will be undertaken using controlled demolition techniques. This approach requires the demolition methodology to be planned meticulously in advance of works commencing to ensure potential environmental disturbances to surrounding receptors are minimised wherever possible i.e. noise, vibration, dust.
- Adoption of working methods that minimise vibration generation, where reasonably practicable;
- Locating plant away from noise and vibration sensitive receptors, where feasible;
- Use of site hoarding, assumed 2.4m high, and acoustic screening for static items of plant and work areas, where feasible;
- Avoiding unnecessary revving of engines and switch off equipment, when not required;
- Keeping internal haul routes well maintained and avoid steep gradients;
- Use of rubber linings for chutes and dumpers to reduce impact noise;
- Minimisation of drop height of materials;
- Carrying out regular inspections of noise mitigation measures to ensure integrity is maintained at all times;
- Providing briefings for all site-based personnel so that noise and vibration issues are understood, and mitigation measures are adhered to;
- Management of plant movement to take account of surrounding noise sensitive receptors, as far as is reasonably practicable; and
- Carrying out compliance monitoring of onsite noise and vibration levels to ensure that the agreed limits are being adhered to.

5.135 An appropriate community awareness campaign will be undertaken to provide information to people residing in properties in the vicinity of the construction works, to reduce the likelihood of negative impacts on the public which could result in complaints. The level of engagement will vary depending upon the expected effects experienced by individual receptors due to the construction works.

5.136 It is envisaged that the public awareness campaign will provide local residents with the following items of information:

- The nature of the works being undertaken;
- The expected duration of the works;
- The contractor's working hours;
- Mitigation measures that have been adopted to minimise noise and vibration, as detailed in the CEMP; and
- Contact details in the event of a noise disturbance.

5.137 If work is required to extend into periods beyond the agreed hours, separate authorisation will be secured with SDCC via the CEMP or other agreement process.

5.138 Best Available Techniques (BAT) as defined in Section 7 of the Protection of the Environment Act will be implemented as part of the working methodology as detailed in the CEMP. This will serve to minimise the noise and vibration effects at receptors in the vicinity of the construction works. The reduction in noise levels provided through the implementation of BAT varies depending on the nature of the works; however, values in excess of 5 dB can be expected through a combination of appropriate measures and the use of site hoardings for noise screening.

Air Quality

5.139 Dust and emission control and mitigation at the application site would be particularly important during earthworks and dry weather periods. To minimise adverse effects due to dust, the site-specific best practice measures described in Table 5-5 would be implemented by the principal contractor.

Table 5-5: Dust Mitigation Measures for Medium Risk Sites

Phase	Mitigation Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display name and contact details of responsible person for dust issues on the site boundary (e.g. hoarding) in addition to head/regional office contact information. • Display the head or regional office contact information.
Dust Management Plan	• Develop and implement a Dust Management Plan (DMP) which is included as part of the CEMP.
Site Management	• Record all complaints and incidents in a site log. • Take appropriate measures to reduce emissions in a timely manner, and record the measures taken within the log.

Table 5-5: Dust Mitigation Measures for Medium Risk Sites

	• Make the complaints log available to the Local Authority if requested. • Record any exceptional dust incidents on site or off site. • Hold regular liaison meeting with other high-risk construction sites within 500 m.
Monitoring	• Undertake daily on site and off site visual inspections where there are nearby receptors. • Carry out regular inspections to ensure compliance with the DMP and record results in the site logbook. • 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.
Preparing and Maintaining the Site	• Plan site layout to locate dust generating activities as far as possible from receptors. • Use solid screens around dusty activities and around stockpiles. • Avoid site runoff of water and mud. • Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Keep site fencing barriers and scaffolding clean using wet methods. • Remove dusty materials from site as soon as possible, unless being re-used on site. If they are being re-used on site cover as described below • Minimise emissions from stockpiles by covering, seeding, fencing, or damping down.
Operating Vehicle/ Machinery and Sustainable Travel	• Enforce an on-site speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced areas. • Ensure vehicles switch off engines when stationary. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Produce a Construction Logistics Plan (CLP) 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).
Operations	• Only undertake cutting, grinding, or sawing equipment with suitable dust suppression equipment or techniques. • Ensure adequate water supply for effective dust and particulate matter suppression. • Use enclosed chutes, conveyors, and covered skips. • Minimise drop heights of materials.

Table 5-5: Dust Mitigation Measures for Medium Risk Sites

	• Ensure suitable cleaning material is available at all times to clean up spills.
Waste Management	• Avoid bonfires. • Avoid explosive blasting using appropriate manual or mechanical techniques. • Bag and remove any biological debris.
Measures Specific to Demolition	• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • Ensure effective water suppression during demolition. • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition.
Measures Specific to Construction	• Ensure aggregates are stored in bunded areas and are not allowed to dry out. • Avoid concrete scabbling where possible. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Measures Specific to Trackout	• Use water-assisted dust sweepers to clean access and local roads. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving the site are appropriately covered. • Record inspections of haul roads in site log, including any remedial action taken. • Implement a wheel washing system. • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit. • Access gates to be located at least 10 m from the receptors where possible.
Measures Specific to Earthworks	• Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil. • Only remove the cover in small areas during work and not all at once.

5.8.1 The Applicant would give detailed dust control protocols as part of their contracts for the site.

Waste Management

5.140 As a principal waste mitigation measure during the proposed development's construction, the principal contractor would prepare an CDWMP at the site, which would be secured by an appropriately worded planning condition.

5.141 The scope of the CDWMP would cover the following:

- All excavations would be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. If any potentially contaminated material is encountered, it will be segregated from clean/inert material, tested, and classified as either non-hazardous or hazardous and further classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC6, which establishes the criteria for the acceptance of waste at landfills. All excavated material would be used.
- Waste materials generated at the site compound would be stored in suitable receptacles in designated areas of the site compound.
- On-site segregation of waste materials would be carried out to increase opportunities for off-site reuse, recycling, and recovery, to ensure that the majority of construction materials are either recyclable or recoverable – it is anticipated that the following waste types, at a minimum, would be segregated: made ground, soils and stones and trees/shrubbery. In addition, the following wastes would be segregated at the site compound: organic (food) waste, packaging (paper/card/plastic), mixed dry recyclables and mixed non-recyclable waste.
- All waste contractors collecting waste from the site would hold a valid collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPO).
- Construction wastes would be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, recycling, recover and/or disposal. As stated in the baseline section, there are numerous licensed waste facilities in the local region that have sufficient capacity to accept both hazardous and non-hazardous waste materials and could manage C&D waste from the proposed development.
- All waste leaving site will be reused, recycled, or recovered where possible to avoid material designated for disposal.
- All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted, or licenced facilities.
- All waste leaving the site would be recorded and copies of relevant documentation maintained.
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) would also be segregated and would be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager would be appointed by the main contractor to ensure effective management of waste during the excavation and construction works.
- All construction staff would be provided with training regarding the waste management procedures.
- The waste from delivers into the two-bay truck loading bay would be compacted on site.

5.142 In particular the following measures would be proposed in the CDWMP to minimise waste generation on site:

- Ordering the quantity of materials required for the job, thus reducing over-ordering;
- Determining when and where materials are required and requesting 'just in time' deliveries;
- Returning damaged goods or incomplete deliveries;
- Requesting suppliers to minimise packaging and to guarantee a take-back service, especially for pallets;
- Ordering materials that are cut to size, rather than standard sizes;
- Where possible and appropriate to do so, using prefabrication off-site;
- Having appropriate storage areas ready - these should be covered to protect against rain and ideally have a hard standing surface;
- Determining where special handling is required;
- Securing the site to avoid theft and vandalism; and
- Ensuring good on-site segregation of wastes.

5.143 Any waste that is not re-used on site and therefore requires off-site disposal would be dealt with in accordance with the Waste Hierarchy, the requirements of the EPA and in line with relevant legislation.

Recycling

5.144 Segregation (on site or off site) and recycling of cardboard, timber, metal, plastics, plasterboard and gypsum based products will be required by the project team. The segregation of polythene film waste from other plastics would also be considered and local collections investigated.

5.145 It is proposed that waste would be segregated and stored for collection on site.

5.146 Where standard sized pallets are used for material storage, then regular collections would be organised for removal and for re-use rather than disposal in timber skips.

5.147 Where on-site segregation of waste is not deemed possible due to spatial constraints at the site, the waste carriers would be required to ensure off-site segregation for waste and diversion from landfill is undertaken.

Disposal

5.148 All construction materials that cannot be re-used or recycled or would be disposed of at appropriately licensed disposal facilities. The destination of all waste or other materials from the application site would be notified to the relevant authority for approval. No burning of construction waste would take place on site.

Climate

5.149 The proposed development has, seek to minimise GHG emissions, wherever possible, to contribute to the achievement of Ireland's GHG reduction targets and carbon budget. The embedded mitigation measures relevant to the construction and demolition stage of the proposed development have been presented in Table 5-6.

Table 5-6: GHG mitigation measures during construction and demolition stage

Mitigation measure	Mitigation detail	Method of reduction
Excavation of materials	Material excavated during construction would be processed for use in the works wherever possible to reduce the amount of material disposed of off site as well as imported from other sources, and associated GHG emissions. Possible uses of excavated materials include general fill and other graded materials. Processing of material would take place on site.	Reduce
Sustainable materials	Using sustainability sourced, recycled or secondary materials with lower embedded GHG emissions and water consumption;	Reduce

[6] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

Table 5-6: GHG mitigation measures during construction and demolition stage

	e.g. Specifying products with a high recycled content and (e.g. Pulverised Fuel Ash (PFA) replacement for up to 30% of the cementitious material (i.e. as replacement for Portland cement); Using recycled crushed concrete in granular sub-base materials in pavements sourced from existing pavements on site to be demolished as part of the works;	
Reporting	Energy consumption and materials use would be recorded and reported on an ongoing basis during the construction phase of the development;	Reduce
Equipment	Using low-emissions or electric construction plant, including the potential for portable PV for use in powering temporary compound and equipment;	Reduce
Procurement	Procuring materials with Environmental Product Declarations (EPD) to allow for the most informed procurement choices; and procuring materials from suppliers that offer take back schemes, where possible;	Reduce
Reuse	Reusing the materials from the pre-existing building wherever possible.	Avoid/ prevent
Minimising waste during construction	Following measures would be proposed in the CDWMP to minimise waste generation on site; ordering the quantity of materials required for the job, thus reducing over-ordering.	Reduce

5.150 In addition, and to reduce GHG emissions associated with vehicles from workers, the following mitigation measures would be implemented:

- Cycle parking would be provided, and this would be covered and secure.
- Facilities for changing and storing cycling clothes would be provided.
- The developer would investigate the provision of public transport vouchers to encourage workers to travel to the site by bus or rail.
- The contractor would encourage workers to car share where possible and would set up a car sharing database to identify where matches could be made.
- Incentives such as a free breakfast once a week for those walking, cycling, car sharing or using public transport would be provided.
- Selecting electrically driven equipment where possible in preference to internal combustion powered; hydraulic power in preference to pneumatic; and wheeled in lieu of tracked plant.
- Operating plant at low speeds where possible and incorporating automatic low speed idling.
- Switching off vehicle engines where vehicles are standing for extended periods and avoid unnecessary revving of vehicle engines.

5.151 Other potential opportunities to reduce GHG emissions during the demolition and construction stage include the following:

- Specification of concrete with increased cement replacement – 40% of none-critical structural elements as a minimum;
- Specification of reinforcement steel with 100% recycled content of non-critical structural elements;
- Aluminium windows frames with recycled content >35% or replace with Wood Alu windows frames;
- Use of glass with recycled content, where available;
- Substitute raised access floor with timber flooring or RAF with recycled content;
- Specify aluminium with 20-35% recycled content;
- Specify plasterboard with 95% recycled content or substitute with gypsum fibreboard; and
- MEP service elements with recycled content where feasible.

Cumulative Impacts

5.152 Site preparation, demolition and construction activities, when undertaken at the same time, have the potential to give rise to combined (cumulative) impacts and effects. Although temporary, these combined impacts, if not managed can give rise to potentially adverse effects on sensitive receptors in proximity to the site, i.e. existing residential, industrial, commercial, community and open space receptors.

5.153 Such impacts are typically restricted to temporary periods of time. Even then, not all receptors would experience impact interactions during this time depending on phasing and proximity to the sensitive receptor. The majority of interactions are likely to arise from activities such as demolition works, noise and vibration from construction plant and vehicles, dust from plant and vehicles, the visual impacts of the work and passing HGVs.

5.154 In terms of residential amenity, demolition and construction works would typically be carried out outside of those hours when residents could reasonably expect quiet enjoyment of their properties. Demolition and construction works would typically be carried out between the hours of 07:00 to 19:00 hours, so residents would not be subjected to unreasonable impacts during daytime works periods.

5.155 Impact interactions that are likely to occur would generally be of a temporary and short-term nature and would be carefully co-ordinated to ensure minimal disruption to sensitive receptors.

5.156 It is anticipated that the stringent management controls set out in this Chapter would ensure that the potential demolition and construction of the proposed development would be kept to a minimum and as such, would limit the potential for further predicted impacts when considered in conjunction with the development proposals in the surrounding area. It is expected that other schemes in the area would also adopt similar stringent management controls.

5.157 The CEMP, to be secured by an appropriately worded planning condition, would be implemented during the demolition and construction works and would provide a framework within which activities on site would be managed 'at source' to minimise impacts on all sensitive receptors.

Deconstruction of Proposed Development

5.158 The deconstruction of the proposed development would follow a demolition method and sequence. Safe working practices would be devised and implemented and would be undertaken according to typical dismantling techniques prevalent at the time.

5.159 The site would be hoarded and full height scaffold with sheeting would be erected to surround the buildings. Soft stripping works would then commence, removing all fixtures and fittings bringing the structure back to its shell. As well as the buildings, the scaffold protection would be dismantled as the development is lowered. When the development is at an appropriate level, long arm track mounted shear cutters would be used. The site would then be taken down to basement level and temporary works installed to make the perimeter retaining walls stable and the site left safe.

Summary

5.160 The development programme comprises the demolition of the existing double-storey dwelling on the site and construction of the proposed development as described in Chapter 4: Proposed Development Description. Assuming planning permission is secured, on-site works are projected to start in Q1 2024 and the construction works to be completed in Q4 2024 / Q1 2025. The works are anticipated to be undertaken over an 11-month period.

5.161 Demolition and construction works have the potential to cause environmental impacts, from subsurface works, noise, wastes, surface water runoff, and emissions to air. Measures to control potential environmental impacts would be set out within the CEMP (including a traffic management statement and CDWMP) to be secured by an appropriately worded planning condition.

6 POPULATION AND HUMAN HEALTH

Introduction

6.1 This chapter of the EIAR reports on the likely significant population and human health effects to arise from the demolition and construction stage and the operation stage of the proposed development.

6.2 The chapter describes the population and human health policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely population and human health effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

6.3 There are no technical appendices associated with this chapter.

6.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017)[1];
- National Legislation and Policy:
  - Healthy Ireland Framework: A framework for improved health and wellbeing (2013-2025)[2]; and
  - PubMed MEDLINE database of biomedical and life sciences journal literature[3].

6.5 The EC guidance on the preparation of an EIAR states that:

> "Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."

6.6 This assessment follows the EC guidelines, and examines the health effects relevant to the proposed development as they relate to a relevant, defined study area.

6.7 Further consideration for this assessment is given to the findings of the other technical chapters of this EIAR, in particular in relation to air quality, noise and vibration, transport and accessibility, and landscape and visual impact assessment.

Assessment Scope

6.8 Health, or what constitutes 'good' health, is difficult to define and measure in all its aspects for a population because perceptions regarding health and expectations of good health vary. This chapter therefore applies the World Health Organization (WHO) definition[4], which states: "Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity".

6.9 The focus of this assessment is on community health[5] and wellbeing and not on occupational health and safety[6]. The terms 'health', 'human health', 'population health' and 'health and wellbeing' are used interchangeably.

Technical Scope

6.10 The technical scope of the assessment has considered the following effects during demolition and enabling works and construction stage:

- Generation of employment;
- Introduction of transient residential population; and
- Effects from increased traffic, noise and dust on amenity and health.

6.11 The following effects during the operation stage of the proposed development have been considered:

- Generation of operation employment;
- Effects from increased traffic noise and air pollutants on health;
- Effects on amenity.

Spatial Scope

6.12 The site lies within the functional area of South Dublin County, which is sub-divided into Electoral Divisions and Small Areas. The site is located within the western end of Clondalkin Village Electoral Division (ED) and is within the Clondalkin Village Small Area (SA) (reference: Sa2017_267053001), as displayed in Figure 6.1. This Clondalkin Village SA excludes almost all of the residential areas of Clondalkin, with the exception of part of the estate of St. Johns off the Fonthill Road South, and primarily covers the employment zoning and wider area to the west of Clondalkin.

[1] European Commission, 2017. Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). EU. 2017.

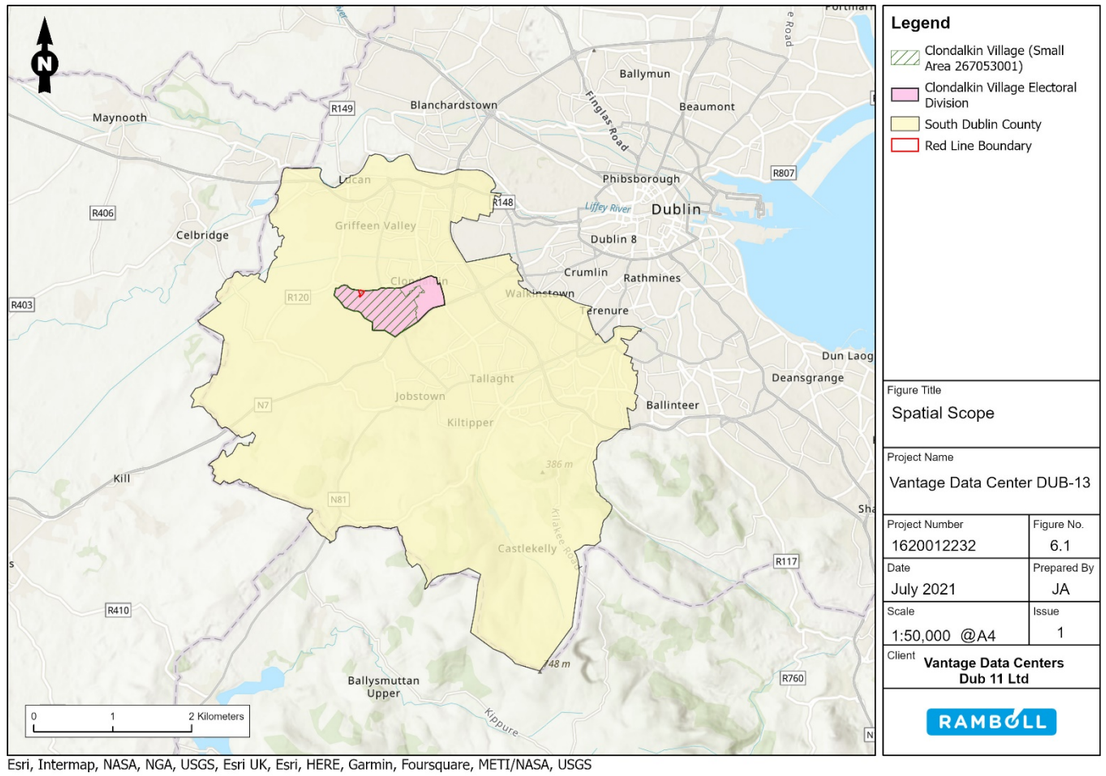
[2] Department of Health, 2013. Healthy Ireland Framework. A framework for improved health and wellbeing 2013-2025. Government of Ireland.

[3] PubMed MEDLINE database of biomedical and life sciences journal literature.

[4] WHO, 1948. WHO remains firmly committed to the principles set out in the preamble to the Constitution [online]. Available at: https://www.who.int/about/governance/constitution [Accessed on 06/07/2021].

[5] The health and wellbeing of those communities in the study area who have the potential to experience effects associated with the proposed development.

[6] This refers to the health and safety of workers employment by the proposed development, either during construction or operation.



Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS

Figure 6-1: Spatial Designations in South Dublin County

Temporal Scope

6.13 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be Temporary (<1 year) and from the operational stage which would be expected to be Long-Term (15-60 years) to Permanent (>60 years).

Baseline Characterisation Method

Desk Study

6.14 In order to establish baseline population and human health conditions in the study area, relevant data was reviewed and assessed. Data was obtained from a review of demographic characteristics of the area, ascertained from Census of Population data and other statistics released by the Central Statistics Office (CSO), comprising:

- Central Statistics Office, South Dublin County Council, 2022[7];
- Central Statistics Office, South Dublin County Council, 2016[8];
- Central Statistics Office, Clondalkin Village ED, 2016[9]; and
- Central Statistics Office, Clondalkin Village SA, 2016[10].

Field Study

6.15 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

Assessment Method

Methodology

6.16 Health at the population level (all the persons inhabiting a defined location) is influenced by a number of determinants of health (non-medical factors that influence health outcomes). Many of these are socio-economic in nature. Those determinants of health commonly thought to be important are:

- employment;
- income;
- access to services;
- transport;
- housing;
- education;
- crime and fear of crime;
- social capital; and
- the physical environment.

6.17 To determine the potential population and human health impacts of the proposed development on nearby residents, the assessment needs to consider the pathways by which the proposed development might affect the determinants of health and by how much. For example, a development that creates new employment opportunities could contribute positively to health. However, if a development causes degradation in air quality, this could have a negative impact for health.

6.18 In terms of assessing the potential human health impacts associated with the proposed development, outputs of the landscape and visual, transport and accessibility, air quality, and noise and vibration chapters have been reviewed and any significant impacts identified in these chapters are considered in terms of their potential implications on population and human health.

6.19 The assessment methodology applied to the population and human health assessment is outlined below

Assessment Criteria

6.20 The assessment of significance of effect with regards to population and human health is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

6.21 This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement

Receptor Sensitivity/Value Criteria

6.22 There is no specific guidance in relation to sensitivity of receptors with regards to population and human health. The baseline below outlines the key population and health vulnerabilities in the study area; however, due to the baseline being desk-based and without in-depth stakeholder engagement at the community

[7] Central Statistics Office, 2016. Sapmap Area: South Dublin County Council [online]. Available at: https://visual.cso.ie/?body=entity/ima/cop/2016&boundary=C03849V04599&guid=2ae19629-14a1-13a3-e055-000000000001 [accessed 09/09/2022]
[8] Central Statistics Office, 2016. South Dublin County Council [online]. Available at: https://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=CTY31&Geog_Code=2AE1962914A113A3E055000000000001#SAPMAP_T13_1301 [Accessed 06/09/2022].
[9] Central Statistics Office, 2016. Census 2016 Sapmap Area: Electoral Division Clondalkin-Village ED [online]. Available at: https://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=ED3409&Geog_Code=2AE196291D0213A3E055000000000001#SAPMAP_T14_1401 [Accessed 06/09/2022].
[10] Central Statistics Office, 2016. Census 2016 Sapmap Area: Small Area Sa2017_267053001 [online]. Available at: https://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=SA2017&Geog_Code=4c07d11e-0d56-851d-e053-ca3ca8c0ca7f#SAPMAP_T14_1401 [Accessed 06/09/2022].

level, it is not possible to assign an overall sensitivity classification to the population in the study area. Therefore, the precautionary principle has been adopted for this assessment, which assumes that the population within the Clondalkin Village SA is of high sensitivity and the population in South Dublin County and Clondalkin Village ED is of medium sensitivity.

Impact Magnitude Criteria

6.23 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 6-1.

Table 6-1: Impact Magnitude Criteria

Magnitude of Impact	Criteria
No effect	The proposed development would not result in a change to the existing baseline conditions.
Low	Change in an environmental and/or socio-economic factor(s) as a result of the proposed development which would result in a minor change to existing baseline conditions (negative or positive).
Medium	Change in an environmental and/or socio-economic factor(s) as a result of the proposed development which would result in a moderate change to existing baseline conditions (negative or positive).
High	Change in an environmental and/or socio-economic factor(s) as a result of the proposed development which would result in a major change to existing baseline conditions (negative or positive).

Scale of Effect Criteria

6.24 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 6-2.

Table 6-2: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors		
	Low	Medium	High
Low	None	Imperceptible	Not-Significant – Slight
Medium	None-Imperceptible	Not Significant – Slight	Moderate - Significant
High	Not Significant – Slight	Moderate -Significant	Very Significant - Profound

6.25 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports[11] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

6.26 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

6.27 The 2022 census has been undertaken however only preliminary county level population data is available and therefore, the assessment has relied on baseline data from the 2016 Census, published by the Central Statistics Office, which is now six years old but is still the most reliable source.

[11] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

Baseline Conditions

Existing Baseline

Land Use

6.28 The surrounding context of the site is largely industrial and agricultural. The site is surrounded by numerous residential properties. A large proportion of these are no longer in residential use due to the extension of Grange Castle Business Park and road improvement in recent years.

6.29 The site is located in Profile Park industrial estate and within the functional area of South Dublin County. Under the South Dublin County Council's (SDCC) Development Plan 2022-2028, the site is allocated under Objective EE: Employment and Enterprise. The stated aim is to provide for enterprise and employment related uses. The proposed land use of a data center is a permitted use under this zoning. Significant precedent exists for the establishment of this use on other EE zoned lands in the area. EE zoned areas are established economic industrial areas running essentially in an arc northward from City West to Grange and Grange Castle.

6.30 The current land use on the site is agricultural with a residential dwelling located in the north-east corner of the site.

Population

6.31 Table 6-3 presents the 2016 Census population data for the study area in 2016. The data shows population at county, electoral region, and Small Area level. The Small Area, where the site is located, represents the local area Clondalkin Village SA, which had a decline in population by 13 people between 2011 to 2016.

6.32 The preliminary 2022 Census results show the total resident population of South Dublin County has increased from 2016 to 299,793[12].

Table 6-3: Study Area Population (2016)

Area	Total Population
Clondalkin Village SA	257
Clondalkin Village ED	9,152
South Dublin County	278,767

6.33 The population age ranges in the study area are presented in Table 6-4. The data shows that Clondalkin Village SA has a lower-than-average younger population (0-19 years old) compared to the electoral region and county average and a significantly higher elderly population (65-84 years old). The overall averages for Clondalkin Village ED align with the South Dublin County average.

Table 6-4: Population Age Ranges (2016)

Area	Percentage of Population (%)					
	0-19	20-24	25-44	45-64	65-84	85 and over
Clondalkin Village SA	20.23	3.89	26.46	31.52	17.51	0.39
Clondalkin Village ED	27.80	5.40	31.81	26.31	8.02	0.66

[12] Results of the 2022 census are preliminary.

Table 6-4: Population Age Ranges (2016)						
South Dublin County	29.46	5.78	31.40	22.27	10.23	0.86

6.34 Ethnicity in the study area is presented in Table 6-5. According to the 2016 Census, 77.77 % of the county population are White Irish, compared to 72 % in Clondalkin Village SA. Clondalkin Village SA and ED both have a higher than county level of those stating Other White as their ethnicity and a lower percentage of Black or Black Irish, White Irish Traveller, Asian or Asian Irish and other residents compared to South Dublin County as a whole.

Table 6-5: Population Ethnicity (2016)

Ethnicity	Percentage of Ethnicity (%)		
	Clondalkin Village SA	Clondalkin Village ED	South Dublin County
White Irish	72.00	77.75	77.77
White Irish Traveller	0.00	0.39	0.80
Other White	14.40	11.69	9.31
Black or Black Irish	1.20	2.43	3.31
Asian or Asian Irish	3.20	2.04	4.11
Other	1.60	1.42	1.91
Not Stated	7.60	4.28	2.79

6.35 The general health of the population is presented in Table 6-6. General health is a self-assessment of a person's general state of health. Within the 2016 Census, people were asked to assess whether their health was very good, good, fair, bad, or very bad. Within South Dublin County 60 % of people rated their overall health as very good compared to 56.82 % and 52.14 % for Clondalkin Village ED and Clondalkin Village SA respectively. In addition, Clondalkin Village SA has a significantly higher percentage of those stating their health as fair compared to Clondalkin Village ED and South Dublin County.

Table 6-6: Population General Health (2016)

Area	General Health Category					
	Not Stated (%)	Very Bad Health (%)	Bad Health (%)	Fair Health (%)	Good Health (%)	Very Good Health (%)
Clondalkin Village SA	7.39	0.00	1.95	12.06	26.46	52.14
Clondalkin Village ED	5.54	0.30	1.19	7.67	28.48	56.82
South Dublin County	3.70	0.29	1.26	7.38	27.23	60.14

Employment

6.36 The percentage of employment by industry is presented in Table 6.7. Within Clondalkin Village SA there is a higher proportion of employment within the agriculture, forestry and fishing industry and building and construction industry compared with Clondalkin Village ED and South Dublin County as a whole. In comparison only 21 % of employed individuals within Clondalkin Village SA work within the commerce and trade industry compared with the 27.94 % in South Dublin County as a whole.

Table 6-7: At Work by Industry (2016)

Industry	Percentage of Employment (%)		
	Clondalkin Village SA	Clondalkin Village ED	South Dublin County
Agriculture, Forestry and Fishing	4.10	0.21	0.20
Building and Construction	8.20	5.48	5.10
Manufacturing Industries	8.20	10.12	8.80
Commerce and Trade	21.30	26.42	27.94
Transport and Communications	9.02	11.21	10.57
Public Administration	6.56	5.99	5.82
Professional Services	22.95	19.38	23.12
Other	19.67	21.19	18.45

Community Facilities

6.37 There is one existing residential dwelling located within the site boundary, however this is now vacant and would be demolished as part of the proposed development.

6.38 Residential dwellings are primarily located to the south and south west of the site. The closest occupied residential dwelling is located approximately 600 m south from the site boundary, bounding the north side of Baldonnel Road, and to the immediate south of the Digital Netherlands consented data centre. Further residential dwellings are present to the south of Baldonnel Road.

Schools

6.39 The population in the surrounding areas of the site (i.e. Clondalkin, Newcastle, Lucan, Tallaght and Rathcode), is serviced by various junior and secondary schools.

6.40 The Junior Genius Creche is located in Castlebagot, approximately 1 km south west. Numerous junior schools are located in the wider site area, namely, Nano Junior National School, Our Lady Queen of Apostles, Sacred Heart National School and Scoil Mhuire located approximately: 2 km north east; 2.7 km north east, 2.5 km east; and 3 km east respectively.

6.41 The wider site area contains numerous National Schools. Talbot Senior National School, Sacred Heart National School and St Johns National School are 1.9 km north east, 2.5 km and 3 km east, respectively.

Healthcare Facilities

6.42 The nearest health centre is the Deansrath Health Centre, located approximately 1.2 km north east. Nangor Medical Center, Boot Road Health Center and Clondalkin Health Center are located approximately 1.8 km, 2.9 km, and 2.9 km east respectively.

6.43 The nearest hospital to the site is located approximately 5 km south-east at the Adelaide and Meath Hospital incorporating the National Children's Hospital, Tallaght, Dublin 24.

Future Baseline

6.44 The future baseline scenario for the proposed development considers the scenario in which the July 2022 DUB-1 permitted development would be operational. Operational employment generation for the July 2022 DUB-1 permitted development would provide 135 FTE jobs.

Sensitive Receptors

6.45 The focus of this assessment is on community health and wellbeing; therefore, all those who are likely to experience population and health effects (positive or negative) associated with the proposed development

are considered sensitive receptors. The main sensitive receptor that this assessment will focus on is the Clondalkin Village SA community, as this is where the development is located. The community receptors that have been considered within this assessment include:

- Local residents (including vulnerable groups such as children and the elderly within the population);
- Local economy; and
- Pedestrians, cyclists, and drivers.

Assessment of Effects

Demolition and Construction Effects

Employment Generation

6.46 The demolition and construction stage of the proposed development would create employment opportunities. Employment generation has been calculated using data from the July 2022 DUB-1 permitted development. Levels of employment for the demolition and enabling stage are estimated to be in the region of 67 direct workforce jobs, with approximately 34 additional jobs during the peak construction period.

6.47 Increased employment opportunities can have a positive influence on health through increasing social contact, involvement in a collective effort or activity and by forming social relationships. All of these contribute to wellbeing. In addition, those with insecure employment are likely to have poorer mental health than those with secure employment.

6.48 These types of jobs often have a related multiplier effect, creating additional indirect employment in business, which in turn benefit from increased spending by local workers. Procurement of goods and services may have the potential to create additional short-term employment opportunities, which in turn may potentially increase people's incomes and have a positive impact on their health. The extent of these benefits will be determined by the level of local procurement. Most of the procurement would be spread across the national economy due to the nature of the goods; this combined with the temporary nature of the demolition and construction stage would limit any health benefits.

6.49 The impact magnitude of employment generation on human health is considered to be low at the SA scale on a receptor of high sensitivity; therefore, health effects associated with employment generation during the demolition and construction stage at the SA scale would be **Temporary**, **Not Significant -Slight**, **Positive** in nature and **Not Significant** in terms of EIA. The ED and SDC scale are of medium sensitivity, therefore, health effects associated with employment generation (low magnitude) during the demolition and construction stage at these scales would be **Temporary**, **Imperceptible**, **Positive** in nature and **Not Significant** in terms of EIA.

Introduction of Resident Population

6.50 There is the potential for an increase in the temporary population of the area as a result of demolition and construction workers from outside the wider Dublin area choosing to reside in the immediate and wider local area.

6.51 While it is anticipated that some of the workforce would be sourced from outside the local area, their presence is unlikely to place additional demands on local services (most notably health care facilities) which cannot be met within the existing capacity. Therefore, it is unlikely that the presence of the additional workforce would result in negative health impacts. In addition, an increased temporary resident population could result in additional trade for local accommodation and services.

6.52 The impact magnitude of the introduction of a resident population on human health is considered to be low at the SA scale on receptor of high sensitivity. It is anticipated that the introduction of a resident population would not result in any effect at the ED and SDC scales. Given the estimated 67 direct workforce jobs and approximately 34 additional jobs created during the demolition and construction phase, the human health effects associated with the introduction of a resident population would be **Temporary**, **Not Significant to Slight**, **Neutral** in nature and **Not Significant** in terms of EIA.

Air Quality Effects

6.53 There would be air quality impacts from demolition and construction stage activities in terms of dust impacts and on-site vehicle emissions.

6.54 The air quality assessment, as reported in Chapter 8 of the EIAR volume, concludes that the demolition and construction dust and on-site vehicle emissions effects in the study area would be negative, temporary, imperceptible and Not-significant in terms of EIA.

6.55 Air quality effects have the potential to affect health in a variety of ways, in particular targeting vulnerable groups such as children, the elderly and those with respiratory problems. However, embedded mitigation and standard good practice measures would be implemented to reduce dust emissions and vehicle emissions, through the construction environmental management plan (CEMP).

6.56 The impact magnitude of air quality effects on human health is considered to be low due to the implementation of the CEMP. Local residents and vulnerable groups are all considered to be of high sensitivity and those located within the SA could be affected; therefore, health effects associated with dust and on-site vehicle emissions during the demolition and construction stage would be **Temporary**, **Not Significant to Slight, Negative** in nature and **Not Significant** in terms of EIA.

Noise Effects

6.57 There would be noise impacts from demolition and enabling stage activities and associated traffic that have the potential to cause effects to human health.

6.58 The noise and vibration assessment in Chapter 9: Noise and Vibration of this EIAR Volume reports that based on the predicted mitigated noise levels and distanced to receptors, demolition and enabling stage works are likely to give a rise in noise levels that are considered temporary, slight, negative in nature and not significant in terms of EIA.

6.59 The noise assessment also reports that noise associated with demolition and construction stage traffic would not exceed the construction noise limit of 65 dB L_{Aeg} and is therefore considered temporary, slight, negative and not significant in terms of EIA.

6.60 Noise has the potential to affect health in a variety of ways. Some negative effects can be auditory (i.e. damage to the ear) and occur as a direct impact of noise (i.e. at levels higher than considered here and in excess of statutory acoustic limiting values) whilst others are non-auditory; such as annoyance, night time effects (e.g. sleep disturbance) and mental health impacts and may be associated with exposure to excessive noise.

6.61 Annoyance is the most reported non-auditory health effect associated with noise with sleep disturbance also being common with certain vulnerable groups (such as the elderly, new-borns and shift workers).

6.62 Those sensitive human health receptors located within the immediate vicinity of the site would experience the greatest noise effects and therefore this has only been assessed at the SA scale.

6.63 The impact magnitude of noise effects on human health is considered to be of low magnitude due to noise levels not exceeding demolition and enabling noise limits. Residential receptors in close proximity to the site are considered to have a high sensitivity to change in the noise environment; therefore, any auditory and non-auditory health effects during the demolition and construction stage would be **Temporary, Not Significant to Slight, Negative** in nature and **Not Significant** in terms of EIA.

Transport and Accessibility Effects

6.64 The transport assessment in Chapter 7: Transport and Accessibility of this EIAR Volume reports that during the peak demolition and construction period (in 2024) there would be a maximum additional 156 vehicle movements per day (of which 44 would be heavy goods vehicles (HGV). This increase in vehicle movements

is reported to be temporary, slight, negative in nature and not significant in terms of EIA in relation to pedestrian severance, delay, amenity, fear, and intimidation.

6.65 The assessment also reports that it is anticipated that there may be some driver delay at times during the demolition and construction stage. However, the CEMP would commit to ensuring deliveries are co-ordinated to ensure vehicles are not waiting on the local highway, and wherever feasible deliveries would be undertaken outside peak hours and the effect would be temporary, slight, negative in nature and not-significant in terms of EIA. However, some level of annoyance and stress amongst local residents and road users may occur due to the potential for increased journey times.

6.66 The assessment does not indicate a prevailing road safety issue which could be made worse by the demolition and construction works and reports the effect on accidents and safety to be temporary, slight negative and not-significant in terms of EIA.

6.67 Vulnerable groups in society would be affected most by the increase in traffic levels. Those such as young children and the elderly may experience negative health impacts. The elderly may experience annoyance from increased noise, whereas young children are at higher risk of road accidents and health impacts associated with potential air pollution.

6.68 Cyclists and pedestrians using the local road network may experience increased fear of accidents and injuries. Any increase in traffic also increases the risk of accidents resulting in injuries and potentially death of road users, especially for more vulnerable road users, such as the young and the elderly.

6.69 The increase in vehicle movements and the resulting effects on human health as a result of the demolition and construction of the proposed development would be localised to within the SA. The impact magnitude of traffic and transport effects on human health is considered to be low due to no significant effects being reported in the transport chapter. Road users, pedestrians and cyclists are all considered to be of high sensitivity; therefore, health effects associated with increased traffic during the demolition and construction stage would be Temporary, Not Significant to Slight, Negative in nature and Not Significant in terms of EIA.

Amenity Effects

6.70 The landscape and visual impact assessment (LVIA) in EIAR Volume 2, Chapter 1: Landscape and Visual Impact Assessment reports that the site is located in an area that has had successive recent developments of a similar scale to the proposed development. Landscape and visual effect during demolition and construction are generally reported as Temporary, slight, negative in nature and not significant in terms of EIA.

6.71 Visual disturbances can become a focus for concern and anxiety. The built environment can impact on public health and the way that people utilise their environment. The built environment can also influence physical activity which in turn can cause health impacts. The natural environment is known to have a restorative function in that it reduces stress and anxiety levels.

6.72 Light pollution from the built environment can also have a negative health impact through annoyance, discomfort and loss of visual environment and visibility.

6.73 Residents may experience feelings of decreased quality of life during the demolition and construction stage which can cause anxiety and concern as well as decreased wellbeing; however, as the area has undergone a period of change, transitioning from an agricultural to an industrial and commercial area it is thought nearby residents would be considered to be more resilient to change.

6.74 In terms of amenity effects on population and human health, the magnitude of effect is considered to be low on a receptor of high sensitivity; therefore, the effect would be **Temporary, Not Significant to Slight, Negative** in nature and **Not Significant** in terms of EIA.

Operation Effects

Employment Generation

6.75 Once operational the proposed development would employ approximately 45 full time equivalent (FTE) staff members on-site. Additional to this would be the ad-hoc attendance of maintenance contractors and visitors. It is anticipated that the data centers would be in operation on a shift basis with reduced numbers presented during night shifts.

6.76 Health benefits associated with employment would be felt most if employment is taken up by those who are currently unemployed or who are in short-term temporary employment. The scale of the employment opportunities is unlikely to have any health benefits at the population level, although individuals may benefit if they find employment and are moving from an unemployed status.

6.77 The magnitude of effect of increased employment on population and human health is considered to be of low magnitude at the SA scale on a receptor of high sensitivity. The effect would therefore be **Long-term to Permanent**, **Not Significant to Slight**, **Positive** in nature and **Not Significant** in terms of EIA. The ED and SDC scale are of medium sensitivity, therefore, health effects associated with employment generation (low magnitude) during operation at these scales would be **Long-term to Permanent**, **Imperceptible**, **Positive** in nature and **Not Significant** in terms of EIA.

Air Quality Effects

6.78 The air quality assessment in Chapter 8: Air Quality of this EIAR Volume considers the air quality effects during operation.

6.79 As discussed above, air quality impacts have the potential to affect health in a variety of ways, in particular targeting vulnerable groups such as children, the elderly and those with respiratory problems.

6.80 The magnitude of effect of air quality effects on human health is considered to be of low magnitude on a receptor of high sensitivity. Those sensitive human health receptors located within the immediate vicinity of the site would experience the greatest air quality effects and therefore this has only been assessed at the SA scale.; The effect would be **Long-term to Permanent**, **Not Significant to Slight**, **Negative** in nature and **Not Significant** in terms of EIA.

Noise Effects

6.81 There would be noise impacts during operation of the proposed development from the plant and servicing that have the potential to cause effects to human health. Noise impacts

6.82 The noise and vibration assessment in Chapter 9: Noise and Vibration of this EIAR volume reports that based on the predicted mitigated noise levels and distanced to receptors, the predicted operational noise rating levels meet the required limits and would be considered Long-term to Permanent, Slight, Negative in nature and Not Significant in terms of EIA.

6.83 Therefore, in terms of operation noise effects on human health the impact magnitude is considered to be low due to noise levels not exceeding operation noise limits on a receptor of high sensitivity. The effect would be **Long-term to Permanent, Not Significant to Slight, Negative** in nature and **Not Significant** in terms of EIA.

Transport and Accessibility Effects

6.84 The transport assessment in Chapter 7: Transport and Accessibility of this EIAR Volume reports that during the operation stage, there would be an additional 59 vehicle movements per day and 4 deliveries. This equates to an estimated increase of under 30 % in Profile Park in 2024. These movements could result in severance or an increase in fear and intimidation.

6.85 The assessment also reports that pedestrians would be safely accommodated by footpaths of approximately 3 m provided on both sides of Profile Park and an informal pedestrian crossing on the approach to the R134

New Nangor Road/Profile Park roundabout. The overall effect on pedestrians would be long-term to permanent, slight, negative in nature and not significant in terms of EIA.

6.86 As a result of the proposed development, the transport assessment reports that there may be some driver delay at times, causing some level of stress and annoyance amongst local residents and road users. The overall effect of driver delay would be long-term to permanent, slight, negative and not-significant in terms of EIA.

6.87 The assessment does not indicate a prevailing road safety issue which could be made worse by the operation traffic flows. The assessment reports that the effect on accidents and safety would be long-term to permanent, slight, negative and not-significant in terms of EIA.

6.88 As previously stated, vulnerable groups in society would be affected most by the increase in traffic levels. Those such as young children and the elderly may experience negative health impacts. However, the impact magnitude of traffic and transport effects on human health is considered to be low due to no significant effects being reported in the transport assessment. The increase in vehicle movements and the resulting effects on human health as a result of the demolition and construction of the proposed development would be localised to within the SA. Road users, pedestrians and cyclists are all considered to be of high sensitivity; therefore, health effects associated with increased traffic during the operation stage would be **Long-term to Permanent**, **Not-significant to Slight, Negative** in nature and **Not-significant** in terms of EIA.

Amenity Effects

6.89 The LVIA in EIAR Volume 2, Chapter 1: Landscape and Visual Impact Assessment reports that on completion, the data center buildings would be a new feature within the landscape, similar in size and visual appearance to surrounding developments. The size, scale and operation of the buildings are consistent with surrounding land uses and therefore it is anticipated that the proposed development would not be out of context and that landscape and visual impacts during operation would be not be significant in terms of EIA.

6.90 Residents may experience feelings of decreased quality of life which can cause anxiety and concern as well as decreased wellbeing; however, as the current immediate visual environment is dominated by similar size and scale buildings to that of the proposed development those nearby residents would be considered to be more resilient to change.

6.91 Therefore, in terms of amenity effects on population and human health the magnitude of effect is considered to be low on a receptor of high sensitivity; therefore, the effect would be **Long-term to Permanent, Not-significant to Slight, Negative** in nature and **Not Significant** in terms of EIA.

Additional Mitigation

Demolition and Construction Stage

6.92 Given no significant effects are identified, no additional mitigation measures are proposed.

Operation Stage

6.93 Given no significant effects are identified, no additional mitigation measures are proposed.

Enhancement Measures

6.94 It is proposed that the procurement of local employment wherever possible is encouraged. If feasible, and available, local suppliers should also be used for goods and services. Jobs created should be advertised and made available in the local area initially in order to maximise this opportunity. This would result in a more positive effect on local employment and the local economy.

Assessment of Residual Effects

Demolition and Construction Residual Effects

6.95 As no additional mitigation would be required, the residual demolition and enabling works effects remain as reported in the assessment of effects section.

Operation Residual Effects

6.96 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section.

Summary of Residual Effects

Table 6.8 provides a summary of the outcomes of the population and human-health assessment of the proposed development. Where **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 6-8: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and Construction								
Local Residents and Economy	Creation of Employment (Small area scale)	None required	Not-significant - Slight	+	L	D	R	T
Local Residents and Economy	Creation of Employment (Electoral division and South Dublin County scale)	None required	Imperceptible	+	L	D/I	R	T
Local Residents and Economy	Introduction of Resident Population (Small area scale)	None required	Not significant – Slight	-	L	D/I	IR	T
Local residents	Air quality effects	None required	Not significant – Slight	-	L	D/I	IR	T
Local residents	Noise effects	None required	Not Significant – Slight	-	L	D	IR	T
Local residents	Transport effects	None required	Not Significant – Slight	-	L	D	IR	T
Local residents	Amenity	None required	Imperceptible	-	L	D	R	T
Operation								
Local Residents and Economy	Creation of Employment (Small area scale)	None required	Not-significant - Slight	+	L	D	IR	Lt - P

Table 6-8: Summary of Residual Effects

Local Residents and Economy	Creation of Employment (Electoral division and South Dublin County scale)	None required	Imperceptible	+	L	D	IR	Lt - P
Local residents	Air quality effects	None required	Not significant – Slight	-	L	D/I	IR	Lt - P
Local residents	Noise effects	None required	Not Significant – Slight	-	L	D	IR	Lt - P
Local residents	Transport effects	None required	Not Significant – Slight	-	L	D	IR	Lt - P
Local residents	Amenity	None required	Imperceptible	-	L	D	IR	Lt - P

Notes:
* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;
L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.
** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

Table 6-9 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 6-9: Inter-Project Cumulative Effects

Cumulative Development	Demolition Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Microsoft - Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 [SD20A/0283]	No	The demolition and construction stage would not overlap with the proposed development demolition and construction stage and therefore cumulative effects would not occur.	Yes	The operation of the cumulative scheme would overlap with the construction year of the proposed development (2024).
UBC Properties -Grange Castle South Business Park, Dublin 22 [An Bord Pleanála Reference – 308585]			No	The cumulative scheme would be operational at the same time as the proposed development; however, the air quality, noise and transport assessments have reported no significant operational cumulative effects.
Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]			No	The proposed amendments to the cumulative scheme would not generate additional effects.
Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD18A/0134]			Yes	The opening year is 2020. Therefore, the operation phase will overlap with the construction and operation stage of the proposed development.
Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0295]			No	The proposed amendments to the cumulative scheme would not generate additional effects.
Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [An Bord Pleanála Ref - 309146]			Yes	Building A partially open, Building B and the proposed GIS substation is scheduled to be complete by Q4 of 2022. Operation stage would overlap with the operation stage of the proposed development.
Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22			No	The proposed amendments to the cumulative scheme would not

Table 6-9: Inter-Project Cumulative Effects

Cumulative Development	Demolition Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
[SD22A/0156]				generate additional effects.
Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0217]			No	The cumulative scheme would be operational at the same time as the proposed development; however, the air quality, noise and transport assessments have reported no significant operational cumulative effects.
UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	Yes	The construction phase would overlap[with he construction and operation of the proposed development.	No	The cumulative scheme would not be operational, when the proposed development would be operational. The opening year of the cumulative scheme is 2028.
Vantage Data Centers Dub 11 Limited - Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22 [An Bord Pleanála Ref - 312793]	Yes	Construction phase would overlap with the construction stage of the proposed development.	No	The EirGrid connection would power the site data centers; however, the air quality, noise and transport assessments have reported no significant operational cumulative effects.
Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	Yes	Construction Period 2023-2025 would overlap with the operation stage of the proposed development	No	The air quality, noise and transport assessments have reported no significant operational

Table 6-9: Inter-Project Cumulative Effects

Cumulative Development	Demolition Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
				cumulative effects
Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	Yes	Two-year construction period (not defined 2023-2025). Assumed that the construction stage will overlap with both the construction of the proposed development.	Yes	Opening year is 2025.

Demolition and Construction Cumulative Effects

6.97 Demolition and construction cumulative effects would arise from the following development:

- UBC Properties – Profile Park [SD20A/0121] in respect of transport;
- Vantage Data Centers Dub11 Limited [An Bord Pleanála Ref - 312793] in respect of transport;
- Centrica Business Solutions – Profile Park [SD21A/0167] in respect of air quality and transport and accessibility effects; and
- Equinix (Ireland) Ltd – Plot 100 [SD21A/0186] in respect of air quality and transport and accessibility effects.

6.98 The demolition and construction stage of the cumulative developments listed above would overlap with the construction stage of the proposed development. To reduce the transport and accessibility effect the appointed demolition and construction contractor(s) and applicant would consult neighbouring developments on the programme and the scheduling of vehicle movements would be undertaken. Through these mitigation measures the effects of accidents and safety, driver delay and pedestrian severance, delay, amenity, fear, and intimidation, on human health would be minimised.

Operation Cumulative Effects

6.99 Operation cumulative effects would arise from the following developments:

- Microsoft - Grange Castle Business Park [SD20A/0283] in respect of transport and accessibility effects;
- Cyrus One - Grange Castle Business Park [SD18A/0134] in respect of transport and accessibility effects;
- Cyrus One - Grange Castle South Business Park [An Bord Pleanála Ref - 309146] in respect of transport and accessibility effects; and
- Equinix (Ireland) Ltd – Plot 100 [SD21A/0186] in respect of transport and accessibility effects.

6.100 The operation stage cumulative developments listed above would overlap with the operation stage of the proposed development. Within the traffic and transport assessment, daily trip generation and distribution traffic flows have been incorporated within the baseline assessment.

Summary of Assessment

Background

6.101 This chapter has detailed the potential population and human health effects associated with the demolition and construction stage and operation stage of the proposed development. The assessment has been undertaken considering the relevant national and local guidance and regulations.

6.102 The baseline assessment has been made using publicly available information from the 2016 South Dublin County Census, within which three areas were examined: South Dublin County, Clondalkin Village Electoral Division and Clondalkin Village SA. For the purpose of this population and human health assessment census data for Clondalkin Village SA was compared against the census data for Clondalkin Village ED and South Dublin County.

6.103 At the time of the 2016 Census, the Clondalkin Village SA population was 257. In terms of the population breakdown, Clondalkin Village has a lower-than-average younger population (0-19) and a significantly higher elderly population compared with Clondalkin Village SA and South Dublin County. When assessing population health. Clondalkin Village has a lower % of residents rating their health as good compared with Clondalkin Village ED and South Dublin County. The highest proportion of employment in Clondalkin Village SA is within the agriculture, forestry and fishing sector and the building and construction industry, compared with Clondalkin Village ED and South Dublin County as a whole.

Demolition and Construction Effects

6.104 Demolition and construction stage effects for population and human health were considered in terms of employment generation, introduction of resident population, air quality, noise, transport and accessibility and amenity effects.

6.105 Overall, it is considered that the demolition of the existing property and construction of the proposed development would result in a mixture of negative (air quality; noise; transport amenity effects and introduction of resident population) and positive (creation of employment) effect on population and human health receptors and would **not give rise to significant** effects on population and human health.

Operation Effects

6.106 Operation effects for population and human health were considered in terms of employment generation, air quality, noise, transport and accessibility and amenity effects.

6.107 The assessment identified numerous positive (Creation of employment) and negative effects (air quality; noise; transport and amenity effects) in relation to population and human health. Overall, it is considered that the operational development would result in a neutral effect on population and human health receptors and would **not give rise to significant effects** on population and human health.

Cumulative Effects

6.108 The cumulative effects of the proposed development and neighbouring schemes has been considered with the relevant technical topic assessments of the EIAR.

6.109 The demolition and construction stage of a number of cumulative developments would overlap with the construction stage of the proposed development. The increase in traffic resulting from the cumulative development is not predicted to result in any significant effects on population and human health.

6.110 The operation stage of a number of cumulative schemes would overlap with the operation stage of the proposed development. The increase in traffic resulting from the cumulative development is not predicted to result in any significant effects on population and human health.

7A TRANSPORT AND ACCESSIBILITY

Introduction

7.1 This chapter of the EIAR reports on the likely significant Transport and Accessibility effects to arise from the demolition and construction stage and the operation stage of the proposed development.

7.2 The chapter describes the Transport and Accessibility policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely Environmental Impact Assessment Report effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects. Where relevant, the assessment follows the methodology set out in the Institute of Environmental Management and Assessment Guidelines for the Environmental Assessment for Road Traffic.[1]

7.3 This chapter is supported by the following technical appendices in EIAR Volume 3:

- Technical Appendix 7.1: Traffic Flow and Distribution Diagrams
- Technical Appendix 7.2: Accident Data;
- Appendix 7.3: Cumulative Schemes Daily Traffic Flow Diagrams; and
- Appendix 7.4: Proposed Development Trip Generation.

Methodology

7.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - National Planning Framework (NPF) 2018[2];
- Regional Policy:
  - South Dublin County Development Plan 2022-2028[3];
- National guidance and Industry Standards:
  - IEMA Environmental Assessment for Road Traffic, 1993[4]; and
  - EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2017[5].

International Legislation

National Planning Framework (NPF) 2018

7.5 The National Planning Framework (NPF) was published in February 2018, and updated in November 2021, setting out a vision for Ireland in land use and planning terms to 2040. The NPF replaced the National Spatial Strategy once it was adopted as the long-term land use and planning vision for Ireland.

7.6 National Strategic Outcome 6 of the NPF relates to the creation of "A Strong Economy Supported by Enterprise, Innovation and Skills". This strategic outcome is underpinned by a range of objectives relating to job creation and the fostering of enterprise and innovation. The following objective, relating to Information and Communications Technology (ICT) infrastructure is included under National Strategic Outcome 6:

> "Promotion of Ireland as a sustainable international destination for ICT infrastructures such as data centres and associated economic activities".

7.7 The NPF also states that "Ireland is very attractive in terms of international digital connectivity, climatic factors and current and future renewable energy sources for the development of international digital infrastructures, such as data storage facilities. This sector underpins Ireland's international position as a location for ICT and creates added benefits in relation to establishing a threshold of demand for sustained development of renewable energy sources."

7.8 National Strategic Outcome 5 relates to sustainable mobility and main target is "to expand attractive public transport alternatives to car transport to reduce congestion and emissions and enable the transport sector to cater for the demands associated with longer term population and employment growth in a sustainable manner through the following measures:

- Deliver the key public transport objectives of the Transport Strategy for the Greater Dublin Area 2016 to 2035;
- Provide public transport infrastructure and services to meet the needs of smaller towns, villages and rural areas; and
- Develop a comprehensive network of safe cycling routes in metropolitan areas to address travel needs and to provide similar facilities in towns and villages where appropriate".

Regional Policy

South Dublin County Development Plan 2022-2028

7.9 The South Dublin County Development Plan 2022-2028 has been prepared in accordance with the requirements of the Planning and Development Act 2000 (as amended) and sets out an overall strategy for the proper planning and sustainable development of the County.

7.10 The Sustainable Movement chapter contains policies and objectives that seek to achieve this goal, and which will assist South Dublin County in achieving its climate action targets. There is also significant scope for movement and transport corridors to form important links in the Council's green infrastructure network as they provide opportunities for additional and replacement planting of native species and pollinators, which will in turn contribute to biodiversity and carbon sequestration.

7.11 The Council recognises that new development, both residential and commercial, permitted in line with this Plan will lead to additional trips being generated. The Council will work with the relevant agencies to seek to ensure that as high a proportion as possible will be conducted by sustainable means. However, it is accepted that a residual proportion of the trips generated will be taken by private vehicle. The challenge is to ensure that this does not add to existing levels of congestion or saturation of the road network.:

- Policy SM1: Overarching – Transport and Movement- Promote ease of movement within, and access to South Dublin County, by integrating sustainable land-use planning with a high-quality sustainable transport and movement network for people and goods.

7.12 One of the major challenges facing the County during the life of this Plan is the need to promote and provide for sustainable transport options, whilst maintaining the effectiveness of the County's road network.

[1] Institute of Environmental Management and Assessment, 1993. Guidelines for the Environmental Assessment for Road Traffic.
[2] National Planning Framework, 2018
https://www.gov.ie/en/publication/daa56-national-planning-framework-ireland-2040-our-plan-npf-2018/
[3] South Dublin County Development Plan 2022-2028
https://www.sdcc.ie/en/devplan2022/stage-2-draft-plan/consolidated-draft-county-development-plan/1-draft-south-dublin-county-development-plan 2022-2028.pdf
[4] IEMA Environmental Assessment for Road Traffic, Institute of Environmental Assessment, 1993.
[5] Environmental Protection Agency, August 2017, Guidelines on the Information to be contained in Environmental Impact Assessment Reports.

National Guidance and Industry Standards

IEMA Environmental Assessment for Road Traffic, 1993

7.13 As agreed with SDCC Highways, IEMA (Institute of Environmental Management and Assessment) methodology has been used for the appraisal of traffic impacts for the proposed development. It should be noted that Republic of Ireland forms part of the IEMA Regional Network.

7.14 The purpose of the IEMA Guidelines is to provide the basis for a systematic, consistent and comprehensive coverage for the appraisal of traffic impacts for a wide range of development projects.

7.15 The EIA process should be a continuous activity running throughout the planning and design stages of a project.

7.16 To ensure the comprehensive coverage of the environmental impacts arising from changes in traffic levels, the IEMA Guidelines identify a check list of potential impacts such as driver severance and delay, pedestrian severance and delay, pedestrian amenity, accidents and safety, hazardous and dangerous roads etc.

7.17 According to the IEMA Guidelines the assessment of the environmental impacts of traffic requires the following stages:

- Determination of existing and forecast traffic levels and characteristics;
- Determining the time period suitable for assessment;
- Determining the year of assessment; and
- Identifying the geographical boundaries of assessment.

7.18 Further, the study area will be defined by identifying any link or location where it is considered that significant environmental effects may occur as a result of the proposed scheme.

7.19 The IEMA Guidelines state two rules to be considered when assessing the impact of development traffic on a highway link:

- Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles (HGVs) will increase by more than 30%); and
- Include any other specifically sensitive areas where traffic flows will increase by 10% or more.

7.20 Less than a 30% increase is considered to result in imperceptible changes in the environmental effects of traffic. The IEMA Guidelines considered that projected changes in traffic flows of less than 10% create no discernible environmental effect.

7.21 Specifically, sensitive areas referred to above may include accident 'black spots', conservation areas, hospitals or links with high pedestrian flows.

Consultation

7.22 Table 7-1 summarises the key consultations that have been undertaken with respect to the Transport and Accessibility assessment.

Table 7-1: Summary of Consultation

Consultee /Date	Summary of Comments	Where in this Chapter Comments are addressed
South Dublin County Council (SDCC) Consultation Meeting 21/09/2022	Accepted the proposed approach to the assessment of potential effects for traffic and transport. It was explained to SDCC that the approach to the transport assessment within the EIA would be consistent with that of the July 2022 DUB-1 permitted development. Baseline traffic flows would be ascertained from the 2019 AWS TIA, and used as a basis for the transport assessment in the EIAR.	Contained herein

Assessment Scope

7.23 The IEMA Environmental Assessment for Road Traffic Guidance (1993) has been followed in undertaking the assessment. The EPA terminology has been applied where appropriate.

Technical Scope

7.24 The technical scope of the assessment has considered the potential impacts of the traffic generation during the demolition and construction stage and the operation stage.

7.25 The assessment will consider the potential impacts of operation and demolition and construction traffic generation on relevant receptors.

Spatial Scope

7.26 In accordance with the IEMA Guidelines, the study area has been defined by identifying any link or location where it is considered that significant environmental effects could occur as a result of the proposed development.

7.27 The local highway network study area has been informed by the following two rules, as set out in IEMA Guidelines:

- Rule 1: include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles (HGVs) will increase by more than 30%); and
- Rule 2: include any other specifically sensitive areas where traffic flows have increased by 10% or more.

7.28 The assessment has been undertaken when the perceived environmental impact is at its greatest during the operation stage, in 2025, and during the demolition and construction stage in 2024. The assessment scenarios considered are identified in 7.4.10.

7.29 Sensitive receptors on each arm of the following junctions along the R134 New Nangor Road have been considered:

- Junction 1: Adamstown Road (R120)/Nangor Road (R134);
- Junction 2: Nangor Road (R134)/Baldonnel Rad (L2001);
- Junction 3: Nangor Road (R134)/Kilcarbery Park/Falcon Avenue;
- Junction 4: Nangor Road (R134)/Grange Castle Business Park North/Grange Castle Gold Course; and
- Junction 5: Grange Castle Road (R136)/Nangor Road (R134).

7.30 The study area has been defined in Figure 7-1.

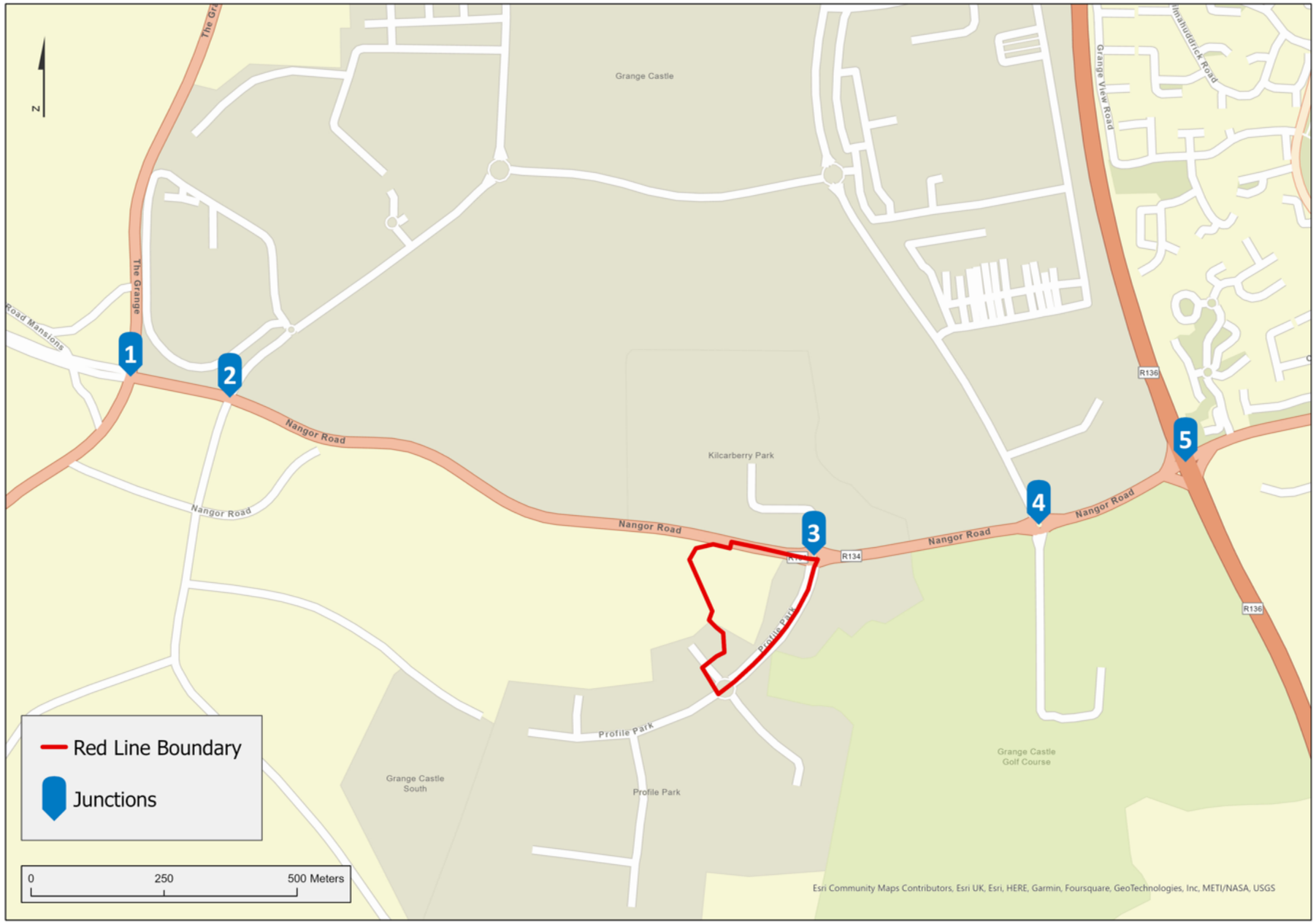


Figure 7-1 Study Area

Temporal Scope

7.31 The assessment has considered impacts arising during the demolition and construction stage and the operation stage which would be expected to be temporary (less than one year) and long term (15 to 60 years) to permanent (>60 years) in nature respectively.

7.32 The assessment would consider the future years at which the peak demolition and construction traffic of the development occurs and when the proposed development is built out and fully operational. It has been assumed that the peak demolition and construction traffic would occur in 2024, whilst according to the indicative programme the proposed development would be fully operational in 2025. The assessment scenarios are anticipated to be:

- Demolition and Construction Stage:
  - Existing Baseline (2022);
  - Future Baseline (2024) Construction and Operation Stage flows for 2024 associated with the July 2022 DUB-1 permitted development (Do Nothing – including cumulative developments);
  - Future Baseline (2024) Construction and Operation Stage flows for 2024 associated with the July 2022 DUB-1 permitted development + Year of Peak Demolition and Construction Works of Proposed Development (2024) + Cumulative Development (Do Something).
- Operation Stage:
  - Existing Baseline (2022);
  - Future Baseline (2025) July 2022 DUB-1 permitted development Operational (Do Nothing – includes cumulative developments);
  - Future Baseline (2025) July 2022 DUB-1 permitted development Operational + Operational Year Baseline of Proposed Development (2025) + Cumulative Schemes (Do Something).

Baseline Characterisation Method

Desk Study

7.33 In order to establish the existing Transport and Accessibility conditions in the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- The approved SD20A/0121 Traffic Impact Assessment[6];
- Google Maps; and
- Road Safety Authority (RSA)[7].

Field Study

7.34 Specific traffic surveys have not been undertaken for this Transport and Accessibility EIAR. For consistency, the traffic data used in the July 2022 DUB-1 permitted development EIAR has been considered. The traffic data contained within the submitted Grange Castle Business Park South, Baldonnel, Dublin 22 Traffic Impact Assessment (Ref SD20A/0121) enables this EIAR to proceed in accordance with the agreed EIAR scope of assessment.

7.35 A Manual Classified Turning Count was undertaken on Tuesday 17 December 2019 by Irish Traffic Surveys (ITS) between 07:00 and 19:00. The weekday peak hour background traffic flows have been found to occur at:

- AM peak (07:30 to 08:30); and
- PM peak (16:30 and 17:30).

[6] Proposed Data Centres, Grange Castle Business Park South, Baldonnel, Dublin 22 Traffic Impact Assessment, prepared by CS CONSULTING GROUP for UBC Properties, May 2020.

[7] https://www.rsa.ie/

7.36 The junctions where traffic surveys were carried out and are within the study area are the following:

- Junction 1: Adamstown Road (R120)/Nangor Road (R134);
- Junction 2: Nangor Road (R134)/Baldonnel Road (L2001);
- Junction 3: Nangor Road (R134)/Kilcarbery Park/Profile Park;
- Junction 4: Nangor Road (R134)/Grange Castle Business Park North/Grange Castle Gold Course; and
- Junction 5: Grange Castle Road (R136)/Nangor Road (R134).

Assessment Method

Methodology

7.37 In the case of the proposed development the sensitive receptors have been considered to be pedestrians and cyclists, road users and the local highway network. The study area includes links and junctions which provide the most direct access routes to the application site and are, therefore, most likely to be affected by traffic arriving and departing the site. Any links that do not meet defined selection criteria, have not been considered as part of the study area and have been excluded from further analysis in the assessment of significance of effect section.

Assessment Scenarios

Demolition and Construction Stage

7.38 The demolition and construction traffic assessment has been limited to the roads immediately adjacent to the application site and any roads further afield where the 30% increase in traffic threshold is breached. Potential demolition and construction traffic impacts from the proposed development have been assessed proportionately based upon the number of vehicle movements identified in the July 2022 DUB-1 permitted development (SD21A/0241) which was based on the previous approved SD20A/0121 application. The assessment focuses on the most intensive year in terms of the number of demolition and construction vehicle movements, which has been considered against the 2022 Baseline.

7.39 The demolition and construction stage will take place between 2024 to 2025. It has been assumed that the most intensive year in terms of vehicle movements would be 2024.

Operation Stage

7.40 The proposed development is anticipated to be completed and fully operational in 2025, when all occupants will be on-site. The assessment would consider the full quantum of development at this future year.

7.41 Estimated trip generation for the proposed development was provided for the assessment.

7.42 Trips were distributed onto the local highway network based upon the directional splits from the 2019 traffic survey data that was used in support of the SD20A/0121 application.

Pedestrian Severance, Delay, Amenity, Fear and Intimidation

7.43 Pedestrian severance, delay, amenity, fear and intimidation has been assessed by considering baseline traffic flows, future year traffic flows, as well as the potential impact of the proposed development in terms of change in traffic flows on each link within the study area. Consideration has been given to daily traffic flows (24-hour Annual Average Daily Traffic (AADT)) in respect of pedestrian severance, amenity, fear and intimidation for the demolition and construction stage and the operation stage.

Driver Delay

7.44 The assessment considers the duration of delays or benefits occurring to road users on the local highway network based upon the estimated increase in traffic resulting from the proposed development for the demolition and construction stage and the operation stage.

Accidents and Safety

7.45 The likely increase or decrease in the number of accidents resulting from the changes in traffic flows and composition for the demolition and construction stage and the operation stage has been considered. Personal Injury Accident (PIA) data can usually be obtained from the Road Safety Authority website however, the RSA is currently in the process of reviewing its road traffic collision (RTC) data sharing policies and procedures. Therefore, the latest accident data available for a five-year period is from 2011 to 2016.

Cumulative Stage

7.46 A review of cumulative schemes and their potential impacts on traffic flows on the local highway network has been undertaken. Predicted traffic flows generated by each of the following cumulative schemes have been considered:

- Microsoft – Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 (SD20A/0283);
- UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 (SD20A/0121);
- Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 (SD18A/0134);
- Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 (SD20A/0295);
- Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 (309146);
- Centrica Business Solutions, Profile Park, Baldonnel, Dublin 22 (SD21A/0167);
- Equinix (Ireland) Ltd, Plot 100 Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD21A/0186);
- UBC Properties -Grange Castle South Business Park, Dublin 22 (An Bord Pleanála Reference – 308585);
- Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 (SD17A/0377);
- Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD22A/0156);
- Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD21A/0217); and

7.47 SID Application to provide the proposed development and July 22 DUB-1 Consented Development permanent electrical connection to the EIR grid (312793).All the aforementioned cumulative schemes are located in close proximity to the site.

7.48 The traffic data associated with the selected cumulative developments has been sourced from their respective Traffic Impact Assessment reports on the South Dublin County Council planning portal. Details of the construction or operational phases of the cumulative developments included in this assessment are identified in Table 7.18.

Assessment Criteria

7.49 The EPA and IEMA Guidelines were reviewed in order to identify appropriate significance criteria applicable to the assessment.

7.50 Paragraph 4.5 of the IEMA Guidelines states that: "For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible".

7.51 Under EPA guidelines quality effects are described as either:

- Positive – a change which improves the quality of the environment (such as reduction of traffic, travel time or patronage, or provision of a new service, access or facility);
- Neutral – no effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error; or
- Negative – a change which reduces the quality of the environment (such as increase of traffic, travel time, patronage or loss of service or facility).

Pedestrian Severance, Delay, Amenity, Fear and Intimidation

7.52 The significance of pedestrian severance, delay, amenity, fear and intimidation effects has been determined by considering future baseline traffic flows obtained from the traffic surveys, as well as the potential impact of the proposed development in terms of change in traffic flows on each link within the study area by reference to the IEMA Guidelines and applying professional judgment.

Pedestrian Severance

7.53 The IEMA Guidelines acknowledge that the measurement and prediction of severance is extremely difficult and that the correlation between the extent of severance and the physical barrier of a road is not clear. It notes that there are no predictive formulae which give simple relationships between traffic factors and levels of severance. However, the IEMA Guidelines do accept that in general, marginal changes in traffic flows are, by themselves, unlikely to create or remove severance.

7.54 Factors which need to be considered when determining severance comprise road width, traffic flows, speed of traffic, the presence of pedestrian crossing facilities and the number of pedestrian movements across the affected route.

7.55 The IEMA Guidelines suggest that:

- Changes in flow of up to 30% would produce slight changes in severance;
- Changes in flow of up to 60% would produce moderate changes in severance; and
- Changes in flow of up to 90% would produce substantial changes in severance.

7.56 It is recognised that these are guidelines only and are highly dependent on existing ambient traffic levels. They are not considered to be definitive measures of severance and should be used with care and regard paid to specific local conditions. The guidelines have been used to inform impact magnitude criteria for the assessment. Professional judgment has been applied to identify the likely scale of effects.

Pedestrian Delay

7.57 The IEMA Guidelines note that changes in the volume, composition and or speed of traffic may affect the ability of people to crossroads. Typically, increases in traffic levels result in increased pedestrian delay, although increased pedestrian activity itself also contributes. The IEMA Guidelines do not set any thresholds for absolute or actual changes in delay, recommending instead that assessors use their judgment to determine the significance of the impact.

7.58 The IEMA Guidelines refer to a report published by the Transport Research Laboratory (TRL) as providing a useful approximation for determining pedestrian delay. The TRL research[8] concludes that the mean pedestrian delay was found to be eight seconds at flows of 1,000 vehicles per hour, and below 20 seconds at 2,000 vehicles per hour for various types of crossing condition.

7.59 A two-way flow of 1,400 vehicles per hour has been adopted as a lower threshold for assessment (equating to a mean 10 second delay for a link with no pedestrian facilities) in the TRL report. Below this flow, pedestrian delay is unlikely to be a significant factor. This is deemed a robust starting point for narrowing down the modelled routes within the study area and ensuring the routes selected exceeded the suggested threshold of analysis in IEMA Guidelines. It should be noted that for controlled forms of pedestrian crossing the pedestrian delays are less.

7.60 As a result, any road with a two-way flow of less than 1,400 vehicles is deemed to have a negligible effect. Roads above this are assessed on the basis of professional judgment.

Pedestrian Amenity

7.61 IEMA Guidelines define pedestrian amenity as the relative pleasantness of a journey and may be influenced by fear and intimidation if they are relevant. As with pedestrian delay, pedestrian amenity is considered to be affected by traffic volumes and composition along with pavement width and pedestrian activity. The

[8] Transport Research Laboratory, 1991. The Estimation of Pedestrian Numbers.

IEMA Guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flows are halved or doubled.

7.62 The Guidelines have been used to inform impact magnitude criteria for the assessment. Professional judgment has been applied to identify the likely scale of effects.

Pedestrian Fear and Intimidation

7.63 A number of factors are considered relevant in determining changes in the level of fear and intimidation experienced by pedestrians and cyclists including volume of traffic; percentage of HGVs; speed of traffic; proximity to people; and the availability and quality of pedestrian infrastructure.

7.64 The IEMA Guidelines sets out the criteria in Table 7-2 for measuring the effects of fear and intimidation.

Table 7-2: Pedestrian Fear and Intimidation Criteria

Degree of Hazard	Average Traffic Flow over 18hr day (vehicles per hour)	Total 18-hour HGV Flow	Average Speed (mph)
Extreme	1,800+	3,000+	20+
Great	1,200–1,800	2,000–3,000	15-20
Moderate	600–1,200	1,000–2,000	10-15

7.65 The IEMA Guidelines stress the need for professional judgment when applying the above criteria. Accordingly, the guidelines have been used to inform impact magnitude criteria for the assessment. Professional judgment has been applied to identify the likely scale of effects.

Driver Delay

7.66 IEMA Guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at or close to the capacity of the system. Professional judgment has been applied to determine the significance of residual effects.

Accidents and Safety

7.67 There is no formal published guidance for the assessment of accidents and safety. Therefore, professional judgment has been applied to assess the implications of local circumstances and the proposed development's likely effect which may increase or decrease the risk of accidents.

Receptor Sensitivity/Value Criteria

Highway Network

7.68 The potential receptors are the users of transport networks within the relevant study area. The sensitivity of a road can be defined by the vulnerability of the user groups who are likely to use it, i.e. the elderly or children. A sensitive area may be where pedestrian activity is high, near a school, or an accident black spot. it also takes into account the existing nature of the road, i.e. an existing residential area is likely to be more sensitive than an A road.

7.69 Professional judgement has been used to define the value of receptors in accordance with LA 104[9] Section 3.1.

7.70 The sensitivity of receptors has been classified as low, medium or high, in accordance with the criteria set out in Table 7-3.

Table 7-3: Receptor Sensitivity Criteria

Sensitivity	Criteria

[9] LA 104 Environmental Assessment and Monitoring, Rev 01, DMRB, July 2019.

Table 7-3: Receptor Sensitivity Criteria

Sensitivity	Criteria
High	Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident clusters, retirement homes, roads without footways that are used by pedestrians.
Medium	Receptors of moderate sensitivity to traffic flow: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, recreation facilities.
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, tourist attractions and residential areas with adequate footway provision.
Very Low	Receptors with very low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.

Impact Magnitude Criteria

7.71 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 7-4.

Table 7-4: Impact Magnitude Criteria

Impact	Assessment Criteria			
	Low	Medium	High	Very High
Severance	Increase in total traffic flows of 30% or under	Increase in total traffic flows of 30%–60%	Increase in total traffic flows of 60% - 90%	Increase in total traffic flows of 90% and above
Pedestrian Severance, Delay, Amenity, Fear and Intimidation	This has been assessed on a case by case basis using professional judgement subject to the sensitivity and vulnerability of the receptor. Threshold for judging the significance of changes to pedestrian amenity where the traffic flows is halved or doubled.			
Driver Delay	This has been assessed on a case by case basis using professional judgement subject to the sensitivity and vulnerability of the receptor. Impacts are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system.			
Accidents and Safety	Accident data for the local area have been reviewed and professional judgement have been applied to assess the implications of potential increase/decrease in traffic.			

Scale of Effect Criteria

7.72 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 7-5. The matrix has been informed by the EPA Guidelines.

Table 7-5: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors			
	Very Low	Low	Medium	High
Low	Imperceptible	Not Significant	Slight	Slight
Medium	Not Significant	Slight	Slight	Moderate-Significant
High	Slight	Slight	Moderate-Significant	Very Significant
Very High	Slight	Moderate-Significant	Very Significant	Profound

7.73 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA

7.74 Where the existing baseline HGV or total traffic flows are very minor, a small increase in vehicles would produce a large change in magnitude whereas in real terms the increase in traffic may still be considered to be negligible or slight. In these instances, appropriate professional and experienced judgements have been made.

Nature of Effect Criteria

7.75 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

7.76 The assessment has relied on 2019 traffic survey data extracted from the approved SD20A/0121 Traffic Impact Assessment. It has been assumed that these data sets have been reported correctly.

7.77 It has been assumed that the AM and PM peak from each cumulative scheme will occur at the same peak periods with the 2019 traffic survey data.

7.78 Unit 5.5 of the TII Project Appraisal Guidelines[10] (Link-Based Traffic Growth Forecasting) has been used to apply growth factors to 2019 traffic data to generate the future baseline.

Baseline Conditions

Existing Baseline

7.79 The following paragraphs provide an overview of the current baseline transport and accessibility conditions within the study area considering pedestrian and cycle facilities and access; public transport accessibility; and the operation of the existing highway network. Consideration is also given to the existing baseline flows where available. This analysis provides the baseline context against which the transport movements and accessibility of the proposed development have been assessed.

Local Highway Network

7.80 The site is accessed off Falcon Avenue which is a street-lit dual carriageway providing access to the businesses within Profile Park and forms a junction with the R134 New Nangor Road and Grange Castle Business Park. Falcon Avenue is subject to a 50km/hr speed limit.

7.81 The site is located adjacent to the R134 New Nangor Road which is a street-lit single carriageway road and is subject to a 40km/h speed limit. The R134 connects the R120 to the west and R136 to the east.

7.82 The R136 is a street-lit dual carriageway road subject to an 80km/h speed limit. The R136 connects the N4 to the north with the N7 to the south. The R136 accommodates two lanes for general traffic and a bus lane in each direction, a shared foot/ cycle path of approximately 3m are present on both sides of the highway.

7.83 Traffic data from various sources including traffic surveys commissioned in December 2019 has been used to inform the assessment and to provide baseline traffic flows. Table 7-7 presents the baseline traffic figures 2022 AADT, % HGV and link speed limits.

Table 7-7: 2022 Baseline Traffic Data

Location	Direction	Speed Limit (kph)	2022 Baseline	
			AADT	%HGV
R120 Adamstown Road (N)	SB	80	5,082	5%
	NB	80	4,386	11%
R134 New Nangor Road (E)	EB	40	6,496	8%
	WB	40	5,339	9%
R120 Adamstown Road (S)	SB	80	4,109	6%
	NB	80	4,569	4%
R134 New Nangor Road (E)	EB	40	5,758	8%
	WB	40	5,317	9%
Baldonnel Road (S)	SB	60	3,503	10%
	NB	60	3,031	9%
R134 New Nangor Road (W)	EB	40	6,100	8%
	WB	40	5,186	10%
Kilcarbery Park (N)	SB	40	1,218	19%
	NB	40	1,172	26%
R134 New Nangor Road (E)	EB	40	7,002	9%
	WB	40	6,549	11%
Falcon Avenue	SB	50	278	20%
	NB	50	250	14%
R134 New Nangor Road (W)	EB	40	6,033	8%
	WB	40	5,599	9%
Grange Caste Business Park (N)	SB	40	2,671	11%
	NB	40	2,652	11%
R134 New Nangor Road (E)	EB	40	7,861	11%
	WB	40	7,617	12%
Grange Caste Business Park (S)	SB	40	126	0%
	NB	40	121	0%
R134 New Nangor Road (W)	EB	40	7,077	10%
	WB	40	6,847	11%
R136 Grange Caste Road (N)	SB	80	8,366	4%
	NB	80	9,058	4%
R134 New Nangor Road (E)	EB	40	7,749	7%
	WB	40	6,698	7%
R136 Grange Caste Road (S)	SB	80	13,223	7%
	NB	80	14,391	6%
R134 New Nangor Road (W)	EB	40	7,899	11%
	WB	40	7,363	11%

Public Transport

Bus Services

7.84 The nearest bus stops are located in both directions on the R134 Nangor Road, within 600 m of the site, from which frequent routes operate between the site and Dublin city centre. The bus stops are served by three bus services, which are presented in Table 7-8.

Table 7-.8: Bus Services

Service/ Bus Stop	Bus Route	Frequency (minutes)		
		Monday	Saturday	Sunday

[10] https://www.tii.ie/tii-library/strategic-planning/project-appraisal-guidelines/Unit-5.5-Link-Based-Traffic-Forecasting.pdf

Table 7-.8: Bus Services				
13	Grange Castle - Harristown	EB: 15mins (05:50-23:30) WB: 15mins (05:30-23:30)	EB: 15mins (06:10-23:30) WB: 15mins (06:10-23:30)	EB: 15mins (07:00-23:30) WB: 15mins (07:00-23:30)
68	Hawkins Street to Newcastle/Green ogue Business Park	EB: 60mins (06:00-00:15) WB: approximately 60mins (06:00-00:15)	EB: 60mins (06:35-00:15) WB: approximately 60mins (06:40-23:30)	EB: 75mins (10:15-00:25) WB: 75mins (09:00-23:30)
68X	Newcastle/Green ogue Business Park to Hawkins Street	One service at 07:30	N/A	N/A

National Rail

7.85 Clondalkin/Fonthill railway station is located at approximately 3km to the northeast of the site from which frequent commuter services operate to/from Dublin city.

7.86 Citywest Campus Luas Tram Stop is approximately 4km to the southeast of the site from which frequent tram services to Dublin city and beyond can be accessed.

Walking and Cycling Network

Pedestrians and Cyclists

7.87 The pedestrian and cycle environment in the site vicinity is of a high standard, with wide, well-lit lengths of dedicated and segregated off-road cycle and pedestrian routes.

7.88 Pedestrian and cyclist access to the proposed development will be via Falcon Avenue where footpaths of approximately 3m are provided on both sides of the road.

7.89 Falcon Avenue intersects with the R134 New Nangor Road at a four-arm roundabout. Pedestrian crossing facilities with dropped kerbs and tactile paving are provided an all arms of the roundabout, except the northern arm (Kilcabery Park).

7.90 A shared use footway/cycleway of approximately 5 m is provided on the northern side of the R134 New Nangor Road, whilst shared foot/cycle paths of approximately 3 m are present on both sides of the R136.

7.91 Signal-controlled toucan crossings with dropped kerbs and tactile paving are provided on all arms of the R134 New Nangor Road/R136.

Accident Data

7.92 A summary of reported accidents between 2012 to 2016, within the locality of the application site is presented in Table 7-9.

Table 7.9: 2012 to 2016 Accident Data				
Year	**Severity**			
	Slight	Serious	Fatal	Total Accidents
2012	1	0	0	1
2013	1	0	0	0
2014	2	0	1	3
2015	6	0	0	6
2016	4	0	0	4

7.93 One fatal accident occurred at the R134 New Nangor Road/R136 junction in 2014, with the remaining accidents within the study area reported as slight.

7.94 Most of the accidents occurred at the R134 New Nangor Road/R136 junction, with three slight accidents reported at the Falcon Avenue/R134 New Nangor Road junction.

Future Baseline

7.95 The proposed development is an extension to the July 2022 DUB-1 permitted development and is the final phase of the wider campus and, would be operated as part of that wider co-ordinated data center campus. As such the future baseline flows consider the flows associated with the July 2022 DUB-1 permitted development as described below.

7.96 The assessment has considered future years of 2024 (peak demolition and construction stage) and 2025 (fully operational year). Future baselines include the flows from cumulative developments under construction or operation in the respective future year (does not include DUB1 or DUB13 flows). The Do Nothing demolition and construction scenario assumes the July 2022 DUB 1 consented development will be two thirds operational in 2024. This scenario includes the Future Baseline (2024) flows, two thirds of the July 2022 DUB 1 consented development operational flow, an additional 54 HGVs a day for the operation of the MFGP using HVO as the fuel source and the construction flows associated with the July 2022 DUB 1 consented development The Do Something demolition and construction scenario includes the traffic flows described above plus the peak demolition and construction flows of the proposed development.

7.97 The Do Nothing operational scenario includes the Future Baseline (2025) flows and operational flows from the July 2022 DUB-1 permitted development in 2025. The Do Something operational scenario includes the traffic flows described above plus the operational flows of the proposed development.

7.98 The data center will be accessed from two main entrances which would be from Falcon Avenue. One access/egress point would be from Falcon Avenue on the eastern border, for staff, pedestrians, and cyclists. HGVs, maintenance vehicles and delivery vehicles would access the site via the roundabout on Falcon Avenue, through the July 2022 DUB-1 permitted development.

7.99 The data center will be served by 60 car parking spaces that will be located generally to the east of the data center, of which 3 no. spaces will be disabled spaces and 6 of these spaces will be provided for electrical charging vehicles. Covered bicycle parking provision will be provided within the site. The data centre will be enclosed by landscape berms and planting to the north and north-east.

Local Highway Network

7.100 The 2024 and 2025 Baseline 'Do Nothing' traffic flows for the highway network are shown in Table 7-11.

7.101 Unit 5.5 of the TII Project Appraisal Guidelines (Link-Based Traffic Growth Forecasting) has been used to apply growth factors to 2019 traffic data to generate the future baseline. The factors applied are:

Table 7-10: Growth Factor	
Years	**Growth Factor**
2019-2022	1.015
2019-2024	1.025

2019-2025	1.030

Table 7-.11: 2024 and 2025 Baseline ('Do Nothing') Traffic Data

Location	Direction	2024 Baseline AADT	2025 Baseline AADT
R120 Adamstown Road (N)	SB	5,279	5,288
	NB	4,548	4,570
R134 New Nangor Road (E)	EB	6,883	6,880
	WB	5,605	5,632
R120 Adamstown Road (S)	SB	4,244	4,265
	NB	4,792	4,795
R134 New Nangor Road (E)	EB	6,141	6,134
	WB	5,606	5,633
Baldonnel Road (S)	SB	3,886	3,904
	NB	3,394	3,409
R134 New Nangor Road (W)	EB	6,483	6,478
	WB	5,451	5,477
Kilcarbery Park (N)	SB	1,230	1,237
	NB	1,184	1,190
R134 New Nangor Road (E)	EB	7,791	7,526
	WB	7,244	7,012
Falcon Avenue	SB	756	457
	NB	727	428
R134 New Nangor Road (W)	EB	6,419	6,413
	WB	5,891	5,920
Grange Caste Business Park (N)	SB	2,698	2,711
	NB	2,678	2,692
R134 New Nangor Road (E)	EB	8,659	8,398
	WB	8,323	8,097
Grange Caste Business Park (S)	SB	127	128
	NB	122	123
R134 New Nangor Road (W)	EB	7,867	7,602
	WB	7,545	7,315
R136 Grange Caste Road (N)	SB	8,484	8,517
	NB	9,222	9,242
R134 New Nangor Road (E)	EB	7,963	7,959
	WB	6,895	6,890
R136 Grange Caste Road (S)	SB	13,865	13,699
	NB	15,000	14,856
R134 New Nangor Road (W)	EB	8,697	8,437
	WB	8,066	7,838

Public Transport

7.102 No public transport improvements within the study area have been identified which are proposed to be implemented by 2025. Therefore, it has been assumed that the future public transport baseline in 2024 and 2025 would be the same as the existing public transport baseline.

Walking and Cycling

7.103A No improvements to the walking and cycling facilities within the study area are proposed to be implemented by 2025 by SDCC. However, as part of the proposed development the existing cycle lane to the northern boundary of the site on New Nangor Road (R134) would be extended to Falcon Avenue. This will link to the existing route further west along the R134.

7.104 Pedestrians and cyclists will access the site via Falcon Avenue in 2024 and 2025, with pedestrian and cycle routes aligned with existing routes around the site in 2025.

Sensitive Receptors

7.105 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 7-12.

Table 7-12 Summary of Sensitive Receptors

Receptor	Sensitivity
Pedestrians and cyclists	High
Local highway network	Low
Road users	Medium

Assessment of Effects

7.106 The following section describes the potential transport and accessibility impacts and effects which could arise as a result if the proposed development during the demolition and construction stage and the operation stage.

Demolition and Construction Effects

7.107 It has been assumed that the demolition and construction traffic for the proposed development will be proportional (approximately 35%) to the construction traffic used for the July 2022 DUB-1 permitted development.

Local Highway Network

7.108 It has been assumed that the peak demolition and construction period would be in 2024 when there would be a maximum of 156 demolition and construction vehicle movements per day, as identified in Table 7-13.

Table 7-13: Maximum Daily Demolition and Construction Stage Trip Generation

Total Vehicles	Arrivals		Departures		Total	
	Car	HGV	Car	HGV	Arrivals	Departures
Daily	56	22	56	22	78	78

7.109 Light and heavy vehicle construction traffic has been distributed across the surrounding network in the same manner as in the previous approved SD20A/0121 application. Light construction traffic has been distributed based upon the 2019 traffic surveys, whilst heavy construction traffic is anticipated to travel to the site from the N7 national road and from the M50 motorway orbital motorway, via the R136 and R134 regional roads, and depart along the same routes.

7.110 Table 7-14 identifies that there are no two-way highway links which would have an increase over 30% in demolition and construction vehicle movements.

Table 7-14: % Increase between Do Nothing and Do Something

Location	Direction	2024 Do Nothing	2024 Do Something	% Increase
		AADT	AADT	
R120 Adamstown Road (N)	SB	5,279	5,283	0
	NB	4,548	4,548	0
R134 New Nangor Road (E)	EB	6,883	6,892	0
	WB	5,605	5,605	0
R120 Adamstown Road (S)	SB	4,244	4,244	0
	NB	4,792	4,797	0
R134 New Nangor Road (E)	EB	6,141	6,150	0
	WB	5,606	5,606	0
Baldonnel Road (S)	SB	3,886	3,886	0
	NB	3,394	3,394	0
R134 New Nangor Road (W)	EB	6,483	6,492	0
	WB	5,451	5,451	0
Kilcarbery Park (N)	SB	1,230	1,230	0
	NB	1,184	1,184	0
R134 New Nangor Road (E)	EB	7,791	7,858	1
	WB	7,244	7,302	1
Falcon Avenue	SB	756	823	9
	NB	727	795	9
R134 New Nangor Road (W)	EB	6,419	6,428	0
	WB	5,891	5,891	0
Grange Caste Business Park (N)	SB	2,698	2,698	0
	NB	2,678	2,678	0
R134 New Nangor Road (E)	EB	8,659	8,726	1

Table 7-14: % Increase between Do Nothing and Do Something

Location	Direction	2024 Do Nothing	2024 Do Something	% Increase
		AADT	AADT	
	WB	8,323	8,381	1
Grange Caste Business Park (S)	SB	127	127	0
	NB	122	122	0
R134 New Nangor Road (W)	EB	7,867	7,934	1
	WB	7,545	7,603	1
R136 Grange Caste Road (N)	SB	8,484	8,487	0
	NB	9,222	9,230	0
R134 New Nangor Road (E)	EB	7,963	7,975	0
	WB	6,895	6,907	0
R136 Grange Caste Road (S)	SB	13,865	13,912	0
	NB	15,000	15,043	0
R134 New Nangor Road (W)	EB	8,697	8,765	1
	WB	8,066	8,124	1

Pedestrian Severance, Delay, Amenity, Fear and Intimidation

7.111 The demolition and construction stage would generate movements by HGVs and construction workers. It has been considered that these would have a temporary impact on the local road network. In addition, an outline Construction Environmental Management Plan (CEMP) has been prepared and includes the requirement for construction traffic including both construction plant and materials deliveries to be programmed to avoid peak traffic periods on the surrounding local and strategic road network.

7.112 Due to the length of the proposed demolition and construction stage, any demolition and construction impacts are considered temporary in accordance with EPA Guidance. However, demolition and construction vehicle movements would fluctuate throughout the duration of the demolition and construction stage. Signs and temporary barriers would be used to inform the public of any changes to walking, cycling or highway routes during the demolition and construction stage.

7.113 Pedestrians are sensitive to traffic flows and considered to have a high receptor sensitivity.

7.114 Table 7-14 identifies all the two-way highway links are within the 30% threshold in demolition and construction vehicle movements. Therefore, it is considered that overall, the impact magnitude is low and the overall effect would therefore be **Temporary Slight, Negative** and **Not Significant** in terms of EIA.

Driver Delay

7.115 It is anticipated that there may be some delay to road users at times due to demolition and construction vehicles entering/exiting the application site. However, the CEMP commits to ensuring deliveries are co-ordinated to ensure vehicles would not be waiting on the local highway, and that wherever feasible deliveries would be undertaken outside peak hours.

7.116 Due to the length of the proposed demolition and construction stage any demolition and construction impacts are considered temporary. However, demolition and construction vehicle movements would fluctuate throughout the duration of the demolition and construction stage.

7.117 Road users are considered to have a medium sensitivity to traffic flow.

7.118 The impact magnitude would be low due to the potential scale of increase in HGV and private vehicle demolition and construction traffic movements. In addition, the CEMP considers how to manage and implement the volume of demolition and construction traffic and proposed safety measures. The effect would therefore be **Temporary, Slight, Negative** and **Not Significant** in terms of EIA.

Accidents and Safety

7.119 Impacts from the demolition and construction stage of the proposed development would be temporary.

7.120 The accident analysis does not indicate a prevailing road safety issue which could be made worse by the demolition and construction works.

7.121 Road users, pedestrians and cyclists are all recognised as receptors to accidents and safety, pedestrians and cyclists are considered to have a high sensitivity.

7.122 The impact magnitude is considered to be low due to the traffic flows associated with the demolition and construction works. The effect on accidents and safety would therefore be **Temporary Slight, Negative** and **Not Significant** in terms of EIA.

Operation Effects

7.123 The proposed development access hierarchy gives precedence to walking, cycling and public transport over private vehicles. The proposed development is focussed on people, including considered provision for people to be able to travel actively, sustainably and safety.

7.124 It has been assumed that the proposed development will be fully operational in 2025.

Proposed Development Trip Generation

7.125 The total vehicle trip generation for the proposed development is presented in Table 7-15.

Table 7-15: Proposed Development Trip Generation - Operation Stage

Total Vehicles	Arrivals		Departures		Total	
	Car	Deliveries*	Car	Deliveries*	Car	Deliveries
Daily	29	2	29	2	59	4

7.126 The total daily trip generation profile for the proposed development during the operation stage can be found in Appendix 7-4. Local Highway Network

7.127 All vehicular traffic will access the site via the four-arm roundabout on Falcon Avenue which leads to a roundabout on the R134 New Nangor Road.

7.128 Table 7-16 presents the baseline traffic figures 2025 Do Nothing and Do Something Annual Average Daily Traffic flow (AADT). The table also identifies the% change between the Do Nothing and the Do Something. The future baseline includes the July 2022 DUB-1 permitted development and background growth (including cumulative schemes).

7.129 In accordance with the IEMA Guidelines, the assessment is focused on links where a potential increase in traffic of greater than 30% has been identified. Table 7-16 identifies that the only % change is on Falcon Avenue with an increase of 6% and 7% (SB and NB respectively), well below the 30% threshold. The distribution of this traffic across the rest of the highway network is considered minimal.

Table 7-16: % Increase between 2025 Do Nothing and Do Something

Location	Direction	2025 Do Nothing	2025 Do Something	% Increase
		AADT	AADT	
R120 Adamstown Road (N)	SB	5,288	5,290	0

Table 7-16: % Increase between 2025 Do Nothing and Do Something

Location	Direction	2025 Do Nothing	2025 Do Something	% Increase
		AADT	AADT	
	NB	4,570	4,570	0
R134 New Nangor Road (E)	EB	6,880	6,884	0
	WB	5,632	5,632	0
R120 Adamstown Road (S)	SB	4,265	4,265	0
	NB	4,795	4,797	0
R134 New Nangor Road (E)	EB	6,134	6,139	0
	WB	5,633	5,633	0
Baldonnel Road (S)	SB	3,904	3,904	0
	NB	3,409	3,409	0
R134 New Nangor Road (W)	EB	6,478	6,482	0
	WB	5,477	5,477	0
Kilcarbery Park (N)	SB	1,237	1,237	0
	NB	1,190	1,190	0
R134 New Nangor Road (E)	EB	7,526	7,555	0
	WB	7,012	7,037	0
Falcon Avenue	SB	457	486	6
	NB	428	457	7
R134 New Nangor Road (W)	EB	6,413	6,418	0
	WB	5,920	5,920	0
Grange Caste Business Park (N)	SB	2,711	2,711	0
	NB	2,692	2,692	0
R134 New Nangor Road (E)	EB	8,398	8,427	0
	WB	8,097	8,121	0
Grange Caste Business Park (S)	SB	128	128	0
	NB	123	123	0
R134 New Nangor Road (W)	EB	7,602	7,631	0
	WB	7,315	7,340	0
R136 Grange Caste Road (N)	SB	8,517	8,519	0
	NB	9,242	9,246	0
R134 New Nangor Road (E)	EB	7,959	7,968	0
	WB	6,890	6,899	0
R136 Grange Caste Road (S)	SB	13,699	13,716	0
	NB	14,856	14,870	0

Table 7-16: % Increase between 2025 Do Nothing and Do Something

Location	Direction	2025 Do Nothing	2025 Do Something	% Increase
		AADT	AADT	
R134 New Nangor Road (W)	EB	8,437	8,466	0
	WB	7,838	7,863	0

Pedestrian Severance, Delay, Amenity, Fear and Intimidation

7.130 Pedestrians would access the site from one access/egress point from Falcon Avenue to the east, which leads to a roundabout on the R134 New Nangor Road.

7.131 Impacts from the operation of the proposed development would be long term to permanent whilst the site remains operational although would be reversible should the site cease operation.

7.132 Pedestrians are considered to have a high sensitivity to changes in traffic flows

7.133 No increase of traffic over 30% is anticipated as a result of the proposed development with no increase in severance or fear and intimidation anticipated. Pedestrians can be safely accommodated by footpaths of approximately 3m provided on both sides of Falcon Avenue, whilst they can cross the road via the informal pedestrian crossing with dropped kerbs and tactile paving on the approach to the R134 New Nangor Road/Flacon Avenue roundabout. Further, the speed limit of 50 Kph and the pedestrian routes of high standards on both sides of the road, it is considered that over all the highway network assessed, the impact magnitude is low.

7.134 The overall effect would therefore be **Long Term to Permanent, Slight, Negative** and **Not Significant** in terms of EIA.

Driver Delay

7.135 Impacts from the operation of the proposed development are considered to be long term to permanent whilst the site remains operational although would be reversible should the site cease operation.

7.136 Road users are considered to have a medium sensitivity to changes in traffic flows.

7.137 The impact magnitude would be low due to the anticipated small increase in peak hour traffic resulting from the proposed development. The effect on driver delay would therefore be **Long Term to Permanent, Slight, Negative** and **Not Significant** in terms of EIA.

Accidents and Safety

7.138 The proposed development would be designed in accordance with appropriate design standards.

7.139 Impacts from the operation of the proposed development would be long term to permanent whilst the site remains operational although would be reversible should the site cease operation.

7.140 The accident analysis does not indicate a prevailing road safety issue which could be made worse by the new development site.

7.141 Road users, pedestrians and cyclists are all recognised as receptors to accidents and safety, pedestrians and cyclists are considered to have a high sensitivity.

7.142 The impact magnitude is considered to be low due to the low traffic flows associated with the proposed development, the high standard of design of the proposed development and commitment to safety and reducing danger and fear associated with traffic. The effect on accidents and safety would therefore be **Long Term to Permanent, Slight, Negative** and **Not Significant** in terms of EIA.

Additional Mitigation

Demolition and Construction Stage

7.143 No additional mitigation measures beyond the CEMP and measures already described in the 'Potential Impacts and Likely Effects' would be required for the demolition and construction stage.

Operation Stage

7.144 No additional mitigation measures beyond the measures already described in the 'Assessment of Effects' would be required for the operation stage.

Enhancement Measures

7.145 No additional enhancement measures beyond the measures already described in the 'Assessment of Effects' would be required for the demolition and construction stage.

Assessment of Residual Effects

Demolition and Construction Residual Effects

7.146 No additional mitigation would be required; therefore, the residual demolition and construction effects remain as reported in the assessment of effects section:

- **Temporary, Slight, Negative** and **Not Significant** in terms of EIA for Pedestrian Severance, Delay, Amenity, Fear and Intimidation;
- **Temporary, Slight, Negative** and **Not Significant** in terms of EIA for Driver Delay; and
- **Temporary, Slight, Negative** and **Not Significant** in terms of EIA for Accidents and Safety.

Operation Residual Effects

7.147 No additional mitigation would be required; therefore, the residual operation effects remain as reported in the assessment of effects section:

- **Long Term to Permanent, Slight, Negative** and **Not Significant** in terms of EIA for Pedestrian Severance, Delay, Amenity, Fear and Intimidation;
- Long Term to Permanent, Slight, Negative and Not Significant in terms of EIA for Driver Delay; and
- Long Term to Permanent, Slight, Negative and Not Significant in terms of EIA for Accidents and Safety.

Summary of Residual Effects

7.148 Table 7-17 provides a summary of the outcomes of the Transport and Accessibility assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 7-17 Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	R IR	D ID	M B T St Mt Lt P**
Demolition and Construction Stage								
Pedestrians	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation	None	Slight	-	L	R	D	T
Road users	Change in Driver Delay	None	Slight	-	L	R	D	T
Road users, pedestrians and cyclists	Change in Accidents and Safety	None	Slight	-	L	R	D	T
Operation Stage								
Pedestrians	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation	None	Slight	-	L	R	D	Lt to P
Road users	Change in Driver Delay	None	Slight	-	L	R	D	Lt to P
Road users, pedestrians and cyclists	Change in Accidents and Safety	None	Slight	-	L	R	D	Lt to P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Cumulative Effects

Intra-Project Effects

As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

Table 7-18 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 7-18: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Microsoft – Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 (SD20A/0283)	No	Construction phase would be complete prior to scheme demolition and construction works in 2024	Yes	**Operation stage** (assumed 2024) would overlap with the **construction opening** year of the proposed development (2024). Considered to be in close proximity to the application site.
UBC Properties – Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 (SD20A/0121)	Yes	Although peak construction is 2021. The **construction phase** would still overlap with the **construction and operation stage** of the proposed development. [peak construction flows have been assessed to consider worst case scenario]	No	Development will not be operational by the fully operational year of the proposed development, therefore no effects considered likely. Opening year of the cumulative scheme is 2028.
UBC Properties – Grange Castle South Business Park, Dublin 22 (VA06S.308585)	No	Opening year of this cumulative development is anticipated to be 2021, therefore demolition and construction stage will not overlap with the opening year of the proposed development, therefore no effects considered likely.	No	The Grange Castle South Business Park EIAR describes a very low trip generation which professional judgement indicates would result in imperceptible associated traffic expected on each link within the study area. The proposed Clutterland substation does not require any full-time staff to operate it on a daily basis.
Digital Reality Trust – Profile Park, Baldonnel, Dublin 22, D22 TY06 (SD17A/0377)	No	The cumulative development has already been constructed.	No	It was not possible to locate all supporting transport documents but those available indicate that the proposed amendments under this application SD17A/0377 will not generate additional traffic to the previously permitted SD12A/0002.
Cyrus One – Grange Castle Business Park, Clondalkin, Dublin 22 (SD18A/0134)	No	The cumulative development has already been constructed.	Yes	The opening year is 2020. Therefore, the **operation phase** will overlap with the **construction and operation stage** of the proposed development.

Table 7-18: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 (SD20A/0295)	No	According to the reports the construction works should be complete. Number of trips anticipated to be generated are very low (approximately 25HGVs between January 2021 and June 2021).	No	It was not possible to locate all supporting transport documents but those available indicate that the proposed amendments under this cumulative scheme will not generate additional traffic to the previously permitted SD18A/0134.
Cyrus One – Grange Castle South Business Park, Baldonnel, Dublin 22 (VA06S.309146)	No	Construction phase completed by 2023	Yes	**Operation stage** would overlap with the **construction and operation stage** of the proposed development.
Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 (SD21A/0167)	Yes	**Construction Period** 2023-2025 would overlap with the **construction stage** and **operation stage** of the proposed development	No	The operation stage will generate very low trip generation which is expected to result in imperceptible associated traffic impact on each road link within the study area.
Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD21A/0186)	Yes	Two-year construction period (not defined 2023-2025). Assumed that the **construction stage** will overlap with the **construction stage** of the proposed development.	Yes	The opening year is 2025 therefore **operation stage** would overlap with the **operation stage** of the proposed development.
SID Application to provide the proposed site (and VDC DUB 1) permanent electrical connection to the EIR grid	Yes	Assumed construction phase would be complete by 2025. Assumed that the **construction stage** will overlap with the **construction stage** of the proposed development.	No	The operation stage will generate very low trip generation which is expected to result in imperceptible associated traffic impact on each road link within the study area.

Table 7-18: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Equinix (Ireland) Ltd - Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD22A/0156)	No	Modifications to the permitted data centre granted under SDCC Reg. Ref. SD21A/0186	No	modifications to the permitted data centre granted under SDCC Reg. Ref. SD21A/0186
Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD21A/0217)	No	Assumed construction completed by 2024.	No	TA states "The increase in traffic on the network is less than 5% of the background traffic at the roundabout junction of Profile Park Road and the R134. The assessment, based upon a robust set of assumptions, indicates that the traffic associated with the proposed development during both construction and operational stages, will be reflected in a non-significant increase to the existing peak time traffic volumes in the area."

Demolition and Construction Cumulative Effects

7.149 The assessment undertaken includes all the cumulative schemes that overlap with the demolition and construction stage of the proposed development, as identified in Table 7-18.

7.150 In relation to each of the cumulative schemes the operation stage of Microsoft (SD20A/0283), Cyrus One (SD18A/0134), Cyrus One (VA06S.309146) and the construction stage of UBC Properties (SD20A/0121), Centrica Business Solutions (SD21A/0167), Equinix (SD21A/0186) and SID Application would overlap with the demolition and construction stage of the proposed development. Cumulative assessment has been carried out by identifying the programmed dates of the cumulative schemes.

7.151 Trip generation and distribution for the demolition and construction stage has been extracted from the supporting Traffic Impact Assessments.

7.152 The appointed demolition and construction contractor(s) and Applicant would consult neighbouring schemes on the programme and local effects of the demolition and construction works, such as pedestrian routes, for example. In addition, collaboration around the scheduling of vehicle movements would be undertaken so that if works coincide with other demolition and construction activity already taking place within the immediate vicinity of the application site, the cumulative effect of dismantling and construction traffic can be minimised and would **not be significant in terms of EIA**.

Operation Cumulative Effects

7.153 The assessment undertaken includes all the cumulative schemes that overlap with the operation stage of the proposed development and may generate additional traffic on the local highway network

7.154 The demolition and construction phase of UBC Properties (SD20A/0121), Centrica Business Solutions (SD21A/0167) and the operation stage of Cyrus One, Grange Castle Business Park (SD18A/0134), Cyrus One Grange Castle South Business Park (VA06S.309146) and Equinix (Ireland) Ltd (SD21A/0186) cumulative schemes would overlap with the operation stage of the proposed development. Cumulative assessment has been carried out by identifying the programme dates of the cumulative schemes.

7.155 Trip generation and distribution for the operation stage has been extracted from the supporting Environmental and Traffic Impact Assessments.

7.156 Daily trip generation and distribution diagrams for the cumulative schemes and the proposed development can be found in Technical Appendix 7-3 and 7-4.

7.157 The traffic flows from these developments have been included within the assessment and are therefore **not considered to be significant in terms of EIA.**

Summary of Assessment

Background

7.158 This chapter has detailed the potential Transport and Accessibility effects due to the demolition and construction stage and the operation stage of the proposed development. The assessment of the demolition and construction stage and the operation stage have been undertaken taking into account the relevant national and local guidance and regulations.

7.159A The pedestrian and cycle environment in the site vicinity is of a high standard, with wide, well-lit lengths of dedicated and segregated off-road cycle and pedestrian routes, in addition to this the applicant would extend the existing cycle path along New Nangor Road. This would allow for future employees of the application site to walk, cycle or use public transport and complete their journeys by alternatives to the private vehicle.

Demolition and Construction Effects

7.160 It has been assumed that the demolition and construction traffic for the proposed development of 12,893sqm will be proportional (≈33%) to the construction traffic used for the site in the approved SD20A/0121 application.

7.161 The peak demolition and construction period would be in 2024 with a maximum of 156 demolition and construction vehicle movements per day.

7.162 Whilst there would be some increase in demolition and construction traffic, the effects of the demolition and construction traffic on the sensitive receptors would be temporary to short-term as follows:

- Temporary, Slight, Negative and Not Significant in terms of EIA for Pedestrian Severance, Delay, Amenity, Fear and Intimidation;
- Temporary, Slight, Negative and Not Significant in terms of EIA for Driver Delay; and
- Temporary, Slight, Negative and Not Significant in terms of EIA for Accidents and Safety.

7.163 An outline CEMP has been prepared and includes both construction plant and material deliveries to be programmed to avoid peak traffic periods on the surrounding local and strategic road network and minimise any effect on the local highway network and road, pedestrian and cycle users. No additional mitigation would be required for the demolition and construction stage.

7.164 Therefore, it is considered that the demolition and construction stage would result in a slight negative effect on Transport and identified receptors, and as such **would not give rise to significant effects** on Transport and Accessibility in terms of EIA.

Operation Effects

7.165 The proposed development will be fully operational in 2025 and is anticipated to generate 59 two-way vehicle trips. The operation of the MFGP up to Q1 2025 using HVO as the fuel source would require an additional short term 54 HGV a day.

7.166 There would be a small increase in traffic at Falcon Avenue resulting from the operation of the proposed development. The effects of the operation stage would be permanent during the operation of the proposed development, however, should the site cease operation the effect would be reversible. All effects are considered likely.

- Slight, Negative and Not Significant in terms of EIA for Pedestrian Severance, Delay, Amenity, Fear and Intimidation;
- Slight, Negative and Not Significant in terms of EIA for Driver Delay; and
- Slight, Negative and Not Significant in terms of EIA for Accidents and Safety.

7.167 Overall, it is considered that the operational proposed development would result in a slight negative effect on Transport and identified receptors, and as such **would not give rise to Significant Effects** on Transport and Accessibility in terms of EIA.

7.168 No additional mitigation would be required for the operation stage.

Cumulative Effects

7.169 The cumulative effects of the proposed development, and neighbouring schemes has been considered within the traffic assessment.

7.170 The operation stage of Microsoft (SD20A/0283), Cyrus One (SD18A/0134), Cyrus One (VA06S.309146) and the construction stage of UBC Properties (SD20A/0121), Equinix (SD21A/0186) and SID Application would overlap with the demolition and construction stage of the proposed development. The demolition and construction phase of UBC Properties (SD20A/0121), Centrica Business Solutions (SD21A/0167) and the operation stage of Cyrus One, Grange Castle Business Park (SD18A/0134), Cyrus One Grange Castle South Business Park (VA06S.309146) and Equinix (Ireland) Ltd (SD21A/0186) cumulative schemes would overlap with the operation stage of the proposed development.

7.171 Whilst there will be an increase in traffic resulting from the cumulative schemes during both the demolition and construction stage and the operation stage, overall, there are **No Significant Effects** in terms of EIA anticipated as a result of the cumulative impacts and therefore no mitigation is proposed.

8 AIR QUALITY

Introduction

8.1 This chapter of the EIAR reports on the likely significant air quality effects to arise from the demolition and construction stage and the operation stage of the proposed development.

8.2 The chapter describes the air quality policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely air quality effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

8.3 The potential exists for dust deposition and increased particulate matter concentrations to occur during the demolition and construction stage, as well as increased air emissions resulting from the operational phases of the proposed development. The main air pollutants of concern are dust and particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}), typically generated during demolition and construction activities, and nitrogen oxides (NO_x) represented as nitrogen dioxide (NO_2) typically generated by combustion engine emissions and road traffic.

8.4 The chapter is supported by the following technical appendices in EIAR Volume 3:

- Appendix 8.1: Air Quality Modelling Inputs.
- Appendix 8.2: Air Quality Detailed Results

Methodology

8.5 The assessment has been informed by the below legislation, policies, and published guidance and those outlined in Chapter 2: EIA Process and Methodology. The relevant policies are discussed throughout this chapter in more detail in the appropriate sections.

- International Legislation:
  - European Air Quality Framework Directive 2004/107/EC1 and daughter Directive 2008/50/EC2 on ambient air quality and cleaner air for Europe (CAFE), which set out a series of limit values for the protection of human health and critical levels for the protection of vegetation;
  - Directive 2010/75/EU industrial emissions (integrated pollution prevention and control)[3] known as Industrial Emissions Directive (IED);
  - Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants (MCPD)[4];
- National Legislation and Policy:
  - Air Pollution Act 1987[5];
  - Environmental Protection Agency Act, 1992[6];
  - Protection of The Environment Act 2003[7]
  - Air Quality Standards (AQS) Regulations 2011[8] amended by the AQS (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016[9], which transposed the European Directive 2008/50/EC into Irish legislation;
  - European Union (Medium Combustion Plants) Regulations 2017[10] which transposed the European Directive 2015/2193 into Irish legislation;
  - The National Climate Action Plan 2021[11]
- Guidance and industry standards:
  - Institute of Air Quality Management (IAQM) guidance on the Assessment of Dust from Demolition and Construction, 2014[12];
  - Environmental Protection UK/IAQM (EPUK/IAQM) guidance on Land Use and Development Control for Air Quality, 2017[13];
  - Environmental Protection Agency (EPA) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)[14];
  - U.S. Environmental Protection Agency (USEPA) Additional Clarification Regarding Application of Appendix W Modelling Guidance for the 1-Hour National Ambient Air Quality Standard[15]; and
  - UK Environment Agency Specified generators: dispersion modelling assessment [16, 17].

8.6 Specific Irish and European guidance and industry standards have been used to inform this assessment where available. International guidance and protocols from the UK or USA were used to supplement methodologies gaps where specific national guidance was not available, with a particular focus on UK guidance and protocols due to geographical proximity and for methodology consistency.

Assessment Scope

8.7 Dispersion of air pollutants is impacted by several factors including the height and location of a release, the prevailing meteorology, and the arrangement of buildings in the immediate vicinity. This EIAR has been based on the architectural and engineering design and drawings that accompany this application.

Technical Scope

8.8 The assessment considers the effects of the proposed development using the methodology set out below within the context of the policy framework and baseline conditions. The assessment considers the following potential impacts and associated likely effects:

1 European Air Quality Directive 2004/107/EC. European Air Quality Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel, and polycyclic aromatic hydrocarbons in ambient air.
2 European Commission. Directive 2008/50/EC. Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.
3 Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
4 Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants.
5 Air Pollution Act, 1987. Number 6 of 1987
6 Environmental Protection Agency Act, 1992. Number 7 of 1992.
7 Protection of the Environment Act 2003. Number 27 of 2003.

8 Statutory Instruments S.I. No. 180/2011 - Air Quality Standards Regulations 2011.
9 Statutory Instruments S.I. No. 659 of 2016 – Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016.
10 Statutory Instruments S.I. No. 595/2017 - European Union (Medium Combustion Plants) Regulations 2017.
11 Government of Ireland, 2021. Climate Action Plan. Department of the Environment, Climate and Communications
12 Holman et al, 2014. IAQM Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, London.
13 Moorcroft and Barrowcliffe. et al., 2017, Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London.
14 Environmental Protection Agency Office of Environment Enforcement (OEE), 2019. Air Dispersion Modelling from Industrial Installations Guidance Note (AG4).
15 USEPA, 2011. Additional Clarification Regarding Application of Appendix W Modelling Guidance for the 1-Hour National Ambient Air Quality Standard.
16 Guidance Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment [Accessed on 04/08/2021]
17 UK Environmental Agency. Guidance Specified generators: dispersion modelling assessment. Available at: https://consult.environment-agency.gov.uk/psc/mcp-and-sg-regulations/supporting_documents/Specified%20Generators%20Modelling%20GuidanceINTERIM%20FINAL.pdf [Accessed on 04/08/2021]

- Development works, the resulting dust impacts from the demolition and construction and the associated effects on human health receptors and amenity, as per the IAQM Guidance on assessment of dust from demolition and construction[12];
- Development works demolition and construction stage and operation stage traffic emission effects on human health receptors, as per the IAQM Guidance on land use and development control for air quality[13].
- Operation of the proposed development data center associated emissions arising from combustion plant effects on human health receptors beyond the site boundary.

8.9 The UK EPUK/IAQM guidance is applicable to assessing the effect of changes in exposure of member of the public resulting from developments where a proposal could affect local air quality and for which no other appropriate guidance exists in Ireland, as such this guidance has been adopted. The guidance considers the proximity to an Air Quality Management Area (AQMA), which is an area likely to approach or exceed the values set by AQS. The guidance provides an indicative criterion to determine the level of an air quality assessment due to road traffic flows emissions:

- A change of Light Duty Vehicles (LDVs) flows of more than 100 Average Annual Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA) or more than 500 AADT elsewhere.
- A change of Heavy-Duty Vehicles (HDVs) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere.

8.10 The proposed development site and study area are not expected to approach or exceed the AQS (as shown in the Baseline Conditions of this Chapter) and therefore the criteria outside an AQMA would apply to determine the significance of effects arising on local air quality due to the proposed development traffic flows.

8.11 The estimated demolition and construction stage peak vehicle movements would result in a combined LGV and HGV two-way 156 daily trips, of which 44 two-way trips would be HGV. However, when the movements are averaged over a full year period (24-hour AADT), these would be expected to be lower than 12-hour daily movements. Demolition and construction works' traffic flows would therefore not be expected to exceed the threshold of 500 AADT LGV movements or the 100 AADT HGVs for a detailed modelling assessment to be necessary according to EPUK/IAQM guidance. In addition, HGV movements would be controlled through the implementation of a Construction Environmental Management Plan (CEMP) as described in Chapter 5: Construction Description, which would be secured by means of an appropriately worded planning condition. The effects of demolition and construction related traffic emissions would be short-term, negative, and imperceptible with relation to human health and considered to be not significant in line with the IAQM guidance. Accordingly, demolition and construction traffic emissions have not been considered further within this chapter.

8.12 The operational stage would be expected to generate 63 daily vehicles, i.e., well below the EPUK/IAQM criteria. The effects of operation stage related traffic emissions would be long-term to permanent, negative, and not significant with relation to human health in line with the EPUK/IAQM guidance. Accordingly, operational stage traffic emissions have not been considered further within this chapter.

8.13 There are no protected European sites, designated under the EC Habitats Directive (92/43/EEC)[18], or National Heritage Areas (NHAs), designated under the Wildlife Acts[19], within the proposed development boundary. The nearest European sites to the Proposed Development are the Rye Water Valley/ Carton Special Area of Conservation (SAC), approximately 5.8 km north-west of the site, and Glenasmole Valley SAC, approximately 8.0 km south-east of the site. The Grand Canal proposed NHA is located approximately 1.3 km north of the site. The nearest protected European sites and NHAs are considered to fall outside the zone of influence of the proposed development and therefore the demolition and construction stage and operation stage air quality effects would be expected to be long-term, negative, and imperceptible and have not been considered further within this chapter.

18 https://www.npws.ie/legislation/eu-directives
19 https://www.npws.ie/legislation/irish-law

8.14 The Proposed Development will incorporate emergency diesel generators to provide power to the data center in the event of failure of the electricity supply. When in use in an emergency, all of the generators could be operational and therefore the impacts during an emergency are higher than those when individual or groups of generators are being routinely tested. The impacts during an emergency have therefore been assessed as the worst-case scenario.

8.15 The assessment includes a quantitative assessment of Proposed Developments emergency generators and the cumulative impact of all emergency generators running for DUB-13 and DUB-1 campus simultaneously. None of the other plant associated with the proposed development (i.e., chillers) would give rise to significant emissions of air pollutants.

8.16 The potential impact to air quality during the operation phase is a breach of the ambient AQS associated with emissions from proposed development combustion engines (emergency generators). The main pollutant of concern in relation to emissions from the combustion engines is NO_2 and the assessment concentrates on the impacts of NO_2 emissions on human health receptors. In relation to carbon monoxide (CO), sulphur (SO2), PM_{10}, $PM_{2.5}$ and benzene no detailed modelling was undertaken as combustion engines emissions of these pollutants' would be significantly lower when compared with NOx emissions relative to their respective ambient air quality standard. Ensuring compliance with NO_2 AQS would ensure compliance of other pollutants.

8.17 It is considered that the proposed development would not give rise to any odour impacts and associated effects and odour is not assessed as part of the EIAR Chapter.

Spatial Scope

8.18 The study area for the demolition and construction stage assessment is defined as up to 350 m from the site boundary for the assessment of demolition and construction dust emissions, and 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s) as per the IAQM guidance on the Assessment of Dust from Demolition and Construction[12].

8.19 For the operation stage assessment, the study area encompasses the application site, representative off-site receptors identified as at risk of impacts from the proposed development and receptor Cartesian grids with the site at the centre, as recommended by EPA AG4 guidance[14]. The off-site receptors and receptor grids are presented in the Baseline Conditions section of this EIAR. The study area also considers identified neighbouring cumulative development and commercial activities adjacent to the site (see Chapter 2: EIA Process and Methodology).

Temporal Scope

8.20 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (less than one year) and from the operation stage which would be expected to be long-term (15 to 60 years) to permanent (>60 years) in nature.

8.21 The assessment of the proposed development has been undertaken in line with the information provided in Chapter 5: Construction Description of this EIAR Volume. The works are anticipated to be undertaken over a 11-month period, with a completion targeted of Q4 2024. The indicative start of operation is Q4 2025. There is no phasing during the construction of the Proposed Development.

8.22 For the operational stage air quality assessment consideration has been given to the modelling scenarios outlined in Chapter 2: EIA Process and Methodology. Three scenarios have been proposed as the proposed development would be powered via the EirGrid connection through the wider DUB-1 campus or powered by the consented Multifuel Generation Plant (MFGP) on the DUB-1 campus. The MFGP has been designed to include the proposed data center and no change in capacity will be required to power the proposed development. The proposed development would not result in an increase in the MFGP air emissions, which have previously been assessed during its planning application (planning reference SD21A/0241). The proposed data center does not create any additional MFGP air emissions that have not already been assessed and consented and therefore no detailed modelling assessment of the MFGP air emissions have

been carried out in this EIAR. From an air quality perspective, Chapter 2: EIA Process and Methodology proposed scenario 1 and scenario 2 would not generate additional air emissions and have therefore been scope out of this assessment. Only the Emergency scenario (Scenario 3) listed in Chapter 2: EIA Process and Methodology, has been assessed for the proposed development.

8.23 The proposed development is an extension to the July 2022 DUB-1 consented development and would operate as part the wider data center campus. As per Chapter 2: EIA Process and Methodology, the future baseline includes the operation of the July 2022 DUB-1 consented development reported within the DUB-1 EIAR. The proposed development operation future baseline has been assumed to be 2025, which is the projected year when the proposed development would become operational and is also when the July 2022 DUB-1 consented development would become fully operational with the MFGP powered by gas.

Baseline Characterisation Method

Desk Study

8.24 To establish baseline air quality conditions in the study area, relevant data was reviewed and assessed. Local air quality monitoring data was obtained from EPA air quality continuous monitoring network[20] and from cumulative schemes EIAR as outlined in Chapter 2: EIA Process and Methodology.

8.25 Traffic flows were provided by the project transport consultant (Ramboll) as per Chapter 7: Transport and Accessibility.

8.26 The air quality impacts for the July 2022 DUB-1 consented development and the cumulative developments described in Chapter 2: EIA Process and Methodology have been extracted from the EIARs submitted as part of the schemes planning applications.

Field Study

8.27 No site-specific field study was undertaken at the site as the data collected from other sources was deemed to be adequate and representative of the site and local air quality conditions.

Assessment Method

8.28 The assessment has been based on the planning application drawings and plans and the development description presented in Chapter 4: Proposed Development Description, as well as reported in Chapter 5: Demolition and Construction Environmental.

8.29 Full details of both demolition and construction stage, and operation stage assessment methodology, data and modelling parameters are provided in Technical Appendix 8.1 in the EIAR Volume 3.

Methodology

Demolition and Construction Stage

8.30 During the demolition and construction stage, the main potential impacts would be dust annoyance and locally elevated concentrations of PM_{10}. These impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source. Separation distance is also an important factor as significant dust annoyance is usually limited to within a few hundred metres of its source. This is due to the rapid decrease in concentrations with distance from the source due to dispersion.

8.31 Likely effects associated with demolition and construction dust emissions, unlike other air borne pollutants, cannot be accurately predicted and quantified because they are highly dependent on local weather conditions and mitigation measures implemented at source. This assessment has followed the guidance published by the IAQM on the assessment of the effects of demolition and construction on air quality[12].

8.32 The guidance recommends that the risk of dust emission magnitude is combined with the sensitivity of the area surrounding the site to determine the risk of dust impacts from demolition and construction stage activities. The risk of dust arising in sufficient quantities to cause annoyance and/or health impacts is determined using four risk categories: high, medium, low, or negligible. Depending on the level of risk for each activity, appropriate mitigation is selected. Full details of the dust risk assessment methodology which includes the assessment criteria are provided in Technical Appendix 8.1 in the EIAR Volume 3.

Operation Stage

8.33 Air dispersion modelling was carried out using Atmospheric Dispersion Modelling System (ADMS 5)[21] to ensure that adequate stack height was selected to aid dispersion of the emissions and achieve compliance with the NO_2 human health ambient AQS beyond the site boundary, considering the existing baseline level on ambient air quality concentrations.

8.34 ADMS is recommended as an appropriate model to assess the impact of air emissions from industrial facilities in the EPA Guidance AG4[14]. ADMS uses representative meteorological data for the local area and plant emissions data to predict ambient concentrations of pollutants in the vicinity of the site. A detailed description of the ADMS 5 model is provided in Technical Appendix 8.1 in the EIAR Volume 3. The air dispersion modelling input data consisted of information on the physical environment, design details for all emission points on-site, building configuration, etc. Full details of the model parameters are presented in Technical Appendix 8.1 in the EIAR Volume 3.

8.35 The proposed development Emergency Scenario 1 consists of:

- Building DUB-13 with 13 diesel emergency back-up generators and associated 22.3 metres flues operating in the unlikely event of an outage of the MFGP and grid connection.

8.36 The proposed development Emergency Scenario 2 consists of:

- Building DUB-13, and DUB-1 Campus with 49 diesel emergency back-up generators and associated 22.3 metres flues operating in the unlikely event of an outage of the MFGP and grid connection.

8.37 For dispersion modelling purposes it is assumed that for the relevant scenarios, the emergency generators would to be operating continuously all year round for the assessment of NO_2 annual average and hourly impacts.

8.38 Controlled maintenance including periodic testing of the emergency diesel generators is required so that they are ready to be started at full load during an emergency power failure. The testing regime and testing times are not currently known, but based on professional experience, the generators are likely to be tested one generator at a time and sequentially with a periodic testing regime of weekly run test at reduced load and quarterly at full load. The periodic test would be expected run for a short period of time between 30 minutes to one hour. Given the expected short period of testing operation and the elevated exhaust improving dispersion, it is unlikely that the NO_2 ambient AQS would be exceeded. When in use in an emergency, all the generators could be operational at full load and therefore the impacts during an emergency are higher than those when individual or groups of generators are being routinely tested. The impacts during the testing regimes have been scoped out of the modelling assessment and the emergency operation have therefore been assessed as the worst-case scenario.

8.39 The operation of the emergency generators has been assessed according to the methodology published by the UK Environment Agency guidance[16,17]. The UK guidance is a conservative probabilistic approach which uses the emergency generators maximum hourly emissions to determine the number of hours that all the generators could operate simultaneously in any one year with a 1% chance of exceeding the 1-hour mean objective based on the worst modelled meteorological year. The USEPA methodology[15] to assess the 1-hour NO_2 ambient AQS considers that a probabilistic method is too conservative and proposes to model impacts from intermittent emissions based on an average hourly rate (i.e., maximum hourly rate factored to a certain number of more realistic operating hours), rather than maximum hourly emissions. Given the conservative approach of the UK guidance, this assessment considers the UK guidance more suitable for

20 EPA, 2021, EPA Website: http://www.epa.ie/whatwedo/monitoring/air/ [Accessed on 03/10/2022]

21 Available at: http://www.cerc.co.uk/environmental-software/ADMS-model.html [Accessed on 03/10/2022]

protection of sensitive receptors and to demonstrate compliance with the ambient AQS and therefore it has been used to assess the likelihood of exceedance of the 1-hour NO_2 ambient AQS.

8.40 Following the UK Environment Agency methodology, the hourly emissions and the allowable operating hours for emergency operation were estimated from a statistical analysis of the likelihood of breaching the 1-hour objective for NO_2 concentrations by using the hypergeometric distribution function. The allowable operating hours were calculated for a 1% probability of exceeding the one-hour mean objective at the most impacted receptor location. In accordance with the emissions from specified generators guidance, in an emergency when the operating period is greater than one hour, the calculated probability has been multiplied by 2.5. For compliance with the annual mean AQS, the predicted concentrations were scaled to the total annual operating hours that the generators were determined to run for the 1% probability of exceeding the one-hour mean objective.

8.41 The likelihood of exceeding the 1-hour mean objective also considers the baseline pollutant concentrations in the vicinity of the site. For the short-term assessment, the background concentration is assumed to be twice the annual mean background concentration. As the dispersion modelling was undertaken for NOx emissions, for estimating the number of exceedances of the hourly mean NO_2 objective, the exceedance concentration in the model was set as follows:

- Model exceedance concentration = 200 – twice annual mean background)/0.35.

8.42 For the accessed scenarios, guidance on air emissions risk assessments produced by the UK Environment Agency[22] was used to support an assessment of the overall impact of the emissions resulting from the installations to confirm that the emissions are acceptable (i.e., do not cause significant environmental pollution). Emissions of NOx from combustion sources include both nitric oxide (NO) and NO_2, with the majority being in the form of NO. During the process of combustion, atmospheric and fuel nitrogen is partially oxidised via a series of complex combustion reactions, because of high temperature, to NO. In ambient air, NO is oxidised to form NO_2, a more harmful form of NOx with more significant health impacts. For this assessment, the conversion of NOx to NO_2 has been estimated using the worst-case assumptions set out in the UK Environment Agency guidance:

- For the assessment of long term (annual mean) impacts at receptors 70% of NOx is converted to NO_2; and
- For the assessment of short term (hourly mean) impacts at receptors 35% of NOx is converted to NO_2.

8.43 The UK Environment Agency assumptions offer a worst-case assessment as the conversion rates may be conservative as the oxidation of NO to NO_2 is not an instantaneous process particularly at short distance from the emissions source where the maximum impacts are predicted to occur.

8.44 Tall buildings can have a substantial impact on the dispersion of pollutants from stacks, as a result of building downwash i.e., pollutants being drawn down in the wake of a building, giving rise to high concentrations close to the base of the buildings. The buildings include in the ADMS model are shown in Technical Appendix 8.1 in the EIAR Volume 3. An initial model run was undertaken to confirm the flues heights would ensure adequate dispersion

8.45 To undertake the assessment, the emergency generators were allocated their own flues and the flues combined in ADMS in triples or quadruples when adjacent, according to the plan's configuration. The location and flue parameters used in the model are shown in Technical Appendix 8.1 in the EIAR Volume 3.

8.46 The dispersion modelling has been undertaken with five years of hourly sequenced meteorology data for the years 2015 to 2019 inclusive, from Casement Aerodrome which is approximately 1 km to the south of the site. Adopting the maximum hourly stack emissions across the five years of meteorological data will ensure the worst-case long and short-term concentrations from the stacks are considered within the assessment. The Casement Aerodrome windroses are presented in Technical Appendix 8.1 in the EIAR Volume 3.

22 UK Environment Agency. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. [Accessed on 04/08/2021]

8.47 For the emergency generators, emission rates, volumetric flowrates and stack parameters have been provided by the lead project consultant, Burns & McDonnell. Flue heights and diameters were taken from the CAD layout drawings. The emergency generators model input data used in the model is provided in Table 8-1.

Table 8-1: Stack Emissions Modelling Input Parameters

Plant	Equipment	Temperature (°C)	Volume Flux (Am^3/s)	Height (m)	Diameter (m)	NO_2 Emission Rate at discharge conditions (g/s)
Emergency Generators	CAT 3516E, EM4789	422	10.0	22.3	0.6	4.2

Cumulative Stage

8.48 Cumulative effects have been included in this Chapter following the review the cumulative schemes EIARs submitted as part of the planning applications as outlined in Chapter 2: EIA Process and Methodology

8.49 Additional cumulative development data center facilities with emergency only emission points would only operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis or simultaneously with the proposed development. Emergency generators emission points associated with the cumulative developments were not considered for the purpose of this assessment.

Assessment Criteria

8.50 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

Demolition and Construction Stage

8.51 The sensitivities of people to dust soiling effect has been classified as low, medium, or high, in line with the IAQM guidance criteria, as set out in Table 8-2.

Table 8-2: Sensitivities of People to Dust Soiling Effect– Demolition and Construction Stage

Sensitivity	Criteria
Low	• The enjoyment of amenity would not reasonably be expected; or • Property would not reasonably be expected to be diminished in appearance, aesthetics, or value by soiling; or • There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. • Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short-term car parks and roads.
Medium	• Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or

Table 8-2: Sensitivities of People to Dust Soiling Effect– Demolition and Construction Stage	
	• First occupants moving into residential dwellings on a large, phased housing development; or • The appearance, aesthetics or value of their property could be diminished by soiling; or • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • Indicative examples include parks and places of work.
High	• Users can reasonably expect enjoyment of a high level of amenity; or • The appearance, aesthetics or value of their property would be diminished by soiling; and • The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. • Indicative examples include dwellings, museums, and other culturally important collections, medium- and long-term car parks and car showrooms.

Operation Stage

8.52 To protect human health, national and European statutory bodies defined health or environmental-based AQS for a range of air pollutants. There are no degrees of sensitivity of receptors to poor air quality, rather, the assessment is based on whether members of the public are likely to be present for the proposed averaging period of the objective and air quality significance criteria are assessed based on compliance with the appropriate standards or limit values.

8.53 The AQS are the concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects on human health (including sensitive sub-groups) or ecosystems. In general, these are concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects. Standards are values often expressed as maximum concentrations not to be exceeded either without exception or with a limited number of exceedances within a specified timescale.

8.54 The applicable standards in Ireland include the AQS Regulations 2011[8,10], which incorporate European Commission Directive 2008/50/EC[2], and set limit values for NO_2, PM_{10} and $PM_{2.5}$ relevant to this assessment, as described in Table 8-3.

Table 8-3: Human Health Air Quality Standard

Pollutant	Time Period	Value
NO_2	Annual Mean for protection of Human Health	40 µg/m³
	1-hour mean	200 µg/m³ not to be exceeded more than 18 times a year
Particulate Matter (as PM_{10})	24 hours mean	50 µg/m³ not to be exceeded more than 35 times per year
	Annual mean	40 µg/m³
$PM_{2.5}$	Annual mean	25 µg/m³

Impact Magnitude Criteria

Demolition and Construction Stage

8.55 The criteria provided in the guidance produced by the IAQM[12] was used to assess the potential risk of impacts to air quality from demolition and construction stage activity in the absence of mitigation during demolition and construction stage of the proposed development. The methodology combines the magnitude of dust emissions together with the sensitivity of the receptor to identify low, medium, or high risk of dust impacts in the absence of mitigation for the four stages of construction: demolition, earthworks, construction and trackout.

Operation Stage

8.56 The operation of the emergency generators has been assessed according to the methodology published by the UK Environment Agency [16,17] to determine the statistical likelihood of exceedance of the NO_2 hourly limit value. The allowable hours for emergency operation are estimated from a statistical analysis of the likelihood of breaching the hourly mean NO_2 AQS (considering baseline pollutant concentrations).

8.57 The hypergeometric probability distribution test (see Appendix 8.1 in Volume 3 for more details) provides an estimate of the probability of breaching the AQO given random use of the generators for a total number of operating hours per year. Table 8-4 shows how the calculated probabilities are judged; the 1% probability is normally used as the benchmark to calculate the allowable operating hours during emergency operation; if the generators had a life of less than 20 years then it may be possible to use the 5% probability level although this does not increase the allowable operating hours significantly.

Table 8-4: Probability Significance for hourly mean NO_2 AQS

Probability	Significance
1%	Indicates exceedance is highly unlikely
5%	Indicates that exceedance is unlikely provided generator lifetime is less than 20 years
>5%	Indicates potential for exceedance

8.58 To assess the potential impacts and associated likely effects of the emergency generators, the 5 years worst case NO_2 modelled concentration at sensitive receptors, known as process contribution (PC), were added to the background concentrations to obtain the process environmental contribution (PEC). The PEC was then compared with the relevant ambient AQS to assess the significance of the air quality effects associated with the proposed development emissions.

8.59 To consider the model uncertainty, this assessment also refers to the recommendations outlined within the EPA AG4 guidance[14]. The guidance recommends that if the facility is operated continually at close to the maximum licenced mass emission rate the PC should be less than 75% of the ambient AQS and less than this where background levels account for a significant fraction of the ambient air quality standard based on the formula:

- Maximum Allowable Process Contribution= 0.75*(AQS-Background)

8.60 Based on the above and the average background concentrations in the study area described in the baseline conditions section of the Chapter, the annual mean PC should not exceed the value of 17.0 µg/m³ and the 1-hour average PC should not exceed the value of 137.3 µg/m³.

Scale of Effect Criteria

Demolition and Construction Stage

8.61 The IAQM guidance recommends that no assessment of the significance of dust effects is made without mitigation in place, as mitigation is assumed to be secured by industry best practice, planning conditions, legal requirements or required by regulations. With appropriate mitigation in place, the effect of demolition and construction stage dust emission impacts on air quality is always assessed as not significant in EIA terms. The purpose of the demolition and construction stage dust assessment has therefore been to identify the appropriate level of mitigation to employ.

8.62 Using the IAQM assessment methodology to identify the appropriate level of mitigation, and on the assumption that the identified mitigation measures are applied and are commensurate with the risk of potential dust impacts, the guidance indicates that that the potential for dust effects to arise during the demolition and construction stage would be at worst 'slight negative' and would be temporary in nature.

Operation Stage

8.63 The potential impact to air quality from the proposed development plant is a breach of the ambient AQS as a result of air emissions from the proposed development emergency generators.

8.64 In determining the significance of reported effects, the assessment has considered the Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

8.65 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

8.66 The assessment has relied on data extracted from the EPA and planning application EIAR air quality assessments. It has been assumed that the data sets have been reported correctly.

8.67 There are many components that contribute to the uncertainty in predicted concentrations. Although the model has been extensively validated against field data sets and their use has gained wide acceptance, no computer-based model is able to totally replicate actual conditions as it is required to simplify real-world conditions into a series of algorithms. The model used in this assessment is also dependent upon several sources of data which will have inherent uncertainties associated with them.

8.68 Tall buildings can have a substantial impact on the dispersion of pollutants from stacks, as a result of building downwash i.e., pollutants being drawn down in the wake of a building, giving rise to high concentrations close to the base of the buildings. ADMS5 can take account of this potential impact by the inclusion of rectangular buildings in the model. The buildings included within the modelling were based on the interpretation of the development parameters and plans.

8.69 The terrain within the study area is relatively flat with slopes less than 10 %, and therefore terrain effects have not been included within the modelling.

8.70 Emission rates, volumetric flowrates and flue parameters have been based on data provided by the project architect consultant, Burns & McDonnell. It has been assumed that the up-to-date data sets have been provided and reported correctly.

8.71 Overall, when considering the assumed number of operating hours; the approach taken to meteorological conditions; and the assumed NOx to NO_2 relationship, the assessment is expected to over-predict the impacts of the proposed development. The approach used therefore provides a robust assessment.

Baseline Conditions

Existing Baseline

8.72 Under the Ambient Air Quality and Cleaner Air for Europe Directive (2008/50/EC), Ireland designated four air quality zones for the purpose of air quality management and assessment[23]. In terms of air monitoring, the development site is within Dublin Zone A.

NO_2

8.73 Air Quality monitoring is carried out by the EPA and local authorities at Dublin Zone A urban and suburban background locations. A summary of the closest and most representative monitoring locations is presented in Table 8-5 and the locations shown in Figure 8-1.

23 https://www.epa.ie/air/quality/zones/ [Accessed on 03/10/2022]

Table 8-5: Measured Annual Average NO_2 Concentrations (µg/m³)

Station	Type	Distance from Site (km)	2015	2016	2017	2018	2019	5 years Average
Ballyfermot	Suburban Background	≈ 6.5	16	17	17	17	20	17
Rathmines	Urban Background	≈ 11.8	18	20	17	20	22	19
Dun Laoghaire	Suburban Background	≈ 21.1	16	19	17	19	15	17
Swords	Suburban Background	≈ 21.8	13	16	14	16	15	15
AQS			40					

8.74 Measured NO_2 concentrations at the closest background automatic monitoring station to the site, Ballyfermot, have been well below the ambient AQS with an average annual mean concentration of approximately 17 µg/m³ between 2015-2019.

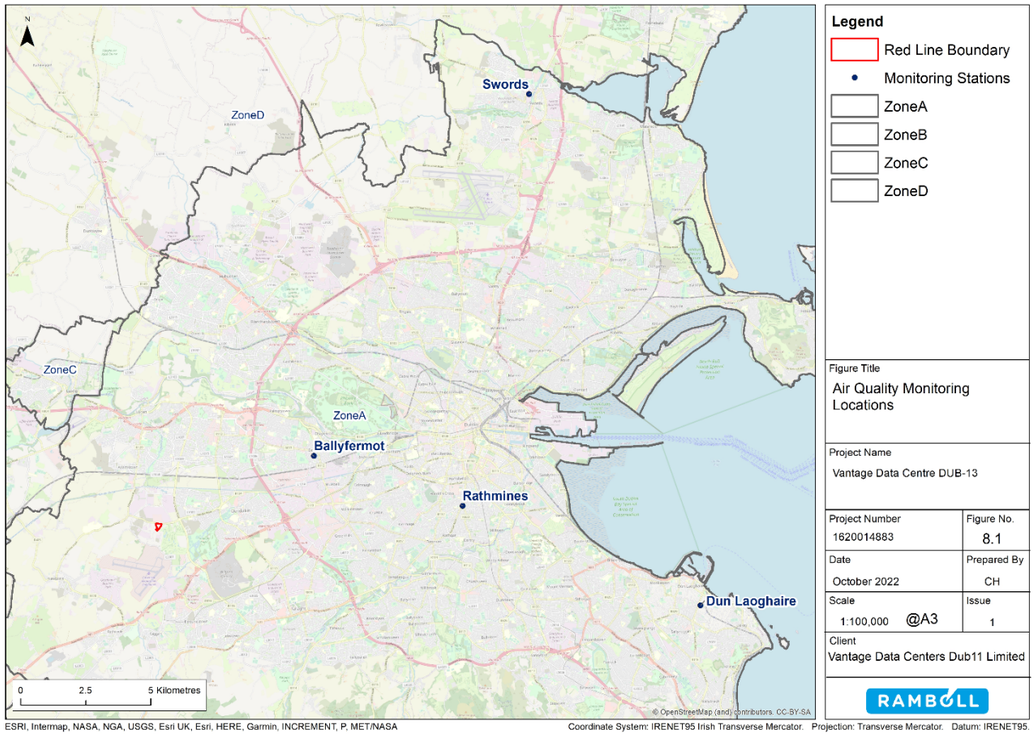


Figure 8-1: Nearest Monitoring Locations

Particulates (PM_{10} and $PM_{2.5}$)

8.75 Measured continuous PM_{10} monitoring carried out within Dublin Zone A background locations have been well below the ambient AQS with an average annual mean concentration of approximately 15 µg/m³.

8.76 Measured continuous $PM_{2.5}$ monitoring carried out within Dublin Zone A locations have been well below the ambient AQS with an average annual mean concentration of approximately 11 µg/m³.

Assessment of Monitoring Data

8.77 Ballyfermot background station is the closest station to the site and would therefore be considered representative of the air quality within study area. Measured NO_2 and PM_{10} at Ballyfermot have been well below the relevant AQS and therefore background concentrations at the site and within the study area would be expected to be below the AQS.

8.78 Measured $PM_{2.5}$ within Dublin Zone A have been well below the relevant AQS and therefore $PM_{2.5}$ background concentrations at the site and within the study area would be expected to be below the AQS.

8.79 For the purposes of this assessment, Ballyfermot NO_2 average background concentration measured between 2015-2019 with the value of 17 µg/m³ has been used to estimate the PEC.

Future Baseline

8.80 As per Chapter 2: EIA Process and Methodology, the future baseline includes the operation of the July 2022 DUB-1 consented development reported within the DUB-1 EIAR. The MFGP permitted as part of the July 2022 DUB-1 consented development was designed to include the proposed data center and no change in capacity will be required to power the proposed development, as such the proposed development would not result in an increase in the MFGP air emissions further to those described as part of the EIAR for the July 2022 DUB-1 consented development. Moreover, the proposed development emergency generators would only operate in case of an outage of the MFGP and grid connection, and therefore would not operate simultaneously with the MFGP. The July 2022 DUB-1 EIAR Chapter 8 Air Quality showed that the operation of the MFGP powered by gas would result in a maximum annual mean NO_2 concentrations of approximately 1 µg/m³. The MFGP process contribution, when combined with existing local background of 17 µg/m³, would result in an overall concentration of approximately 18 µg/m³ and therefore well below the AQS.

8.81 Air quality at background and roadside locations is expected to improve in future years due to the gradual improvement in vehicle combustion technologies and enforcement of national policies such as the Government of Ireland Climate Action Plan[24]. The climate plan proposes to achieve a net zero target by 2050 and commits to evaluate in detail the changes required to adopt such a goal in Ireland. Future baseline air quality within the study area would therefore be expected to improve and remain well below the AQS.

8.82 Although air emissions are predicted to decline with time, to take into account the uncertainties regarding future local air quality, the proposed development operational stage emergency generators PC were added to the 2019 measured background concentrations to obtain the PEC. This is considered to provide an appropriately conservative assessment assuming no future improvements on local air quality.

Sensitive receptors

8.83 The site is surrounded by large commercial areas occupied by industrial uses to the north and south within the Kilcarbery Park, Grange Castle Business Park and Profile Park. The closest potential residential property is located approximately 125 m to the northeast of the site boundary along Nangor Road. Residential development is primarily located in Deansrath, Clondalkin, approximately 600 m south of the site. The residential property within the site boundary is proposed to be demolished as part of the development.

8.84 Relevant sensitive locations are places where members of the public might be expected to be regularly present over the averaging period of the AQS. For the annual mean and hourly mean AQS that are the focus of this assessment, sensitive receptors will generally be residential properties, schools, nursing homes and temporary residence caravan parks. The locations of existing receptors were chosen to represent locations where impacts from the proposed development are likely to be the greatest.

24 Government of Ireland, 2021. Climate Action Plan 2021. Securing our future. https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/# [Accessed on 03/10/2022]

8.85 The existing receptors identified as being sensitive to the proposed development and which have been 'scoped-in' to the assessment are summarised Table 8-6 and displayed on Figure 8-2. Existing receptor locations were modelled at a height of 1.5 m and 4.5 m representing typical two storey property with exposure at ground floor and top floor level, except for R1, R2 and R5 which have additional heights of 18 m and 12 m respectively, modelled representing top floor commercial exposure.

Table 8-6: Summary of Sensitive Receptors

Receptor ID	Location	X (m)	Y (m)	Type Exposure
R1	Kilcarbery Park	703862	730924	Commercial/Industrial
R2	Kilcarbery Park	703970	730908	Commercial/Industrial
R3	Nangor Lea, Nangor Road	704053	730934	Potential Residential
R4	Nangor Road	703515	730878	Industrial/Commercial
R5	DUB-1	703703	730781	Industrial
R6	Castlegrange Green	704731	731119	Residential
R7	Oldcastlepark Lawn Caravan park	704658	731156	Residential
R8	Oldcastlepark Lawn Caravan park	704652	731171	Residential
R9	Kilbride House, Baldonnel Road	703686	730091	Residential
R10	Casement Aerodrome, Baldonnel	703654	730026	Residential
R11	Casement Aerodrome, Baldonnel	703482	730024	Residential
R12	Aungierstown, Baldonnel Road	703286	730109	Residential
R13	Aungierstown, Baldonnel Road	703257	730117	Residential
R14	Aungierstown, Baldonnel Road	703200	730136	Residential
R15	Aungierstown, Baldonnel Road	703129	730165	Residential
R16	Baldonnel Road	703027	730288	Residential
R17	Baldonnel Road	703014	730327	Residential
R18	Baldonnel Road	702964	730384	Residential
R19	Baldonnel Road	703024	730476	Residential
R20	Baldonnel Road	702940	730528	Residential
R21	Baldonnel Road	702897	730569	Residential
R22	Baldonnel Road	702876	730595	Residential
R23	Baldonnel Road Comex Mc Kinnon	702850	730615	Commercial

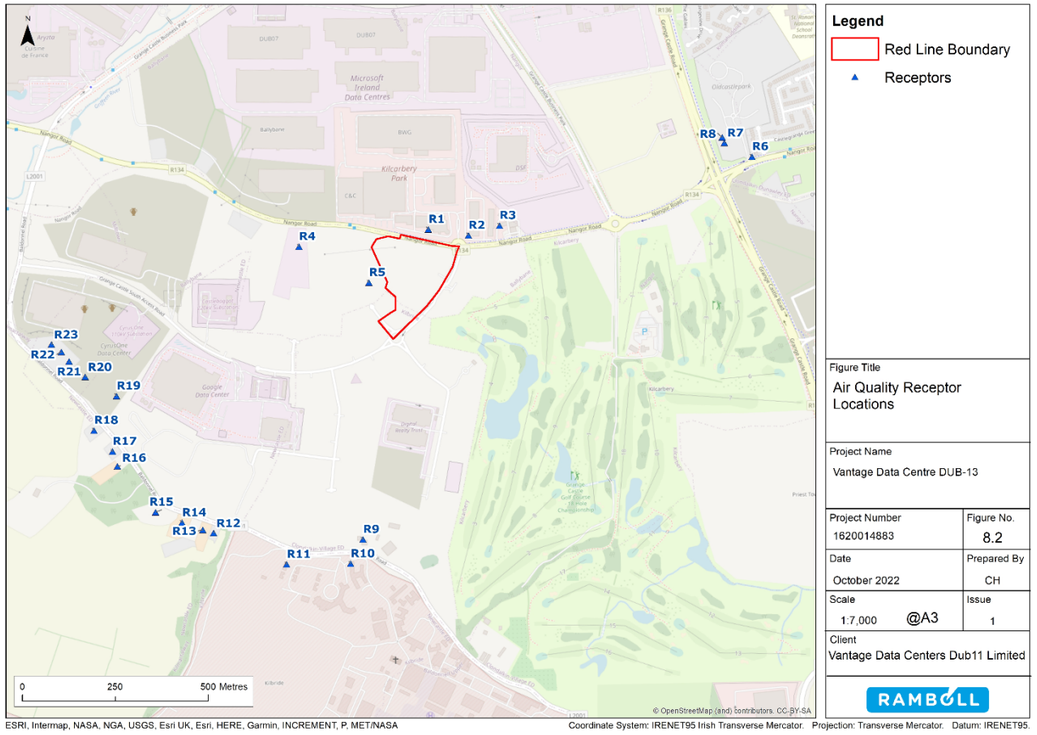


Figure 8-2: Air Quality Receptor Locations

8.86 Concentrations were also predicted for a grid of receptors (contours) mapped with sufficient resolution to ensure all localised "hot-spots" were identified and to visually demonstrate the pattern of dispersion, as recommended by EPA AG4 guidance. The grids were based on a Cartesian grid with the site at the centre and are described in Table 8-7 and modelled at a height of 4.m representing 1st floor residential buildings.

Table 8-7: Receptor Grids

Grid	Measure	Spacing (m)
Outer Grid	5x5 km	500
Middle Grid	3x3 km	100
Inner Grid	500x500 m	20

Assessment of Effects

Demolition and Construction Effects

8.87 The main activities with potential to cause emissions of dust construction will include:

- Demolition of existing buildings;
- Earthworks and site preparation;
- Construction of building structures, including foundations;
- Materials Handling such as storage of materials in stockpiles and spillage;
- Construction of on-site highway improvements; and
- Hard and soft landscaping.

8.88 Dust impacts would be greatest in dry weather following long periods without rain and with the wind blowing towards sensitive receptors. Depending on wind speed and turbulence it is likely that most of the dust will be deposited within 100 m of the source. Meteorological data for Casement Aerodrome, shown in Technical Appendix 8.1 in EIAR Volume 3, suggests that prevailing winds are typically south-westerly.

8.89 The risk of potential air quality impacts from demolition, earthworks, construction and trackout (the transport of dust and dirt from the application site onto the public road network) was assessed according to guidance developed by the IAQM to identify the appropriate level of mitigation.

8.90 Using the evaluation criteria within the IAQM's Guidance, the potential dust emission magnitude has been identified for each stage of the proposed development as shown in Table 8-8 based on information presented in Chapter 5: Construction Description of this Volume.

Table 8-8: Dust Emission Impact Magnitude for Proposed Development Works

Activity	Dust Emission Magnitude	Justification
Demolition	Small	Demolition of the former residential property within the site. The total building volume is estimated to be <20,000 m^3. Demolition activities would occur at height of more than 10 m above ground level.
Earthworks	Large	Total site area over 10,000 m^2.
Construction	Medium	The proposed development would have a total estimated construction volume of between 25,000m^3 - 100,000 m^3.
Trackout	Medium	HDV movements over the course of the worst-case phase would be up to 10-50 HDV movements in one day. Unpaved road length would be between 50 m- 100m.

8.91 The closest sensitive receptor to construction activity within 350 m of the site would be potential residential property to the north east of the site, identified as Receptor R3 in Table 8.6, and the places of work at Kilcarbery Park, identified as receptor R1.

8.92 The next stage of the process is to define the sensitivity of the assessment area to dust soiling and human health impacts. This process combines the sensitivity of the receptor with the distance from the source to determine the overall sensitivity. The sensitivity of the area to dust impacts (considering distance to construction activity) is provided in Table 8-9.

Table 8-9: Sensitivity of Study Area to Dust Impacts

Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts
Low: places of work within 50 m of the site.	Medium: places of work within 50 m of the site. Average measured PM_{10} concentrations are below 24 µg/m^3 (see Baseline Conditions section).

8.93 The dust emission magnitude determined in Table 8-8 has been combined with the sensitivity assessment in Table 8-9 to define the risk of impacts for each stage of the proposed development works in the absence of mitigation, as shown in Table 8-10.

Table 8-10: Risk of Dust Impacts in Absence of Mitigation at Proposed Development

Sensitivity of Study Area	Dust Emission Magnitude for Each Phase of Works			
	Demolition (Small)	Earthworks (Large)	Construction (Medium)	Trackout (Medium)
Dust Soiling (Low)	Negligible Risk	Low Risk	Low Risk	Low Risk
Human Health (Medium)	Low Risk	Medium Risk	Medium Risk	Low Risk

8.94 Therefore, using professional judgement, the overall risk of dust impacts in the absence of mitigation has been assessed as the highest resulting risk, i.e. as being Medium Risk.

Embedded Mitigation and Standard Good Practice

8.95 The control of dust and construction traffic emissions from a demolition and construction site relies upon good site management and mitigation techniques to reduce emissions of dust and limit dispersion. A summary of the mitigation measures recommended IAQM guidance to reduce impacts from medium risk sites is provided Table 8-11. The mitigation measures for both direct impacts and those from traffic would be detailed within the site's CEMP. It is noted that these measures have already been accounted for in EIAR Chapter 5: Construction Description of this Volume.

Table 8-11: Dust Mitigation Measures for Medium Risk Sites

Phase	Mitigation Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display name and contact details of responsible person for dust issues on the site boundary (e.g. hoarding) in addition to head/regional office contact information. • Display the head or regional office contact information.
Dust Management Plan	• Develop and implement a Dust Management Plan (DMP) which is included as part of the CEMP.
Site Management	• Record all complaints and incidents in a site log. • Take appropriate measures to reduce emissions in a timely manner, and record the measures taken within the log. • Make the complaints log available to the Local Authority if requested. • Record any exceptional dust incidents on- or off-site. • Hold regular liaison meeting with other high-risk construction sites within 500 m.
Monitoring	• Undertake daily on and off-site visual inspections where there are nearby receptors. • Carry out regular inspections to ensure compliance with the DMP and record results in the site logbook. • 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.
Preparing and Maintaining the Site	• Plan site layout to locate dust generating activities as far as possible from receptors. • Use solid screens around dusty activities and around stockpiles. • Avoid site runoff of water and mud.

Table 8-11: Dust Mitigation Measures for Medium Risk Sites

Phase	Mitigation Measure
	• Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Keep site fencing barriers and scaffolding clean using wet methods. • Remove dusty materials from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below • Minimise emissions from stockpiles by covering, seeding, fencing, or damping down.
Operating Vehicle/ Machinery and Sustainable Travel	• Enforce an on-site speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced areas. • Ensure vehicles switch off engines when stationary. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Produce a Construction Logistics Plan (CLP) 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).
Operations	• Only undertake cutting, grinding, or sawing equipment with suitable dust suppression equipment or techniques. • Ensure adequate water supply for effective dust and particulate matter suppression. • Use enclosed chutes, conveyors, and covered skips. • Minimise drop heights of materials. • Ensure suitable cleaning material is available at all times to clean up spills.
Waste Management	• Avoid bonfires. • Avoid explosive blasting using appropriate manual or mechanical techniques. • Bag and remove any biological debris.
Measures Specific to Demolition	• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • Ensure effective water suppression during demolition. • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition.
Measures Specific to Construction	• Ensure aggregates are stored in bunded areas and are not allowed to dry out. • Avoid concrete scabbling where possible. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Measures Specific to Trackout	• Use water-assisted dust sweepers to clean access and local roads. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving the site are appropriately covered. • Record inspections of haul roads in site log, including any remedial action taken. • Implement a wheel washing system. • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit. • Access gates to be located at least 10 m from the receptors where possible.
Measures Specific to Earthworks	• Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil. • Only remove the cover in small areas during work and not all at once.

8.96 As per this chapter scale of effects section, the purpose of the demolition and construction stage dust risk assessment is to identify the appropriate level of mitigation to employ and no assessment of the significance of demolition and construction stage effects is made without mitigation in place. With the implementation of the CEMP and CLP (i.e. the measures outlined in Chapter 5: Construction Description), the demolition and construction dust and on-site vehicle emissions effects in the study would be **Temporary, Imperceptible** and **Negative,** i.e. **Not Significant** in terms of EIA.

Operation Effects

Emergency Scenario 1: DUB-13 emergency scenario.

8.97 The modelling has been undertaken to determine the DUB-13 emergency operation with a 1% probability of exceeding the 1-hour objective. The detailed results of the dispersion modelling at the sensitive receptors identified in Table 8-6 are shown in Technical Appendix 7.2 in Volume 3.

8.98 Table 8-12 shows the results of the modelling for the highest impacted receptor for any of the assessed receptor locations.

Table 8-12: Emergency Scenario 1 DUB-13 Emergency Generators Emergency Operation

Plant	Operating hours for 1% probability of exceeding the 1-hour mean objective
DUB-13 Emergency Generator	62

8.99 The DUB-13. Emergency Generators would operate for 62 hours to reach a 1% probability of exceeding the objective the 1-hour mean objective.

8.100 Table 8-13 shows the maximum predicted annual mean NO_2 concentrations at the worst-case receptor with the highest predicted concentration for the DUB-13 emergency generator maximum of 62 emergency operation hours. It should be recognised however that it is extremely unlikely that the generators would operate for maximum number of hours determined. It is considered that the predicted impacts are conservative as it would require a loss of grid power to this area of Ireland for approximately 2.6 days in a year.

Table 8-13: Emergency Scenario 1 DUB-13 Emergency Generators Maximum Annual Mean Concentrations for 62 hours Operation

Receptor	Height	NO_2 PC (µg/m³)	PC % AQS	NO_2 Average Background (µg/m³)	Annual Mean PEC (µg/m³)	PEC % AQS
R1 GF	1.5	0.36	0.89	17.4	17.8	44.4
R1 TF	7.5	0.79	1.99	17.4	18.2	45.5
R2 GF	1.5	0.43	1.07	17.4	17.8	44.6
R2 TF	7.5	0.59	1.49	17.4	18.0	45.0
R3 GF	1.5	0.45	1.12	17.4	17.8	44.6
R3 TF	7.5	0.45	1.14	17.4	17.9	44.6

Table 8-13: Emergency Scenario 1 DUB-13 Emergency Generators Maximum Annual Mean Concentrations for 62 hours Operation

Receptor	Height	NO_2 PC (µg/m³)	PC % AQS	NO_2 Average Background (µg/m³)	Annual Mean PEC (µg/m³)	PEC % AQS
R4 GF	1.5	0.05	0.12	17.4	17.4	43.6
R4 TF	7.5	0.05	0.12	17.4	17.4	43.6
R5 GF	1.5	0.12	0.31	17.4	17.5	43.8
R5 TF	7.5	0.21	0.53	17.4	17.6	44.0
R6	1.5	0.10	0.24	17.4	17.5	43.7
R7	1.5	0.11	0.28	17.4	17.5	43.8
R8	1.5	0.11	0.28	17.4	17.5	43.8
R9	1.5	0.01	0.02	17.4	17.4	43.5
R10	1.5	0.01	0.02	17.4	17.4	43.5
R11	1.5	0.01	0.02	17.4	17.4	43.5
R12	1.5	0.01	0.03	17.4	17.4	43.5
R13	1.5	0.01	0.03	17.4	17.4	43.5
R14	1.5	0.01	0.03	17.4	17.4	43.5
R15	1.5	0.02	0.04	17.4	17.4	43.5
R16	1.5	0.02	0.05	17.4	17.4	43.6
R17	1.5	0.02	0.06	17.4	17.4	43.6
R18	1.5	0.03	0.07	17.4	17.4	43.6
R19	1.5	0.04	0.10	17.4	17.4	43.6
R20	1.5	0.04	0.11	17.4	17.4	43.6
R21	1.5	0.04	0.11	17.4	17.4	43.6
R22	1.5	0.04	0.11	17.4	17.4	43.6
R23	1.5	0.04	0.10	17.4	17.4	43.6

GF = Ground Floor exposure
TF = Top floor Exposure

8.101 The maximum predicted annual mean PC concentrations occurs at receptor R1, on the top floor. As this property is commercial, annual mean AQS does not apply. The maximum predicted annual mean PC concentration at a residential property occurs at R3 (Top Floor), northeast of site, where the PC is below the maximum allowable PC recommended by EPA AG4 guidance.

8.102 The maximum results indicate that the ambient level concentrations due to emissions arising from the emergency scenario would be comfortably below the relevant NO_2 AQS. For the worst-case year modelled, predicted PEC (including background) would be below 75% of the ambient NO_2 annual AQS at all assessed receptors, with maximum PEC predicted at receptor R1 where concentrations would be approximately 45% of the NO_2 annual AQS.

8.103 The geographical variation in annual mean NO_2 PC concentrations (without background) resulting from 62 h emergency operation of DUB-13 are shown in Figure 8.3.

8.104 The localised air quality effects of the emergency generators are considered **Long-term to Permanent**, **Imperceptible and Neutral**, i.e. **Not Significant** in terms of EIA.

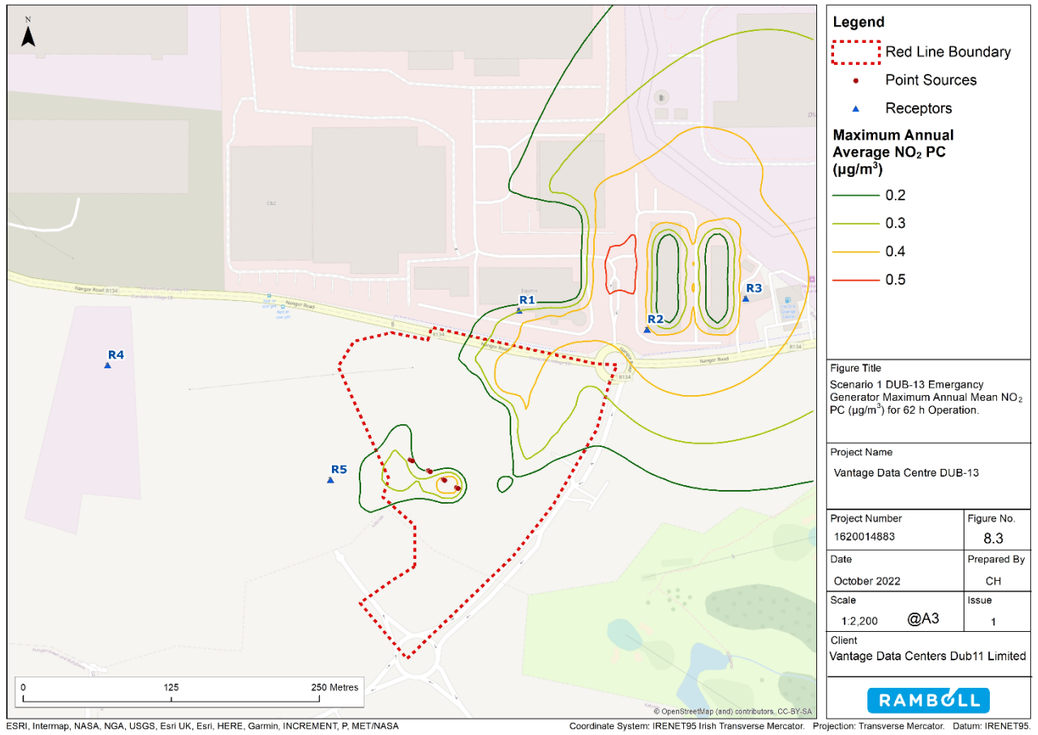


Figure 8-3: Emergency Scenario 1 DUB-13 Emergency Generator Maximum Annual Mean NO_2 PC (µg/m³) for 62 h Operation.

Emergency Scenario 2: DUB-13 and DUB-1 Campus emergency scenario.

8.105 The modelling has been undertaken to determine the DUB-13 and DUB-1 combined emergency operation with a 1% probability of exceeding the 1-hour objective. The detailed results of the dispersion modelling at the sensitive receptors identified in Table 8-14 are shown in Technical Appendix 7.2 in Volume 3.

8.106 Table 8-14 shows the results of the modelling for the highest impacted receptor for any of the assessed receptor locations.

Table 8-14: Emergency Scenario 2 DUB-13 and DUB-1 Emergency Generators

Plant	Operating hours for 1% probability of exceeding the 1-hour mean objective
DUB-13 and DUB-1 Campus Emergency Generator	29

8.107 DUB-13 and DUB-1 Campus Emergency Generators would operate for 29 hours to reach a 1% probability of exceeding the objective the 1-hour mean objective.

8.108 Table 8-15 shows the maximum predicted annual mean NO_2 concentrations at the worst-case receptor with the highest predicted concentration for the DUB-13 and DUB-1 Campus emergency generator maximum of 26 emergency operation hours. It should be recognised however that it is unlikely that the generators will

be required to operate for maximum number of hours determined. It is considered that the predicted impacts are conservative as it would require a loss of grid power to this area of Ireland for approximately 1.2 days in a year.

Table 8-15: Emergency Scenario 2 DUB-13 and DUB-1 Campus Emergency Generators Maximum Annual Mean Concentrations for 29 hours Operation

Receptor	Height	NO_2 PC (µg/m³)	PC % AQS	NO_2 Average Background (µg/m³)	Annual Mean PEC (µg/m³)	PEC % AQS
R1 GF	1.5	0.58	1.45	17.4	18.0	45.0
R1 TF	7.5	0.89	2.22	17.4	18.3	45.7
R2 GF	1.5	0.56	1.39	17.4	18.0	44.9
R2 TF	7.5	0.66	1.64	17.4	18.1	45.1
R3 GF	1.5	0.51	1.28	17.4	17.9	44.8
R3 TF	7.5	0.52	1.29	17.4	17.9	44.8
R4 GF	1.5	0.08	0.21	17.4	17.5	43.7
R4 TF	7.5	0.09	0.22	17.4	17.5	43.7
R5 GF	1.5	0.44	1.10	17.4	17.8	44.6
R5 TF	7.5	0.53	1.33	17.4	17.9	44.8
R6	1.5	0.14	0.34	17.4	17.5	43.8
R7	1.5	0.15	0.38	17.4	17.6	43.9
R8	1.5	0.15	0.38	17.4	17.6	43.9
R9	1.5	0.02	0.05	17.4	17.4	43.5
R10	1.5	0.02	0.04	17.4	17.4	43.5
R11	1.5	0.01	0.03	17.4	17.4	43.5
R12	1.5	0.02	0.04	17.4	17.4	43.5
R13	1.5	0.02	0.04	17.4	17.4	43.5
R14	1.5	0.02	0.05	17.4	17.4	43.6
R15	1.5	0.03	0.06	17.4	17.4	43.6
R16	1.5	0.04	0.10	17.4	17.4	43.6
R17	1.5	0.05	0.12	17.4	17.4	43.6
R18	1.5	0.06	0.14	17.4	17.5	43.6
R19	1.5	0.08	0.20	17.4	17.5	43.7
R20	1.5	0.09	0.22	17.4	17.5	43.7
R21	1.5	0.09	0.22	17.4	17.5	43.7
R22	1.5	0.09	0.21	17.4	17.5	43.7
R23	1.5	0.08	0.20	17.4	17.5	43.7

GF = Ground Floor exposure
TF = Top floor Exposure

8.109 The maximum predicted annual mean PC concentrations occurs at receptor R1 (Top floor). As this property is commercial, annual mean AQS do not apply. The Maximum predicted annual mean PC concentrations at a residential property occurs at R3 (Top Floor), northeast of site, where the PC is below the maximum allowable PC recommended by EPA AG4 guidance.

8.110 The maximum results indicate that the ambient level concentrations due to emissions arising from the emergency scenario would be comfortably below the relevant NO_2 AQS. For the worst-case year modelled, predicted PEC (including background) would be below 75% of the ambient NO_2 annual AQS at all assessed receptors, with maximum PEC predicted at receptor R1 where concentrations would be approximately 45% of the NO_2 annual AQS.

8.111 The geographical variation in annual mean NO_2 PC concentrations (without background) resulting from 29 h emergency operation of DUB-13 and DUB-1 Campus emissions are shown in Figure 8.4.

8.112 The localised air quality effects of the emergency generators are considered **Long-term to Permanent**, **Neutral** and **Imperceptible**, i.e., **Not Significant** in terms of EIA.

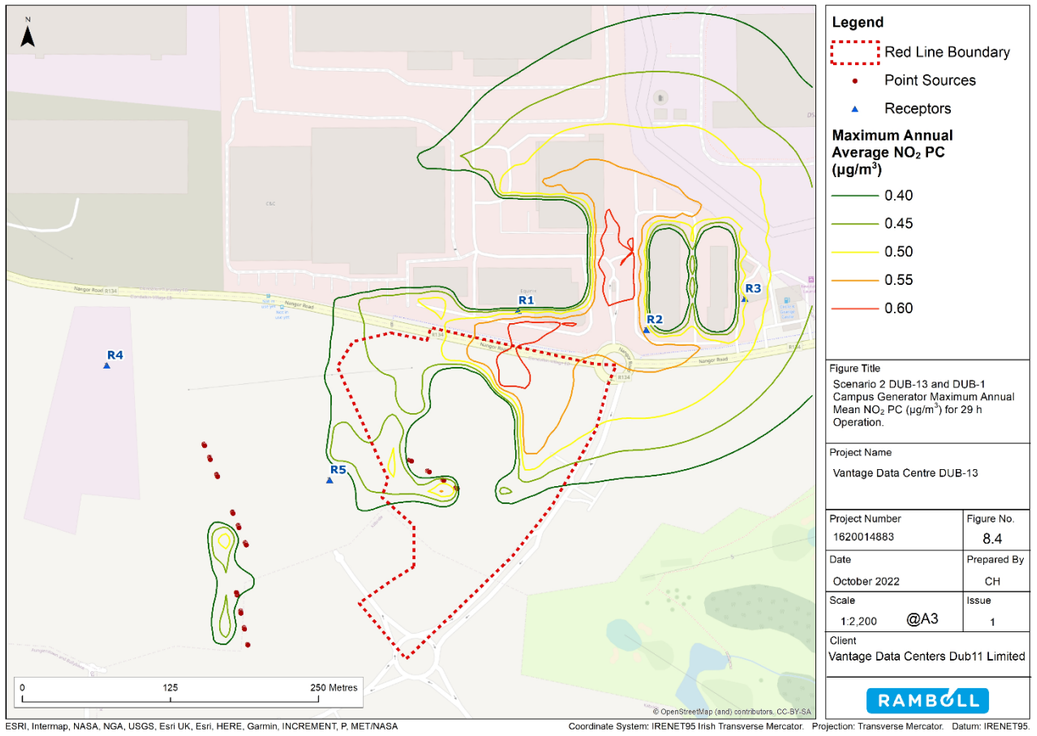


Figure 8-4: Emergency Scenario 2 DUB-13 and DUB-1 Campus Generator Maximum Annual Mean NO_2 PC (µg/m³) for 29 h Operation.

Additional Mitigation

Demolition and Construction Stage

8.113 No significant negative effects are predicted and consequently no additional mitigation is required.

Operation Stage

8.114 No significant negative effects are predicted and consequently no additional mitigation is required.

Enhancement Measures

8.115 No enhancement measures are proposed in respect of air quality.

Assessment of Residual Effects

Construction and Demolition

8.116 With the IAQM recommended mitigation measures include within the CEMP, the residual demolition and construction effects remain as reported in the assessment of effects section as being **Temporary, Imperceptible** and **Negative**, i.e. **Not Significant** in terms of EIA.

Operation Residual Effects

8.117 As no additional mitigation would be required, the residual operation effects of Emergency Scenario 1, DUB-13 emergency generators remain as reported in the assessment of effects section, **Long-term** to **Permanent**, **Neutral** and **Imperceptible**, i.e. **Not Significant** in terms of EIA.

8.118 As no additional mitigation would be required, the residual operation effects of Emergency Scenario 2, DUB-1 Campus and DUB-13 emergency generators remain as reported in the assessment of effects section, **Long-term** to **Permanent**, **Neutral** and **Imperceptible**, i.e. **Not Significant** in terms of EIA.

8.119 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section.

Summary of Residual Effects

8.120 Table 8-16 provides a summary of the outcomes of the air quality assessment of the proposed development. Where significant positive effects are likely these are highlighted in bold green and where significant negative effects are predicted these are highlighted in bold red.

Table 8-16: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and Enabling Works								
Existing Off-site Human Health and Amenity	Dust Soiling and PM_{10} due to demolition and construction works	None required	Imperceptible (not significant)	-	L	D	R	T
Existing Off-site Human Health	Change in NO_2, PM_{10} and $PM_{2.5}$ levels due to vehicle emissions	None required	Imperceptible (not significant)	-	L	D	R	T
Operation								
Existing Off-site Human Health	Change in NO_2, PM_{10} and $PM_{2.5}$ levels due to vehicle emissions							
Existing Off-site Human Health	Change in NO_2 levels due to DUB-13 emergency generators	None required	Imperceptible (not significant)	-	L	D	IR	Lt to P
Existing Off-site Human Health	Change in NO_2 levels due to DUB-13 and DUB-1 campus emergency generators	None required	Imperceptible (not significant)	-	L	D	IR	Lt to P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

8.121 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

8.122 A review of potential cumulative schemes has been undertaken as listed in Chapter 1: Introduction and Chapter 2: EIA Process and Methodology.

8.123 The demolition and construction stage cumulative effects exercise has been undertaken for cumulative schemes within 350 m of the proposed development as demolition and construction stage effects of cumulative schemes beyond 350 m are not expected to combine with the demolition and construction effects of the proposed development according to IAQM guidance.

8.124 Table 8-17 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 8-17: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Microsoft - Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 [SD20A/0283]	No	Development constructed.	No	Microsoft application assessed the NO_2 Impacts for the continuous operation of gas generators, and backup generators. Emissions are unlikely to overlap with proposed development emergency generator emissions.

Table 8-17: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
				Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	No	Development located to the west beyond 350m of the site.	No	UBC properties Townlands only assessed emergency point generator emissions. Emissions are unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
UBC Properties - Grange Castle South Business Park, Dublin 22 [An Bord Pleanála Reference – 308585]	No	Scheme located west of the site at the edge of the 350m distance considered. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	There are no significant emission sources associated with UBC Properties Grange castle. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	No	Development located beyond the 350m of the site and constructed.	No	Digital Reality Trust only assessed emissions from emergency point generators. Emissions are unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances

Table 8-17: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
				(except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD18A/0134]	No	Development located to the west beyond the 350m of the site.	No	Cyrus One, Grange Castle only assessed emissions from emergency point generators. Emissions are unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0295]	No	Development located to the west beyond the 350m of the site.	No	Cyrus One, Townlands only assessed emissions from emergency point generators. Emissions are unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [An Bord Pleanála Ref - 309146]	No	Development located to the west beyond the 350m of the site.	No	There are no significant emission sources associated with Cyrus One, Grange castle. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be

Table 8-17: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
				expected to be in operation on a day-to-day basis.
Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	Yes	Development located immediately to the south of the site. There will be a potential for overlap with the site's development works. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Centrica day-to-day basis gas fired power plant emissions unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	Yes	Development located immediately to the east of the site. There will be a potential for overlap with the site's development works. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Equinix, Plot 100, only assessed emissions from emergency point generators. Emissions are unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD22A/0156]	Yes	Development located immediately to the east of the site. There will be a potential for overlap with the site's development works. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Equinix, Plot 100, only assessed emissions from emergency point generators. Emissions are unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis

Table 8-17: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0217]	Yes	Development located to the south in within the 350m distanced considered. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Digital Netherlands day-to-day basis gas fired power plant emissions and emergency generators are unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.
Vantage Data Centers Dub 11 Limited - Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22 [An Bord Pleanála Ref - 312793]	No	Development located immediately to the south of the site. There will be a potential for overlap with the site's development works. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Vantage Data centres, only assessed emissions from emergency point generators. Emissions are unlikely to overlap with proposed development emergency generator emissions. Proposed development emergency only emission points would operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis.

Demolition and Construction Cumulative Effects

8.125 Demolition and construction significant cumulative effects are unlikely to occur as the Equinix and Centrica Business Solutions development are anticipated to employ similar dust mitigation techniques such that the individual construction stage effects are not significant, alone or in combination.

Operation Cumulative Effects

8.126 Nearby data centres with emergency emission points would only operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis. The emergency generators emission points associated with the nearby data storage facilities are unlikely to cause a significant cumulative impact.

Summary of Assessment

Background

8.127 This chapter has detailed the potential air quality effects due to the construction and operation stages of the proposed development. The assessment of construction and operation stages has been undertaken considering the relevant national and local guidance and regulations. Potential sources of emissions have been identified and assessed in the context of existing air quality and the nature and location of receptors.

8.128 The main air pollutants of concern are dust and particulate matter with an aerodynamic diameter of less than 10 microgram (PM_{10}), typically generated during demolition and construction activities and nitrogen dioxide (NO_2), typically generated by road traffic and combustion engines.

8.129 Air quality monitoring data was obtained from the EPA monitoring stations to establish the status of existing air quality. The data was used as the basis for air quality modelling and predictions.

8.130 NO_2 concentrations at the site and within the study area would be expected to be similar to measured concentrations at the closest monitoring sites and therefore likely to comfortably meet the relevant air quality standards.

Demolition and Construction Effects

8.131 During the demolition and construction works, there is the potential for vehicle emissions and dust emissions to arise at existing off-site human health receptors, as well as a loss of amenity at nearby existing residential and commercial properties.

8.132 The predicted annual average demolition and construction traffic flows are not expected to exceed the Institute of Air Quality Management (IAQM) guidance threshold such as to require formal assessment. In addition, traffic flows would be controlled through the implementation of the Construction Environmental Management Plan (CEMP). The effects of demolition and construction related traffic emissions would be temporary and not of a scale that would give rise to significant effects.

8.133 Based on criteria set out in the IAQM guidance, the construction works would present a medium risk of from dust impacts in the absence of appropriate mitigation. With the implementation of suitable mitigation measures, already incorporated within the proposed development's CEMP, it is anticipated that dust effects could be mitigated to at worst result in temporary negative, but not significant, effects at existing off-site receptors.

8.134 Overall, the demolition of existing buildings on the site and construction of the proposed development would result in an imperceptible effect on air quality and identified receptors, and as such would not give rise to significant negative effects on air quality in terms of EIA.

Operational Effects

8.135 The predicted annual average completed development traffic flows are not expected to exceed the Institute of Air Quality Management (IAQM) guidance threshold such as to require formal assessment. The effects of operation stage related traffic emissions would be long-term and not of a scale that would give rise to significant effects.

8.136 Concentrations of NO_2 have been predicted for several worst-case locations representing existing sensitive receptors in the study area.

8.137 The potential impact to air quality during the operation stage of the proposed development is a breach of the ambient air quality standards because of air emissions from the proposed development emergency engines. The modelled predicted concentrations are below the relevant standards at all the existing receptor locations for the operation stages.

8.138 It is considered that the operation of the proposed development emergency generators would result in an imperceptible effect on air quality and identified receptor that is **Not Significant** in terms of EIA.

Cumulative Effects

8.139 Demolition and construction stages of approved cumulative schemes within 350 m of the proposed development are not expected to combine with the demolition and construction stage of the proposed development. Significant cumulative effects are unlikely to occur as each scheme is anticipated to employ similar dust mitigation techniques such that the individual construction stage effects are not significant, alone or in combination.

8.140 The cumulative for emergency only emission points from other data centres which would only operate under exceptional circumstances (except for testing purposes) and therefore would not be expected to be in operation on a day-to-day basis. i.e. **Not Significant** in terms of EIA.

8.141 Overall, no significant long term cumulative effects on air quality are anticipated as a result of the operation of the proposed development.

9A NOISE AND VIBRATION

Introduction

9.1 This chapter of the EIAR reports on the likely significant noise and vibration effects to arise from the demolition and construction stage and the operation stage of the proposed development.

9.2 The chapter describes the noise and vibration policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely noise and vibration effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

9.3 This chapter is supported by the following technical appendices in EIAR Volume 3:

- Technical Appendix 9.1: Acoustic Terminology; and
- Technical Appendix 9.2: Construction Noise Calculations.

9.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - EU Directive 2002/49/EC[1]
- National Legislation and Policy:
  - Environmental Noise Regulations, SI number 140 of 2006[2]
  - Environmental Protection Agency Act 1992[3]
  - The National Climate Action Plan 2021[4]
- Regional & Local Policy:
  - Dublin Agglomeration Environmental Noise Action Plan December 2018 – July 2023[5]
- Guidance and Industry Standards:
  - EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)[6], which refers to the following British Standards:
  - BS 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites[7]; and
  - BS 4142:2014+A1 2019 for industrial and commercial noise[8].

Consultation

9.5N1 Table 9N-1 summarises the key consultations that have been undertaken with respect to the noise and vibration assessment.

Table 9N-1: Summary of Consultation

Consultee / Date	Summary of Comments
South Dublin County Council / 01 February 2023	Ramboll issued a response to the SD22A/0420 Request for Additional Information and Chief Executive's Order PR/0038/23. The response highlighted where in the assessment the required information was provided.
Kate Kivlehan, HSE / 01 March 2023	Meeting to discuss the response to the SD22A/0420 Request for Additional Information and Chief Executive's Order PR/0038/23 which was following up on by email to confirm the assessments undertaken in support of the November 2022 EIA.

Assessment Scope

Technical Scope

9.6 The technical scope of the assessment has considered the following:

- Demolition and construction noise from works being undertaken;
- Demolition and construction road traffic noise;
- Demolition and construction vibration; and
- Operational noise from plant.

9.7 In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources such as construction activities, road traffic, and building services plant. Vibration is defined as perceptible oscillations or ground and building structure transmitted from sources such as construction plant.

Effects Scoped Out

9.8 An assessment of the likelihood for building damage due to demolition and construction vibration has not been provided, as the generated vibration levels from demolition and construction works are not expected to be high at the assessed receptor locations, due to the proximity of the receptors to the site.

9.9 This magnitude of vibration is not considered likely as a result of the proposed construction activities being undertaken, and therefore an assessment of building damage has not been undertaken

9.10 There are no predicted significant road traffic noise, or operational vibration effects associated with the operational phase of the proposed development, therefore these elements have been scoped out of the noise and vibration assessment.

Spatial Scope

9.11 The study area incorporates the site and existing noise-sensitive receptors (NSR) at up to approximately 690 m from the nearest site boundary. This area encompasses the NSRs. NSRs beyond this distance are not expected to be affected by the demolition and construction or operation of the proposed development.

[1] Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise
[2] Irish Statutory Instrument (S.I.) No. 140/2006 - Environmental Noise Regulations 2006
[3] Irish Environmental Protection Agency Act, 1992.
[4] Government of Ireland, 2021. Climate Action Plan. Department of the Environment, Climate and Communications
[5] Dublin Agglomeration Noise Action Plan 2018-2023(NAP) Relating to The Assessment and Management of Environmental Noise
[6] Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4, January 2016). EPA.
[7] British Standards Institute, 2009 + A1 2014. British Standard BS 5228: Code of Practice for Noise and Vibration Control on Construction and Open Sites. BSI
[8] British Standards Institute, 2014 + A1 2019. British Standard BS 4142: Methods for rating and assessing industrial and commercial sound. BSI

9.12 For the purposes of demolition and construction and operational noise and demolition and construction vibration impact assessments, a number of NSRs have been identified from site investigations, satellite imagery and the proposed development plans. These NSRs are considered to represent a worst case, such that other receptors located at greater distances from the site would not experience greater noise and vibration impacts.

9.13 The existing NSRs identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 9-1 and Figure 9-1.

Table 9-1: Summary of Sensitive Receptors

Receptor reference	Receptor	Type of Receptor	Approximate Distance from nearest proposed development phase	Sensitivity
NSR1	Office buildings on Nangor Road	Office, commercial	40 m	Medium
NSR2	Residential buildings at Nangor Lea, Nangor Road	Residential	120 m	High
NSR3	Detached house off Baldonnel Rd to south west of site	Residential	690 m	High
NSR4	Detached house off Baldonnel Rd to south of site, outside the department of defence.	Residential	535 m	High
NSR5	Houses located south of Baldonnel Rd	Residential	680 m	High

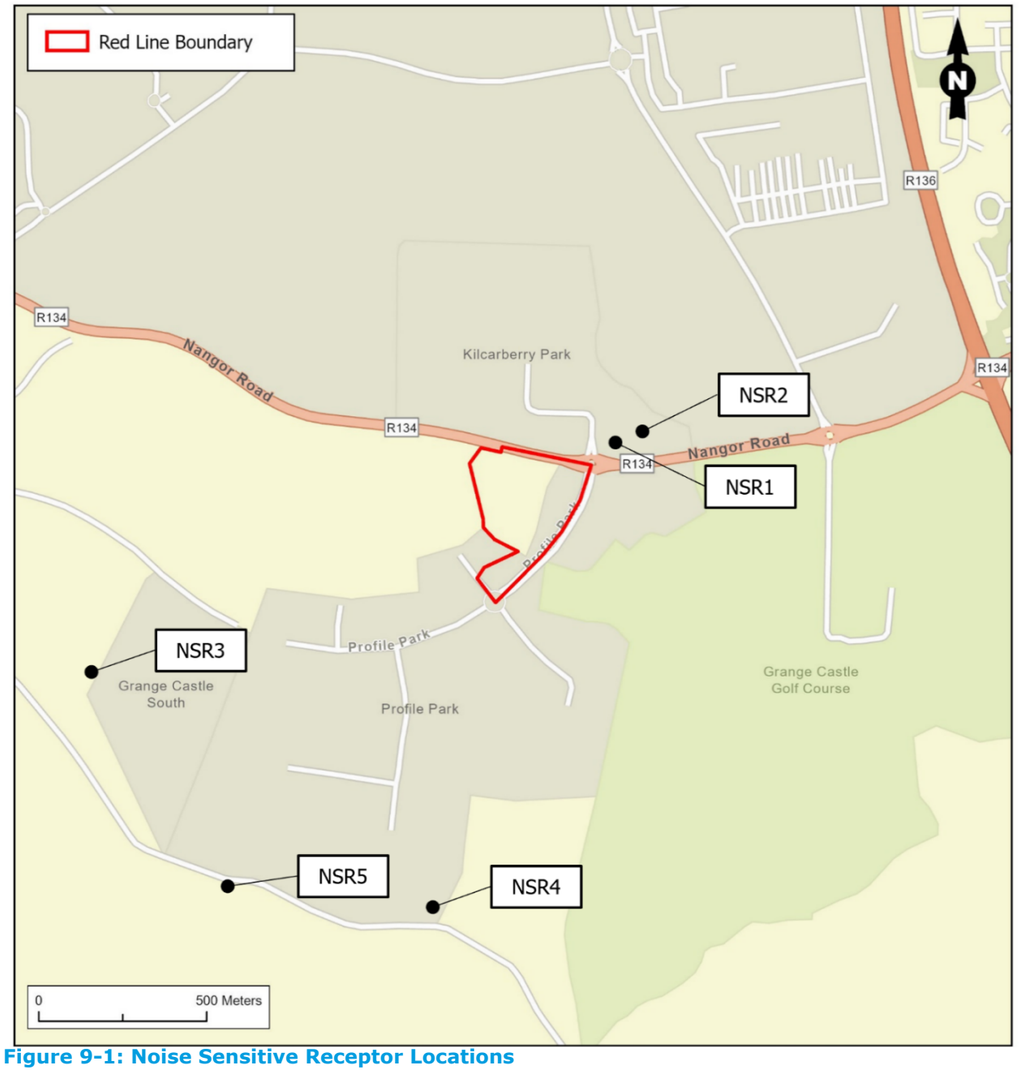


Figure 9-1: Noise Sensitive Receptor Locations

9.14 No identified NSRs have been scoped out of the assessment.

Temporal Scope

9.15 In line with EPA guidance, as outline in EIAR Chapter 2: EIA Process and Methodology of this EIAR Volume, the assessment has considered impacts arising during the demolition and construction stage (11 months) which would be expected to be temporary (less than a year) in nature and from the operation stage which would be expected to be long-term (15 to 60 years) to permanent (> 60 years).

9.16 In addition to assessing the effects of the proposed development, the assessment contained in this chapter would consider the effects of the proposed development over that of the consented DUB-1 campus (which is assessed as the future baseline). The assessment scenarios that were adopted for the July 2022 DUB-1 permitted development, and how these have been applied for the proposed development, are detailed in Table 9-2. Further information on the linkages between the proposed development and the July 2022 DUB-1 permitted development are described in Chapter 4: Proposed Development Description.

Table 9-2: Noise Modelling Scenarios used for DUB-1

Assessment Scenarios described in the EIAR for the July 2022 DUB-1 permitted development		Proposed Development EIAR Scenarios
Scenario 1 (~from Q4 2023 to Q1 2025)	• DUB 11 powered by northern block of MFGP using HVO as the fuel source. • MFGP running 24/7. • Emergency scenario below applies if the MFGP fails.	Not relevant as the proposed development would become operational in 2025.
Scenario 2 (reasonable worst case from Q1 2025)	• DUB 11 and 12 powered from the EirGrid connection across Falcon Avenue. • MFGP powered by gas from GNI. In a reasonable worst case this is assessed to be operational 24/7 using natural gas. • Emergency scenario below applies if the gas connection from GNI to the MFGP fails and there is a local grid network failure from EirGrid.	Would form the operation assessment scenarios for the proposed development with the emissions from proposed development assessed against these future baseline scenarios.
Scenario 3 (reasonable best case from Q1 2025)	• DUB 11 and 12 powered from the EirGrid connection across Falcon Avenue • MFGP not in operation. • Emergency scenario below applies if there is a local grid network failure from EirGrid.	
Emergency Scenario	• Diesel used for day tanks for emergency backup generators for the data center in the unlikely event of an outage of the MFGP and grid connection (depending on scenario). MFGP and emergency generators would not be operational at the same time.	Would form the emergency scenario for the proposed development.

9.17 The scenarios described in Table 9-2 establish the future baseline for the proposed development associated with the operation of the July 2022 DUB-1 permitted development. Table 9-3 outlines the operational scenarios for the proposed development which would be used in the noise modelling of the proposed development for the operation assessment of effects.

Table 9-3: Operational Noise Assessment Scenarios

Scenario 1 (reasonable worst case)	• Proposed Development powered from the EirGrid connection through wider DUB-1 campus. • MFGP on wider DUB-1 campus powered by gas from GNI. In a reasonable worst case this is assessed to be operational 24/7 using natural gas. • Emergency scenario below applies if the gas connection from GNI to the MFGP fails and there is a local grid network failure from EirGrid.
Scenario 2 (reasonable best case)	• Proposed Development powered from the EirGrid connection through wider DUB-1 campus. • MFGP on wider DUB-1 campus not in operation. • Emergency scenario below applies if there is a local grid network failure from EirGrid.
Emergency Scenario	• Diesel used for day tanks for emergency backup generators for the data center in the unlikely event of an outage of the MFGP and grid connection (depending on scenario). MFGP and emergency generators would not be operational at the same time.

9.18 The operational assessment presents the predicted operational noise levels for:

- Scenario 1: worst-case operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as whole, including the July 2022 DUB-1 permitted development;
- Operational Scenario 2: best-case operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as whole, including the July 2022 DUB-1 permitted development; and
- Scenario 3: emergency operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as whole, including the July 2022 DUB-1 permitted development.

9.19 The operational results are compared to the future baseline noise levels with the July 2022 DUB-1 permitted development operational.

9.20 The effects are described against the noise emission limits and the contribution of the proposed development to the future baseline noise levels with the July 2022 DUB-1 permitted development operational.

9.21 The existing and future baseline conditions have been characterised by means of desk studies, site visits, surveys and modelling, as described in the following sections.

Baseline Characterisation Method

Desk Study

9.22 In order to establish the existing baseline noise conditions in the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- Noise prediction modelling of the July 2022 DUB-1 permitted development to establish the future baseline;
- Other previous planning applications in the public domain (planning portal);
- Satellite imagery (Google Maps);
- Architectural Drawings, Sections, Elevations of the proposed development; and
- Manufacturer supplied noise data for proposed plant installations associated with both the July 2022 DUB-1 permitted development and proposed development.

9.23 The operational results are compared to the future baseline noise levels with the July 2022 DUB-1 permitted development operational and the representative background noise levels from the Field Study.

9.24 It is not possible to accurately calculate the future baseline noise levels by combining the typical measured background noise levels with the predicted specific noise levels from the operation of the July 2022 DUB-1 permitted development. Therefore, it has been deemed appropriate to compare the rating noise levels of the proposed development with the contribution of the July 2022 DUB-1 permitted development, to the representative background noise levels as measured during the baseline noise survey (field Study), as the findings of the July 2022 DUB-1 permitted development assessment found that the DUB-1 operation was not expected to significantly affect the background noise levels at the NSRs.

9.25 Therefore, the noise impact of the proposed development has been assessed against the background noise levels without the contribution of the July 2022 DUB-1 permitted development and has been compared to the predicted rating noise levels with the July 2022 DUB-1 permitted development in operation, to calculate

the difference between the rating noise levels of the proposed development and the July 2022 DUB-1 permitted development.

9.26 The noise impact of the proposed development has been compared to the predicted rating noise levels with DUB-1 in operation, to calculate the significance of effects for the difference between the rating noise levels of the proposed development and DUB-1. This is to enable the assessment of effects from the proposed development based on its contribution to the campus wide rating noise levels i.e. additional noise created by the proposed development further to the noise level ratings already consented as part of the July 2022 DUB-1 permitted development.

Field Study

9.27 The existing noise environment was characterised by baseline noise surveys to inform the assessment of the July 2022 DUB-1 permitted development. These were taken in and around the DUB-1 permitted development site to quantify the prevailing ambient and background noise levels during the daytime and night-time periods.

9.28 The results from the baseline noise survey of the July 2022 DUB-1 permitted development are deemed representative of the NSRs assessed for the proposed development. Therefore, no additional noise surveys have been completed.

9.29 The ambient and background noise levels have been used to inform the assessment criteria for plant noise emissions, building envelope and ventilation strategies and demolition and construction noise effects.

9.30 The surveys were taken outside of Covid-19 lockdown measures. However, the noise levels measured on site may have been lower due to reduced traffic levels. This is not considered to affect the assessments because the use of lower background levels would form a worst-case in terms of settling plant noise emission limits.

9.31 Attended and unattended measurements have identified the major noise sources around the site. The locations of noise measurements are detailed in Figure 9-1. Long term (LT) positions were unattended monitoring positions. Short term (ST) positions were attended monitoring positions.

9.32 At each measurement location, a comprehensive suite of noise level metrics was recorded. The following noise level indices are relevant to this assessment:

- $L_{Aeq,T}$ The A-weighted equivalent continuous noise level over the measurement period;
- $L_{A90,T}$ The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise.

9.33 Vibration surveys were not undertaken as there are no active rail links or considerable vibration generating sources within 100 m.

9.34 For the assessment of the proposed development, monitoring location LT1 is deemed to be representative of the noise climate at NSRs 1 and 2 as the dominant noise source was road traffic noise from R134 Nangor Road. Other noise sources were aeroplanes, helicopters and more distant noise from other industrial land uses, which would also affect the noise climate at NSRs 1 and 2.

9.35 Monitoring location LT2 is deemed to be representative of the noise climate at NSRs 3-5 as the dominant noise sources were road traffic noise and aircraft movements from the department of defence/Casement Aerodrome. Distant plant noise from the Google Data Center Campus was also audible at this position. The noise sources would also affect the noise climate at NSRs 3-5.

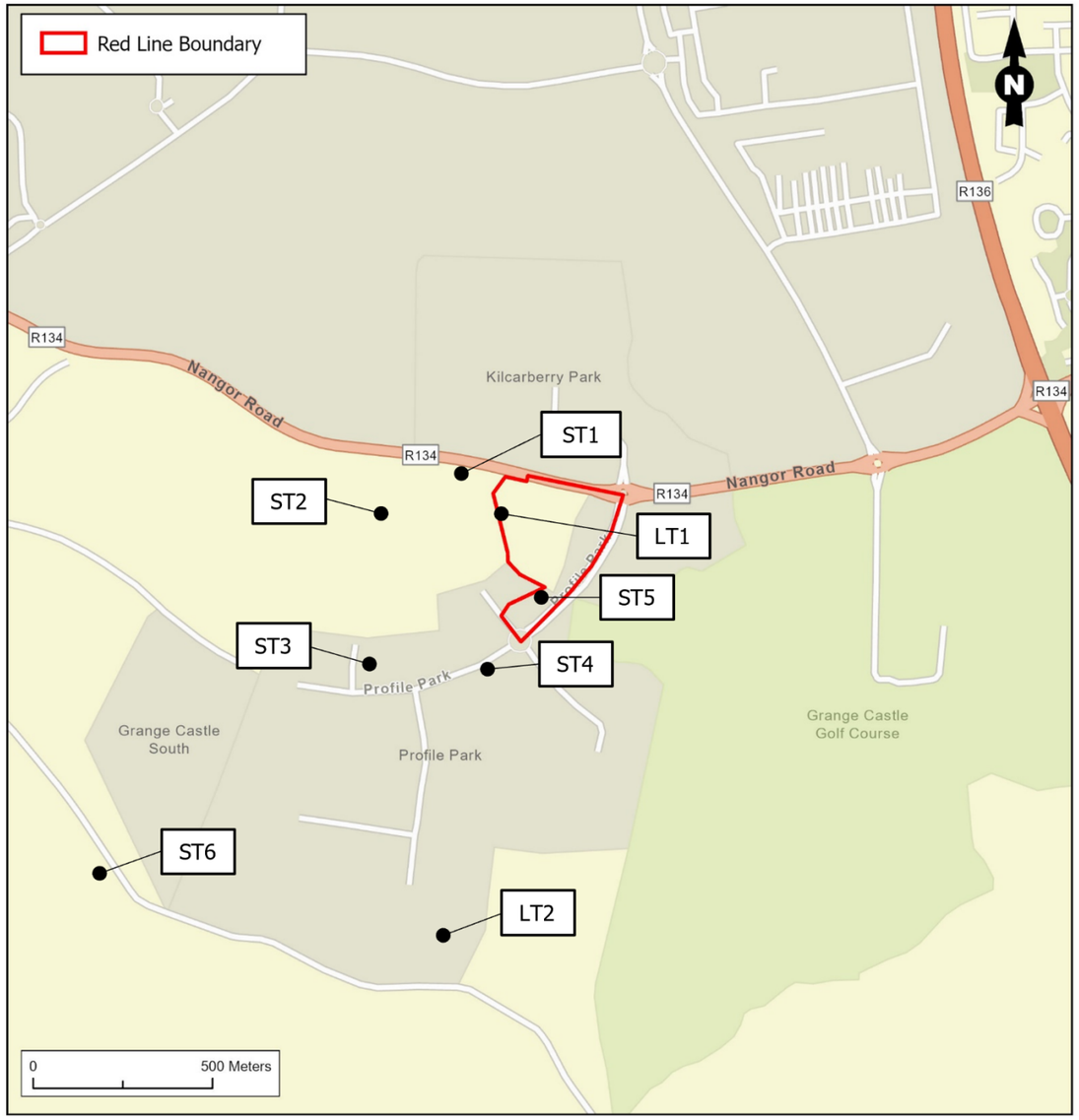


Figure 9-2: Noise Measurement Locations (LT positions were unattended monitoring positions and ST positions were attended monitoring positions)

Assessment Method

Methodology

Demolition and Construction Stage

9.36 Published Guidance: BS 5228:2009+A1 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites

9.37 BS 5228:2009+A1 2014 gives recommendations for basic methods of noise and vibration control relating to construction work. It also provides guidance concerning methods of predicting and measuring noise and vibration and assessing their impacts on those exposed to it. The prediction method considers the noise emission level of proposed plant, the separation distance between the source and the receiver and the effect of the intervening topography and structures.

9.38 The approach adopted in BS 5228:2009+A1 2014, calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the demolition and construction activities.

9.39 BS 5228:2009+A1 2014 sets out guidance on permissible noise levels relative to the existing noise environment. Table 9.4 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS 5228:2009+A1 2014. These are construction noise levels only and not the cumulative noise level due to construction plus existing ambient noise.

Table 9-4: BS 5228:2009+A1 2014 Assessment Categories

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A (Note A)	Category B (Note B)	Category C (Note C)
Night-time (23:00 to 07:00)	45	50	55
Evenings and weekends (Note D)	55	60	65
Daytime (07:00 to 19:00) and Saturdays (07:00 to 13:00)	65	70	75

Note A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

Note B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

Note C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

Note D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

9.40 Noise limits have been set for the purposes of the construction noise effects assuming daytime working (07:00-19:00).

9.41 Part 2 of the standard gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration.

9.42 The legislative background to vibration control is described and recommendations are given regarding procedures for the establishment of effective liaison between developers, site operators and local authorities. The standard also provides guidance on measuring vibration and assessing its effects on the environment.

Demolition and Construction Noise Assessment

9.43 Proposed demolition and construction works on the site would involve the use of a variety of working methods, and operations would vary across the site throughout the construction period. Therefore, noise levels from the works are likely to vary over time as the distance from the noise sources and the type of construction activity change. Note BS 5228-1:2009+A1:2014 states that calculations to receivers over 300m away should be treated with caution.

9.44 The exact working methodology and plant to be employed on site for the demolition/construction work have not yet been established. This level of detail would only be available post-planning when specialist contractors are engaged; therefore a realistic worst case has been assessed.

9.45 An estimate of the expected noise levels over a representative period has been prepared using typical types of plant commensurate for works of this nature, and noise emission data for plant obtained from BS 5228-1:2009+A1:2014. As a 'worst case', the assessment has assumed that all plant would operate for each phase of work at a given location within the site.

9.46 Construction noise predictions have been based on the methodology contained within BS 5228-1:2009+A1:2014. This enables predictions to be made of the noise emissions from the construction activities for given distances from the works.

9.47 The daytime construction noise criteria used for identifying potentially significant impacts has been identified as 65 dB $L_{Aeq,10hr}$, based on the measured noise levels at the site (Category A).

9.48 The following demolition and construction stages have been considered:

- Demolition;
- Enabling Works;
- Substructure;
- Superstructure;
- Internal Fit-out; and
- External works.

Demolition and Construction Traffic Noise Assessment

9.49 There is potential for disturbance to occur as a result of heavy goods vehicles (HGVs) travelling on the public highway. Impacts of this nature are typically more likely to occur close to the construction site access, or on sections of road that are subject to low levels of preconstruction traffic.

9.50 The HGV movements on the roads nearest the site have been considered for the purposes of identifying significant impacts. This approach has been taken because they are bounded by NSRs in close proximity; therefore, they provide the worst case for the assessment.

9.51 The number of HGVs attributable to the construction works would be highest during earthworks.

9.52 This assessment has been undertaken using the haul route method outlined in BS 5228-1:2009+A1:2014. The maximum number of trips would be included within the CEMP.

Demolition and Construction Vibration Assessment

9.53 BS 5228-2:2009+A1:2014 states that for the majority of people vibration levels between 0.14 and 0.3 mm/s Peak Particle Velocity (PPV) are just perceptible. A vibration level of 1.0 mm/s is sufficient to cause complaint, but tolerable with prior warning; whereas a level of 10 mm/s is intolerable for anything more than a very brief exposure. Vibration levels exceeding 15 mm/s PPV are sufficient to result in minor cosmetic damage in light/unreinforced buildings. This magnitude of vibration is not considered likely as a result of the proposed construction activities being undertaken, and therefore an assessment of building damage has not been undertaken. No piling is proposed as part of the development.

9.54 Perceptibility of vibration is considered in the assessment.

Operation Stage

Published Guidance: BS 4142:2014+A1:2019 Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas

9.55 BS 4142:2014+A1:2019 provides a method for rating industrial and commercial sound and method for assessing resulting impacts upon receptors. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.

9.56 The basis of BS 4142:2014+A1:2019 is a comparison between the background noise level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- Background Level, $L_{A90,T}$: defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, and quoted to the nearest whole number of decibels;
- Specific Level, $L_{Aeq,T}$: the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T;
- Residual Level, $L_{Aeq,T}$: the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and
- Rating Level, $L_{Ar,Tr}$: the specific sound level plus any adjustment made for the characteristic features of the noise.

9.57 The standard specifies that noise measurements of one hour should be used during the day (07:00-23:00) and 15 minutes at night (23:00-07:00).

9.58 Potential impacts are predicted from the difference between the representative background level at a NSR and the rating level from the noise source considered. The standard suggests that the greater the excess, the greater the magnitude of impact.

9.59 In determining the significance of the impact, BS 4142:2014+A1:2019 requires a consideration of the context of the assessment i.e. the nature of the existing acoustic environment and the new noise source, and the sensitivity of the affected receptors.

Operational Noise Modelling Approach

9.60 The predicted noise levels likely to be generated during the operational phase of the proposed development due to new items of fixed plant have been calculated using the proprietary noise modelling software CadnaA®. The operational noise predictions have been undertaken in accordance with the noise prediction framework set out in ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation'.

9.61 The ISO 9613 noise prediction model assumes that individual sources act as point sources; the noise level reducing by 6 dB for every doubling of distance. Noise from line sources reduce by 3 dB per doubling of distance. The model takes into account the distance between the sources and the NSRs and the amount of attenuation due to atmospheric absorption and ground cover.

9.62 The topography on and around the site has been modelled using topographical survey information. The acoustic ground absorbency has been modelled according to local conditions.

Cumulative Stage

9.63 For the purposes of assessing the cumulative effects, consideration has been given to all cumulative schemes that have the potential to result in a significant cumulative effect alongside the proposed development. Full details of all the cumulative schemes are given in Chapter 2: EIAR Process and Methodology. The baseline and assessment of significance, and the judgement of the magnitude of change stages are as above for the construction and operation stages. Only receptors for which the proposed development is predicted to result in a significant residual effect alone are included in this part of the assessment.

Assessment Criteria

9.64 The assessment of significance of effect with regards to noise and vibration is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

9.65 The general criteria used to assess if an effect is significant or not, is set out in Chapter 2, further details are provided herein. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

9.66 The sensitivity of receptors has been classified as low, medium or high in accordance with the criteria set out in Table 9-5.

Table 9-5: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	Industrial, commercial and retail premises
Medium	Places of worship, community facilities, offices
High	Specialist vibration sensitive equipment, residential properties, educational buildings, medical facilities, care homes, hotels

9.67 NSR 1 is deemed to be of medium sensitivity (office). NSRs 2-5 are high sensitivity (residential).

Impact Magnitude Criteria

Demolition and Construction Noise

9.68 The magnitude of impact has been classified as low, medium or high, in accordance with the criteria set out in Table 9-6.

Table 9-6: Impact Magnitude Criteria – Construction Noise

Magnitude of Impact	Façade noise level dB(A)
Low	<65
Medium	65-70
High	>70

Demolition and Construction Vibration

9.69 Table 9-7 details the distances at which certain construction activities are likely to give rise to a just perceptible level of vibration. These figures are based on historical field measurements to inform BS 5228:2009+A1:2014.

Table 9-7: Distances at which vibration may just be perceptible

Construction Activity	Distance from Activity (m)
Heavy vehicles (e.g. dump trucks)	5-10
Excavation	10-15
Hydraulic breaker	15-20
Continuous flight auger (CFA) piling	10-20
Rotary bored piling	20-30
Driven piling	50-100

Operational Phase Building Services Plant

9.70 Plant rating noise limits have been set following the methodology of BS 4142:2014+A1:2019. Based on guidance from BS 4142:2014+A1:2019 and noise limits defined by the EPA, the magnitudes of impact in Table 9-8 have been used.

Table 9-8: Impact Magnitude Criteria – Operational Building Services Noise Emissions

Magnitude of Impact	Description
	Noise due to the normal operation of the proposed development, shall not exceed the lesser of the following limits:
Low	• Daytime (07:00-19:00) 55 dB $L_{Ar,Tr}$ or 10 dB above background. • Evening (19:00-23:00) 50 dB $L_{Ar,Tr}$ or 0 dB above background. • Night time (23:00-07:00) 45 dB $L_{Ar,Tr}$ or 0 dB above background.
Medium	• Daytime (07:00-19:00) 60 dB $L_{Ar,Tr}$ or 10-15 dB above background. • Evening (19:00-23:00) 55 dB $L_{Ar,Tr}$ or 0-5 dB above background. • Night time (23:00-07:00) 50 dB $L_{Ar,Tr}$ or 0-5 dB above background.
High	• Daytime (07:00-19:00) 65 dB $L_{Ar,Tr}$ or > 15 dB above background. • Evening (19:00-23:00) 60 dB $L_{Ar,Tr}$ or > 5 dB above background. • Night time (23:00-07:00) 55 dB $L_{Ar,Tr}$ or > 5 dB above background.

Operational Phase Emergency Plant

9.71 Back-up emergency generators would be provided as part of the proposed development to serve the data hall. The generators would only operate in a situation where there is a failure in the electricity supply from the national grid and for routine testing. Routine testing would be conducted during regular weekday daytime periods only.

9.72 Section 4.4.1 of the Environmental Protection Agency (EPA) document "Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities" (NG4 - 2016) contains the following comments in relation to emergency plant items:

> 'In some instances, sites would have certain items of emergency equipment (e.g. standby generators) that would only operate in urgent situations (e.g. grid power failure). Depending upon the context, it may be deemed permissible for such items of equipment to give rise to exceedances in the noise criteria/limits during limited testing and emergency operation only. If such equipment is in regular use for any purposes other than intermittent testing, it is subject to the standard limit values for the site'.

9.73 With reference to other developments in the area, it is noted that an emergency noise emissions limit of 55 dB $L_{Aeq,1hr}$ is generally applied at nearby NSRs. On this basis, the following magnitudes of impact have been adopted for this assessment:

Table 9-9: Impact Magnitude Criteria – Operational Emergency Services Noise Emissions

Magnitude of Impact	Description
	Noise due to emergency plant operation at the proposed development, shall not exceed the lesser of the following limits:
Low	55-60 dB $L_{Aeq,1hr}$
Medium	60-65 dB $L_{Aeq,1hr}$
High	>65 dB $L_{Aeq,1hr}$

Scale of Effect Criteria

9.74 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 9-10.

Table 9-10: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors		
	Low	Medium	High
Low	Imperceptible	Not Significant	Slight
Medium	Not Significant	Slight	Moderate
High	Slight	Moderate	Significant

9.75 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports[9] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

9.76 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

General

9.77 The following assumptions and limitations apply to the assessments contained within this Chapter:

- The assessment has relied on data provided by Burns & McDonnell. It has been assumed that these data sets have been reported correctly;
- The measured baseline climate is a sample of the current noise climate at the site and is representative of activities occurring during the surveys;
- A number of assumptions have been made to inform the appraisal of demolition and construction stage impacts, such as the techniques used to construct the buildings, the type of plant being used, the number of plant items operating, and the running time throughout the day. The assumptions provide a worst-case assessment;
- The demolition and construction phasing strategy for the site has been set out in EIAR Chapter 5 and has been used to assess potential impacts;
- The specification for the building envelope of the generator building has been determined to achieve the noise limits set out in this report. This is subject to detailed design, along with other mitigation measures proposed for barriers, attenuation requirements for exhaust stacks, etc;
- Exhaust stack heights for the MFGP are modelled at 30m and the emergency diesel generators are modelled at 22.3m;
- Sound level data for the emergency diesel generators has been used as follows:
  - 'Inlet' and 'Canopy' applies to noise breaking out of the generator enclosure;
  - 'Discharge' applies to the noise exiting through the enclosure chimney; and
  - 'Exhaust' sound data has been applied to the top of the stacks.

[9] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

Table 9-11: Summary of Noise Measurements at Monitoring Position LT1

Measurement Period	Time Period	Log Average $L_{Aeq,T}$	Typical $L_{A90,T}$ dB
25/06/2021 to 02/07/2021	Daytime (07:00-19:00)	53	46
	Evening (19:00-23:00)	50	44
	Night time (23:00-07:00)	47	42

9.78 In the absence of specific measurement conditions of this data (an overall figure averaged from measurements all around the generator is provided) it is assumed the generator radiates equal sound levels from all faces;

- Noise from externally mounted or terminating plant is not expected to be tonal or intermittent at the NSRs due to distance attenuation and masking by ambient noise. The spectral sound data does not indicate any strong tonal properties to the noise.

Approach to Assessment

9.79 The assessment of noise and vibration impacts has been undertaken using the detailed masterplan layouts and general arrangement (GA) plans/sections/elevations that have been prepared for the site.

Baseline Conditions

Existing Baseline

9.80 The existing noise climate across the site varies with location. The northern portion of the site generally experiences higher levels of noise due to the influence of the surrounding road network and other commercial/industrial uses. Other noise sources include industrial uses and aircraft movements from the nearby Casement Aerodrome. A summary of the noise measurements at each position is provided below. The typical $L_{A90,T}$ values have been derived from statistical analysis in line with BS 4142:2014+A1 2019.

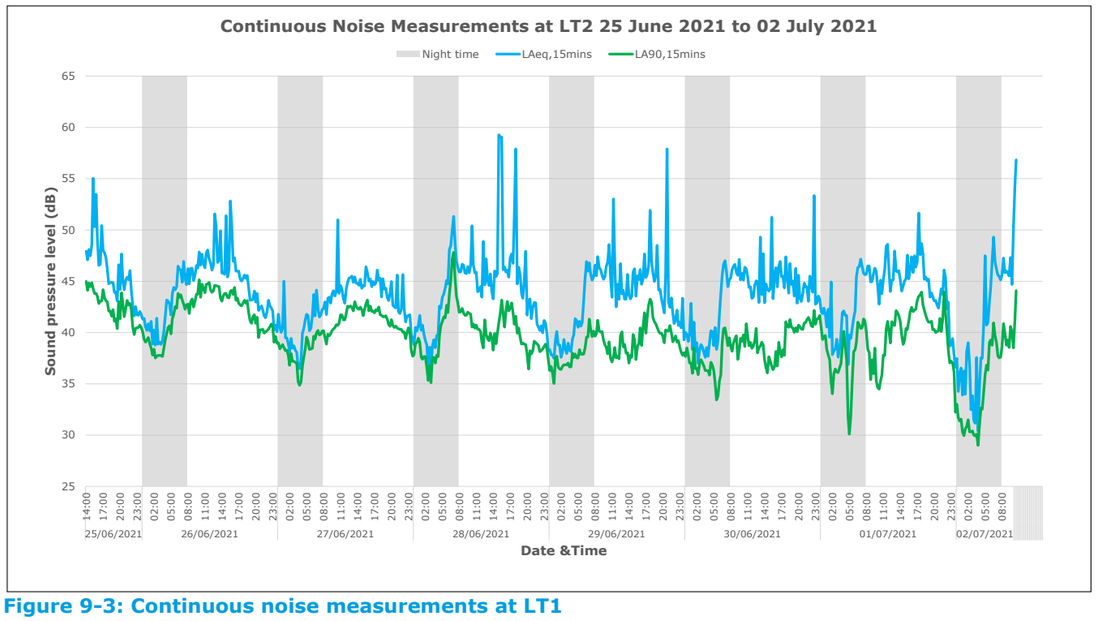


Figure 9-3: Continuous noise measurements at LT1

9.81 It is evident from the survey data recorded at LT1 that the noise levels did not vary significantly throughout the duration of the survey. The dominant noise sources were road traffic noise, aeroplanes and helicopters and more distant noise from other industrial land uses.

9.82 The noise climate at LT2 during the survey was dominated by road traffic noise and aircraft movements from the department of defence/Casement Aerodrome. Distant plant noise from the Google Data Center Campus was also audible at this position.

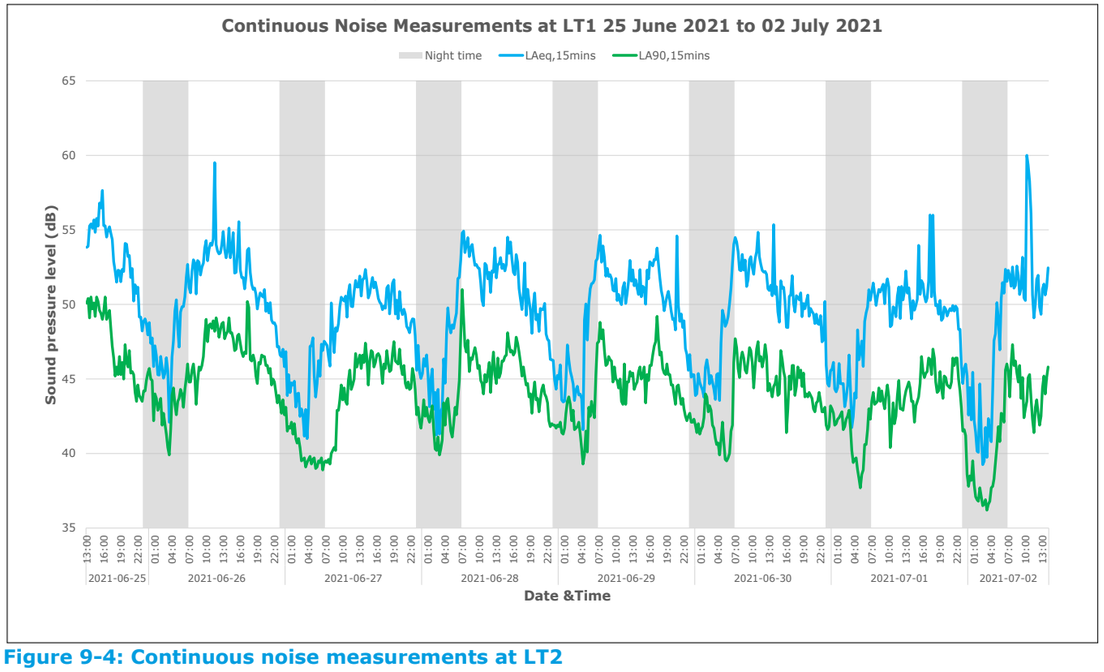


Figure 9-4: Continuous noise measurements at LT2

Table 9-12: Summary of Noise Measurements at Monitoring Position LT2

Measurement Period	Time Period	Log Average $L_{Aeq,T}$	Typical $L_{A90,T}$ dB
25/06/2021 to 02/07/2021	Daytime (07:00-19:00)	47	42
	Evening (19:00-23:00)	45	40
	Night time (23:00-07:00)	42	38

9.83 The noise climate at STI was dominated by road traffic noise during the daytime, with occasional planes and helicopters also contributary. Other sources included cyclists in the cycle lane along New Nagor Road and birdsong. During the night-time, road traffic noise was reduced with only one car approximately every 30-minutes. Humming from nearby industrial units was more clearly audible during the night-time measurements.

Table 9-13: Summary of Noise Measurements at Monitoring Position ST1

Date of measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
23/06/2021	23:17	54	40
24/06/2021	00:28	48	39
	01:33	45	37
02/07/2021	11:14	67	46
	13:31	69	49
	16:58	69	51

9.84 During the daytime the noise climate at ST2 was dominated by distant road traffic noise and the nearby car garage workshop (hammering, banging, and cars idling). During the night-time, the noise climate was dominated by distant road traffic noise.

Table 9-14: Summary of Noise Measurements at Monitoring Position ST2

Date of measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
23/06/2021	23:39	38	33
24/06/2021	00:48	38	34
	01:54	36	34
02/07/2021	11:35	45	39
	13:52	49	43
	17:19	44	40

9.85 During the daytime the noise climate at ST3 was dominated by distant road traffic noise and the occasional aircraft noise as noted for ST1 above. Some nearby construction noise was also noted. During the night-time, humming from other data centers was more audible, along with faunal clicks in nearby trees.

Table 9-15: Summary of Noise Measurements at Monitoring Position ST3

Date of measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
24/06/2021	00:05	39	35
	01:13	40	37
	02:11	39	36
02/07/2021	13:11	46	44
	15:41	44	41
	16:38	45	40

9.86 During the daytime the noise climate at ST4 was dominated by road traffic noise and overheard aircraft movements. Other distant sources included a lorry reversing, a car alarm and fan exhaust noise from the Google Data Center. During the night-time, road traffic noise was more distant with the 'hum' from Google's plant more audible.

Table 9-16: Summary of Noise Measurements at Monitoring Position ST4

Date of measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
24/06/2021	00:52	41	39
	23:43	41	38
	01:53	41	39
02/07/2021	12:52	46	43
	15:22	44	42
	16:20	50	42

9.87 The noise climate at ST5 was similar to that at ST4, with the loudest industrial noise contributions coming buildings located to the north of New Nangor Road. During the night-time, it was noted that contributions from Digital Realty's Data Center were more audible.

Table 9-17: Summary of Noise Measurements at Monitoring Position ST5

Date of measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
23/06/2021	23:22	49	39
24/06/2021	00:31	39	37
	01:35	39	36
02/07/2021	12:32	41	39
	15:01	41	37
	16:01	46	41

9.88 The noise climate at ST6 in the daytime was dominated by road traffic noise, vehicles accessing the 'Junior Genius' creche, and children playing in the nearby gardens. During the night-time, no local vehicle movements were noted except for the measurement at 01:13 when an articulated lorry passed the measurement position. Otherwise, plant noise from the Google Data Center dominated the noise climate during the night-time.

Table 9-18: Summary of Noise Measurements at Monitoring Position ST6

Date of measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
24/06/2021	00:06	34	33
	01:13	50	32
	02:15	36	33
02/07/2021	11:59	64	43
	14:38	64	39
	17:44	65	39

9.89 A summary of the weather conditions during the survey period is provided below (as measured at monitoring position LT2):

Table 9-19: Summary of Weather Conditions During Monitoring Period

Average Wind Direction	Average Wind Speed (m/s)	Average Ambient Temperature (°C)	Average Pressure (bar)	Average Precipitation (mm)
South-East (SE)	1.3	14.1	1009.6	0.0

Future Baseline

9.90 The future baseline includes the operation of the July 2022 DUB-1 permitted development and so therefore, background noise levels may be slightly higher than the background noise levels used for setting plant noise limits in this assessment.

9.91 The rating noise levels for the July 2022 DUB-1 permitted development were equal to the representative background noise levels, as a worst case (for NSR 4) for scenario 1 of the proposed development. The predicted rating noise levels for all other NSR locations were below the representative background noise levels in scenario 1 as described in Table 9-2.

9.92 The rating noise levels for the July 2022 DUB-1 permitted development were less than the representative background noise levels for all NSRs for scenario 2 of the proposed development, as described in Table 9-2.

9.93 The predicted emergency operation noise levels met the limiting criterion.

DUB-1 Future Baseline Equipment

9.94 The following section outlines the equipment that will operate for the DUB-1 campus to form the future baseline, as included in the EIAR for the July 2022 DUB-1 permitted development.

Generator Buildings (Multifuel Generation Plant) associated with the July 2022 DUB-1 permitted development

DUB-1 Exhaust Stacks

9.95 A total of 11 Wartsilla 20V34SG engines would operate in the two generator halls. The sound power per engine exhaust is shown below:

Table 9-20: Wartsilla 20V34SG engine noise

Total (dBA)	Sound Power Level L_{wA} (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
119.8	88.0	103.0	110.0	113.0	114.0	111.0	114.0	-

9.96 Each exhaust stack would include silencers to reduce the engine noise by 45dB.

DUB-1 Internal reverberant noise level

9.97 The internal reverberant noise level from within the engine halls is based on 5no. Wartsilla 20V34SG engines running in each generator hall.

Table 9-21: Internal reverberant noise level in generator halls used in the assessment

Total (dBA)	Internal reverberant noise level (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
105.8	74.1	89.1	96.1	99.1	100.1	97.1	100.1	-

DUB-1 Building Envelope Construction

9.98 The building design allows for the following building envelope construction:

- 0.7mm standing seam steel outer
- 160mm Rockwool 100kg/m³ (1 x 60mm + 1 x 100mm)
- 5mm Tecsound (10kg/m²)
- 1.2mm profiled steel liner

9.99 The estimated performance of this construction is as follows:

Table 9-22: Generator building envelope construction octave band transmission loss used in the assessment

• Transmission loss of building envelope (dB)	Approx R_w (dB)	Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
	50	20	28	37	49	55	58	64	-

DUB-1 Noise from Air Inlets/Exhausts

9.100 The noise level from each air inlet/exhaust would be limited to 65 dBA at 1m from the external louvre/duct. This has been calibrated within the model using the spectrum for the internal reverberant noise level, corrected to 65 dBA at 1 m.

DUB-1 Remote radiators

9.101 The air-cooled radiators associated with the MFGP would be selected to be 'ultra-ultra-low noise'. The A-weighted sound power level $L_{w,A}$ for one 3-fan cooling radiator is shown below. It is assumed that this data is applied evenly over the radiator per fan for the model.

Table 9-23: Remote radiator fan noise used in the assessment

Total (dBA)	A-weighted Sound Power Level $L_{w,A}$ (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
88	92.2	93.1	88.6	85.2	83.0	77.8	73.0	65.1

DUB-1 Barriers/Screens

DUB-1 Substation compound

9.102 The proposed substation compound would include a min. 3m high brick blast wall to its full perimeter.

DUB-1 External Plant Installations

DUB-1 Rooftop Chillers per data hall

9.103 12no. Airedale TurboChill V chillers would operate per roof of each data hall. The sound power per chiller is as follows:

Table 9-24: Sound power L_w (dB) as a function of frequency (Hz) per chiller

Total (dBA)	Sound power L_w (dB) at Octave Band Centre Frequency (Hz) per chiller							
	63	125	250	500	1k	2k	4k	8k
99.2	72.0	87.7	98.6	96.5	93.2	90.7	89.4	86.6

9.104 Each chiller would include an acoustic package with attenuated inlet and discharge, providing the following minimum insertion losses:

Table 9-25: Chiller acoustic package octave band insertion loss used in the assessment

Insertion loss (dB) at Octave Band Centre Frequency (Hz)

Table 9-25: Chiller acoustic package octave band insertion loss used in the assessment							
63	125	250	500	1k	2k	4k	8k
4.0	8.0	13.0	22.0	24.0	21.0	18.0	14.0

DUB-1 Step-up Substation

9.105 3no. transformers would be located in the external substation compound. A sound power of 106 dB L_w has been assumed per transformer in the model.

DUB-1 Emergency generators

9.106 36 no. KD3300-F emergency generators would be included (13no. per hall). These would be housed in containers and include silencers to attenuate noise levels to 85dBA at 1m. The following sound levels have been used in the model:

DATA:
Generator set: KD3300-F
Engine: KD83V16-5BFS @ 1500RPM
Radiator Cooling airflow: 46m³/s @ 300Pa.
Absorbed fan Power: 70kW
Combustion airflow: 3.262m³/s
Overall Noise : 85dB(A)@1m

NOISE DATA FOR PROPOSED GENERATOR SET, CANOPY
designed to achieve 85dB(A)@1m around the perimeter under standard test conditions Free Field .

FREQUENCY (Hz)	Octave band Centres (dB).								OVERALL dB(A)
	63	125	250	500	1000	2000	4000	8000	
UNSILENCED ENGINE NOISE L_W	119.4	126.3	125.6	118.7	117.7	116.9	114.6	114.7	..
UNSILENCED Radiator fan L_W (Calculated)	119	123	124	125	125	125	123	121	130
CANOPY PREDICTED L_P @1m	64.1	74.3	78.2	75.9	69.9	56.9	56.9	52.8	81.6
INLET ATTN PREDICTED L_P @1m	99.3	96.3	80.7	67.3	58.2	55.2	60.2	74	82.2
DISCHARGE PREDICTED L_P @1m	102.6	97.1	80.8	62.8	56.7	56.1	54.0	72.8	83.1
UNSILENCED EXHAUST NOISE Lw SDMO Data	129.9	142.9	135.2	129.3	125.4	123.8	125.6	124.2	..
PREDICTED EXHAUST L_P @1m	99.0	95.0	87.0	69.0	60.0	54.0	56.0	59.0	83.0

NOTES: Grey areas above denote source data stated in L_W Sound Power levels.
White areas above denote calculated data, stated in L_P Sound Pressure levels at 1m from the unit.

Calculations for noise within the unit is carried out using both the engine and radiator fan as noise sources to ensure "Beaming" from fan Pure Tones is prevented in the discharge attenuator.

Figure 9-5: Emergency Generator Sound Levels

Assessment of Effects

Embedded Mitigation

9.107 The assessment of effects has taken account of the following embedded mitigation.

Demolition and Construction

9.108 Standard best practice controls and measures, as detailed below, would be adopted onsite to ensure that noise management forms an integral part of the contractor's scope of works.

Construction Environmental Management Plan

9.109 A Construction Environmental Management Plan (CEMP) would be prepared that defines construction mitigation measures to be adopted to minimise noise and vibration emissions at surrounding sensitive receptors. This would be updated as the project progresses to incorporate specific measures for all phases of the construction works where noise and vibration may give rise to disturbance.

9.110 The CEMP would include the following Best Available Techniques (BAT):

- Use of plant conforming with relevant Irish standards, directives or recommendations on noise or vibration.
- Works would only be carried out within agreed working hours. Restricted working hours (including Monday-Friday: 07:00-19:00, Saturday: 08:00-13:00, and no working on Sundays or Bank Holidays). Planning of working hours to take account of the effects of noise and vibration upon persons in areas surrounding site operations and upon persons working onsite.
- Construction plant would be maintained in good condition with regards to minimising noise output and workers exposed to harmful noise and vibration.
- All drivers to site, including deliveries, would drive vehicles in a considerate manner in accordance with the specified speed limits with any failure to comply addressed as per infringements of the contractor's Project Health and Safety Plan.
- Construction plant would be operated and maintained appropriately, having regard to the manufacturer's written recommendations and maintenance programmes.
- Starting-up plant and vehicles sequentially rather than all together. Plant, equipment and site vehicles would be switched off when not in use.
- Construction traffic would only use the designated routes as per the construction traffic management plan as outlined in Chapter 5: Construction Description.
- The transport of construction materials, spoil and personnel would be programmed and routed to reduce the risk of increased noise and vibration impacts.
- Adoption of quiet working methods, using plant with lower noise emissions, where reasonably practicable.
- Use of silenced and well-maintained plant conforming with the relevant Irish directives relating to noise and vibration. Vehicle and mechanical plant used for the purpose of the works would be fitted with effective exhaust silencers and/or mufflers, maintained in good working order and operated in such a manner as to minimise noise emissions.
- Construction plant and activities would be positioned to minimise noise at sensitive locations.
- Equipment that breaks concrete by munching or similar, rather than by percussion, would be used as far as is practicable.
- Mufflers would be used on pneumatic tools.
- Avoiding breaking out hard surfaces using percussive techniques, where reasonably practicable. Where practicable, rotary drills actuated by hydraulic or electrical power would be used for excavating hard materials.

- Adoption of working methods that minimise vibration generation, where reasonably practicable;
- Locating plant away from noise and vibration sensitive receptors, where feasible;
- Use of site hoarding, assumed 2.4m high, and acoustic screening for static items of plant and work areas, where feasible;
- Avoiding unnecessary revving of engines and switch off equipment, when not required;
- Keeping internal haul routes well maintained and avoid steep gradients;
- Use of rubber linings for chutes and dumpers to reduce impact noise;
- Minimisation of drop height of materials;
- Carrying out regular inspections of noise mitigation measures to ensure integrity is maintained at all times;
- Providing briefings for all site-based personnel so that noise and vibration issues are understood, and mitigation measures are adhered to;
- Management of plant movement to take account of surrounding NSRs, as far as is reasonably practicable; and
- Carrying out compliance monitoring of onsite noise and vibration levels to ensure that the agreed limits are being adhered to.

9.111 An appropriate community awareness campaign would be undertaken to provide information to people residing in properties in the vicinity of the construction works, to reduce the likelihood of negative impacts on the public which could result in complaints. The level of engagement would vary depending upon the expected effects experienced by individual receptors due to the construction works.

9.112 It is envisaged that the public awareness campaign would provide local residents with the following items of information:

- The nature of the works being undertaken;
- The expected duration of the works;
- The contractor's working hours;
- Mitigation measures that have been adopted to minimise noise and vibration, as detailed in the CEMP; and
- Contact details in the event of a noise disturbance.

9.113 If work is required to extend into periods beyond the agreed hours, separate authorisation would be secured with SDCC via the CEMP or other agreement process.

9.114 Best Available Techniques (BAT) as defined in Section 7 of the Protection of the Environment Act would be implemented as part of the working methodology as detailed in the CEMP. This would serve to minimise the noise and vibration effects at receptors in the vicinity of the construction works. The reduction in noise levels provided through the implementation of BAT varies depending on the nature of the works; however, values in excess of 5 dB can be expected through a combination of appropriate measures and the use of site hoardings for noise screening.

Demolition and Construction Effects

Demolition and Construction Noise

9.115 Reference should be made to Appendix 9.2 for details of the construction noise calculation that has been used to inform this summary.

9.116 Table 9-26 presents the mitigated noise levels (dBA) at various distances from the construction activities taking place at the site. A +3 dB building façade correction factor has been applied in accordance with BS 5528:2009+A1 2014.

Table 9-26: Construction noise assessment results, dB L_{Aeq} (façade levels)

Activity	NSR1 (Offices)	NSR2 (Nangor Lea)	NSR3 (Baldonnel Rd)	NSR4 (Baldonnel Rd)	NSR5 (Baldonnel Rd)
Min. separating distance[1]	75/120m	155/200m	690/770m	535/690m	680/830m
Enabling Works	60	53	41	43	41
Demolition	55	52	41	42	42
Substructure	58	53	41	42	41
Superstructure	50	46	34	35	33
Internal Fit-out	47	42	31	32	30
External Works	58	52	39	41	39

[1]Distance to boundary for Enabling and External Works / distance to building footprint, at the closest point

9.117 The noise levels at the identified NSRs are not predicted to exceed the threshold criteria as demonstrated by the above table.

9.118 On the basis of the predicted mitigated noise levels and distances to NSRs, the demolition and construction works are predicted to give rise to noise levels that would constitute:

- a **direct, temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), not-significant in terms of EIA; and
- **direct, temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), not-significant in terms of EIA.

Demolition and Construction Traffic Noise

9.119 The management of demolition and construction vehicle movements would form an integral part of the CEMP as outlined above.

9.120 The assessment has calculated a maximum number of trips per hour to not exceed the construction noise limit (65 dB $L_{Aeq,T}$).

9.121 Based on a (83 dBA at 10m) 44t lorry travelling at 34 kph, the peak permissible number of HGV vehicle movements passing a NSR at 20m (the shortest distance been the NSR and the road centreline) has been assessed as 16 per hour, or 8 return journeys per hour. On this basis the predicted demolition and construction traffic noise level would be calculated as 65 dB $L_{Aeq,1hour}$. This would constitute:

- a **Direct, Temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), Not-significant in terms of EIA; and
- **direct, temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), Not-significant in terms of EIA.

Demolition and Construction Vibration

9.122 With reference to Table 9-7, the assessed receptors are at distances greater than which vibration may be perceptible.

9.123 Receptor NSR1 is deemed to be at 75 m from the site boundary/proposed works, at the closest point. No works that would take place at the site boundary are expected to generate sufficient levels of vibration to be perceivable at receptor NSR1. All other receptors are of much greater distance from the site boundary/proposed works.

9.124 Demolition and construction vibration constitutes:

- a **direct, temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), Not-significant in terms of EIA; and
- direct temporary **Slight, Negative** and **Not Significant** (low magnitude) effects for receptors NSR2-5 (high sensitivity), Not-significant in terms of EIA.

Operation Effects

9.125 This section of the chapter outlines:

- Noise emission limits applicable to the operation of the proposed development and the July 2022 DUB-1 permitted development;
- The equipment that will be required for the operation of the proposed development;
- The predicted operational noise levels for:
  - Scenario 1: worst-case operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as whole, including the July 2022 DUB-1 permitted development;
  - Operational Scenario 2: best-case operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as a whole, including the July 2022 DUB-1 permitted development; and
  - Scenario 3: emergency operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as whole, including the July 2022 DUB-1 permitted development.

9.126 The results are compared to the future baseline noise levels with the July 2022 DUB-1 permitted development operational.

9.127 The effects are described against the noise emission limits and the contribution of the proposed development to the future baseline noise levels with the July 2022 DUB-1 permitted development operational.

Building Services Plant

Noise Emission Limits

9.128 The specifications for fixed plant installations serving the proposed development have been based on the following noise limits, which have been set in accordance with BS 4142:2014+A 2019 and local requirements.

9.129 Limits are set at 1 m from the window of the nearest NSRs and include a façade reflection.

Table 9-27: Noise Emissions Limits for New Building Services Plant

NSR reference	Time Period	Representative Background Noise Level $L_{A90,15min}$ (dB)	Rating Noise Limit $L_{Ar,Tr}$ (dB)	Emergency Noise Limit $L_{Aeq,1hr}$ (dB)
1-2	Daytime (07:00-19:00)	46	≤56	55
	Evening (19:00-23:00)	44	≤44	55
	Night-time (23:00-07:00)	42	≤42	55
3-5	Daytime (07:00-19:00)	42	≤52	55

Table 9-27: Noise Emissions Limits for New Building Services Plant				
	Evening (19:00-23:00)	40	≤40	55
	Night-time (23:00-07:00)	38	≤38	55

9.130 The proposed development would run 24 hours a day, 7 days a week. Therefore, the assessment has considered the noise emission limits during night-time only (for normal operation).

9.131 The limits for NSRs 1 and 2 have been taken from the unattended noise survey results of LT1. The limits for NSRs 3-5 have been taken from the unattended noise survey results of LT2.

9.132 The limits set in Table 9-27 are based on the representative background noise levels measured during the baseline noise survey and are equal to the limits set for the assessment of the July 2022 DUB-1 permitted development.

9.133 The future baseline would include the operation of the July 2022 DUB-1 permitted development and so therefore, background noise levels may be slightly higher than the background noise levels used for setting plant noise limits.

9.134 The rating noise levels for the July 2022 DUB-1 permitted development were equal to the representative background noise levels, as a worst case (for NSR 4) for scenario 1 of the proposed development. The predicted rating noise levels for all other NSR locations were below the representative background noise levels in scenario 1.

9.135 The rating noise levels for the July 2022 DUB-1 permitted development were less than the representative background noise levels for all NSRs for scenario 2 of the proposed development.

9.136 It is not possible to accurately calculate the future baseline noise levels by combining the typical measured background noise levels with the predicted specific noise levels from the operation of the July 2022 DUB-1 permitted development. Therefore, it has been deemed appropriate to compare the rating noise levels of the proposed development, with the contribution of the July 2022 DUB-1 permitted development, to the representative background noise levels as measured during the baseline noise survey, as the findings of the July 2022 DUB-1 permitted development assessment found that the DUB-1 operation was not expected to significantly affect the background noise levels at the NSRs.

9.137 Therefore, the noise impact of the proposed development has been assessed against the background noise levels without the contribution of the July 2022 DUB-1 permitted development and has been compared to the predicted rating noise levels with the July 2022 DUB-1 permitted development in operation, to calculate the difference between the rating noise levels of the proposed development and the July 2022 DUB-1 permitted development.

Proposed Development Equipment

9.138 With reference to the DUB-1 Future Baseline Equipment section above, the proposed development would comprise the following equipment:

- 14 no. Airedale TurboChill V chillers with acoustically attenuated inlets and discharge (or equivalent); and
- 13 no. KD3300-F emergency generators, silenced to 85dBA at 1m (or equivalent).

Modelled Sound Levels – Normal Operations

9.139 Noise levels have been predicted using the computer noise propagation model, the proposed building constructions, proposed screens and barriers and proposed fixed plant installations, inclusive of any embedded mitigation measures as outlined in this assessment.

9.140 Extracts of the noise model for scenarios 1 and 2 are shown in Figure 9-6 and Figure 9-7, respectively. The noise contour plots in each scenario include the contribution from the DUB-1 campus as the future baseline noise levels.

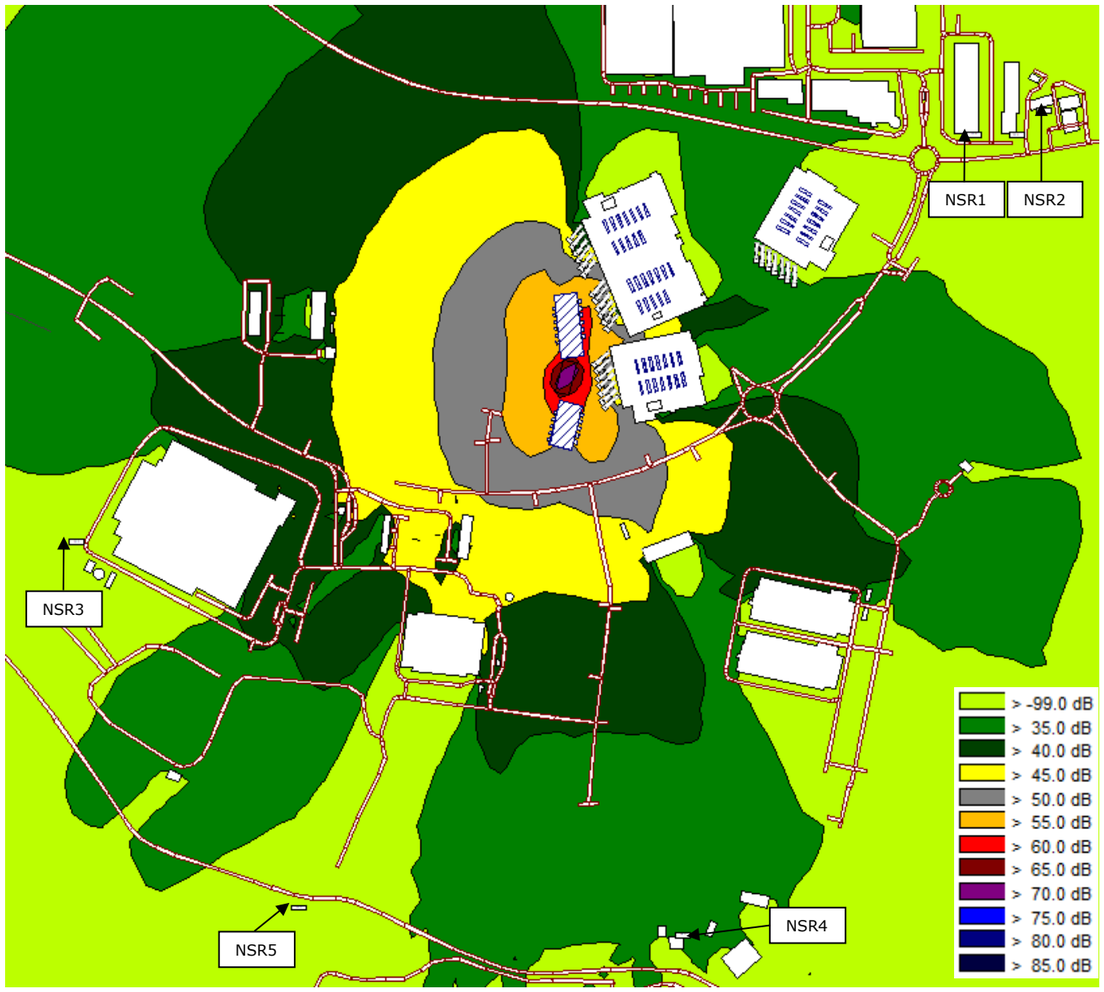


Figure 9-6: Scenario 1 worst-case noise emissions at 4.0 m above ground level

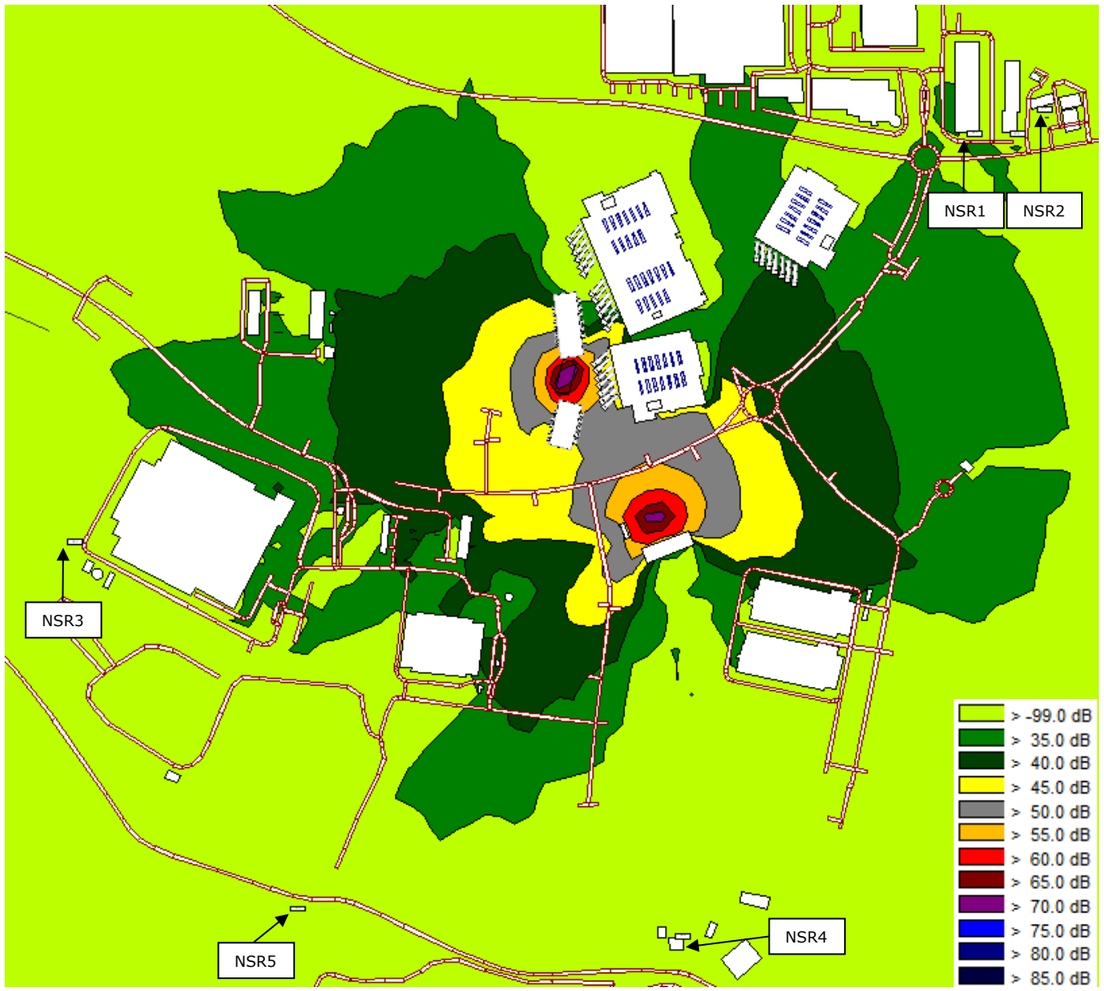


Figure 9-7: Scenario 2 best-case noise emissions at 4.0 m above ground level

9.141 Table 9-28 details the noise emissions from the July 2022 DUB-1 permitted development, without the proposed development operational.

Table 9-28: July 2022 DUB-1 permitted development predicted normal operational building services noise at NSR at 1m from the façade with façade reflection

NSR reference	Rating Noise Limit $L_{Ar,Tr}$ (dB)	Predicted Rating Noise Level $L_{Ar,Tr}$ (dB)		
		Scenario 1	Scenario 2	Scenario 3 (Emergency)
1	42	37	37	49
2	42	29	33	43
3	38	32	26	44
4	38	38	28	50
5	38	32	32	44

9.142 The predicted noise levels at each NSR location for the proposed development operating in addition to the July 2022 DUB-1 permitted development campus are detailed in Table 9-29.

Table 9-29: Proposed development (in addition to July 2022 DUB-1 permitted development) predicted normal operational building services noise at NSR at 1m from the façade with façade reflection

NSR reference	Rating Noise Limit $L_{Ar,Tr}$ (dB)	Predicted Rating Noise Level $L_{Ar,Tr}$ (dB)		
		Scenario 1	Scenario 2	Scenario 3 (Emergency)
1	42	36	37	51
2	42	28	33	45
3	38	32	26	45
4	38	38	28	52
5	38	32	32	44

9.143 The difference in predicted rating levels between the proposed development and July 2022 DUB-1 permitted development are detailed in Table 9-30.

Table 9-30: Predicted rating noise level difference between the proposed development and the July 2022 DUB-1 permitted development

NSR reference	Predicted Rating Noise Level Difference (dB) Proposed Development – July 2022 DUB-1 permitted development		
	Scenario 1	Scenario 2	Scenario 3 (Emergency)
1	-1	0	2
2	-1	0	2
3	0	0	1
4	0	0	2
5	0	0	0

9.144 The predicted noise rating levels for Scenario 1 (worst-case typical operation) meet the required limits and do not cause an increase in the predicted noise levels from DUB-1. This constitutes a direct **long-term to permanent Slight**, **Negative** (low magnitude) effect which is **Not Significant** in terms of EIA for all NSRs (medium-high receptor sensitivity).

9.145 The predicted noise rating levels for Scenario 2 (best-case typical operation) meet the required limits and do not cause an increase in the predicted noise levels from DUB-1. This constitutes a direct **long-term to permanent Slight**, **Negative** (low magnitude) effect which is **Not Significant** in terms of EIA for all NSRs (medium-high receptor sensitivity).

Modelled Sound Levels – Emergency Condition

9.146 An extract of the noise model showing the calculated noise levels during the emergency scenario is shown in Figure 9-8. The noise contour plot includes the contribution from the DUB-1 campus as the future baseline noise levels.

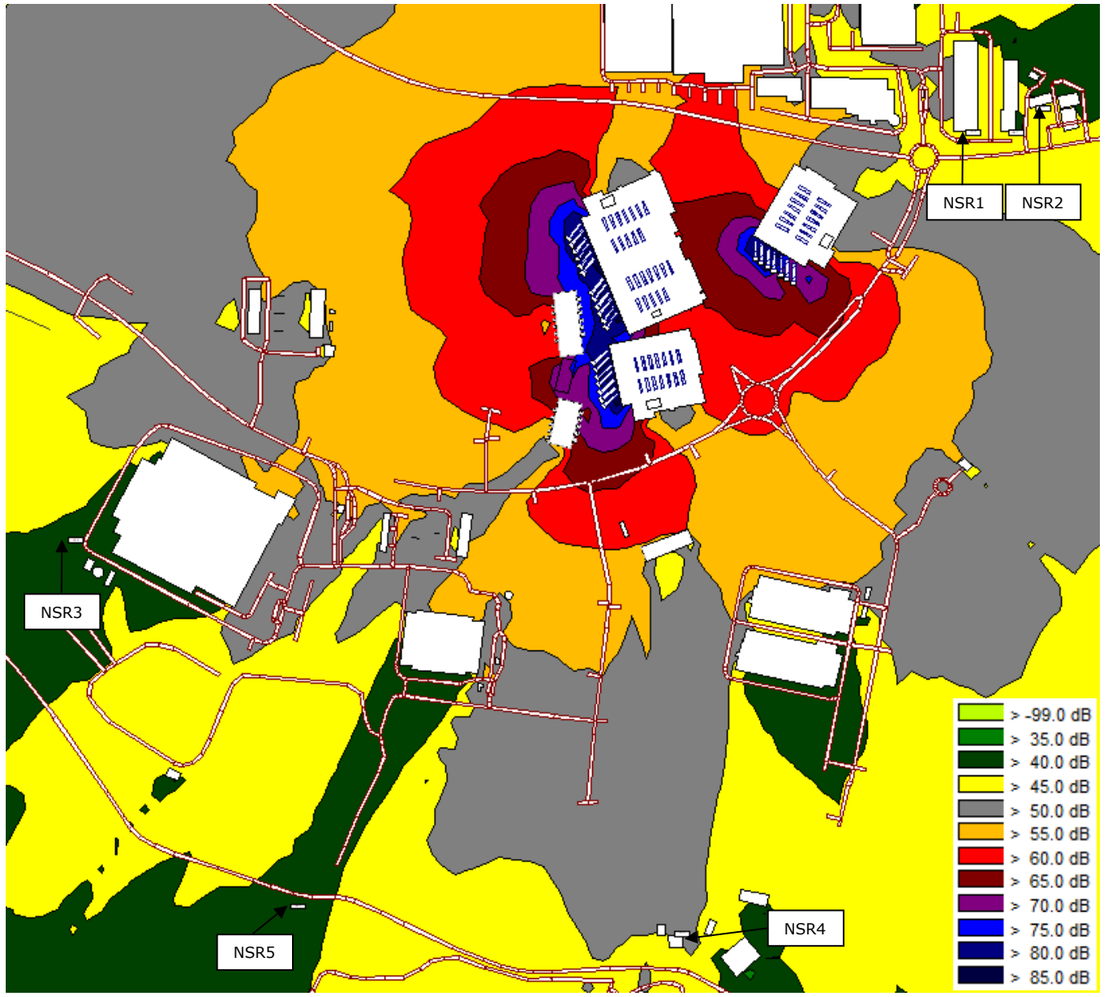


Figure 9-8: Scenario 3 emergency noise emissions at 4.0m above ground level

9.147 With reference to Scenario 3 (emergency operation) of Table 9-30, the predicted noise rating levels meet the required limits and are predicted to cause an increase over the predicted noise levels from DUB-1, of up to 2 dB. This constitutes a direct temporary brief **Slight**, **Negative** (low magnitude) effect which is **Not Significant** in terms of EIA for all NSRs (medium-high receptor sensitivity).

Additional Mitigation

Demolition and Construction Stage

9.148 No significant effects are identified therefore no additional mitigation is proposed.

9.149 The CEMP would include provision for monitoring to see that construction phase noise levels do not exceed thresholds above which significant effects may occur. Any complaints would be recorded and addressed with additional mitigation considered as appropriate.

Operation Stage

9.150 No significant effects are identified therefore no additional mitigation is proposed.

9.151 It is expected that compliance with the adopted criteria for plant noise emissions can be achieved through use of a suitably worded planning condition.

9.152 Noise and vibration monitoring has not been proposed during the operational phase of the proposed development.

Enhancement Measures

9.153 No enhancement measures are proposed in respect of noise and vibration.

Assessment of Residual Effects

Demolition and Construction Residual Effects

9.154 As no additional mitigation would be required, the residual demolition and construction effects remain as reported in the assessment of effects section.

- Demolition and Construction Noise
  - a **temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), (Not-significant in terms of EIA); and
  - a **temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), (Not-significant in terms of EIA).
- Demolition and Construction Traffic
  - a **temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), (Not-significant in terms of EIA); and
  - a **temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), (Not-significant in terms of EIA).
- Demolition and Construction Vibration
  - a **temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), (Not-significant in terms of EIA); and
  - **temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), (Not-significant in terms of EIA).

Operation Residual Effects

9.155 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section.

- Scenario 1 (worst-case operation of the proposed development)
  - a **long-term to permanent Slight**, **Negative** (low magnitude) effect (Not-significant in terms of EIA) for all NSRs (medium-high receptor sensitivity).
- Scenario 2 (best-case operation of the proposed development)
  - a **long-term to permanent Slight**, **Negative** (low magnitude) effect (Not-significant in terms of EIA) (medium-high receptor sensitivity) for all NSRs.
- Scenario 3 (emergency operation of the proposed development)

- brief to temporary **Slight**, **Negative** (low magnitude) effect (Not-significant in terms of EIA)(medium-high receptor sensitivity) for all NSRs.

Summary of Residual Effects

9.156 Table 9-31 provides a summary of the outcomes of the noise and vibration assessment of the proposed development. Where **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 9-31: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and Construction								
NSR1	Demolition and Construction Noise	None required	Not significant	-	L	D	IR	T
NSR2-5	Demolition and Construction Noise	None required	Slight	-	L	D	IR	T
NSR1	Demolition and Construction Traffic Noise	None required	Not significant	-	L	D	IR	T
NSR2-5	Demolition and Construction Traffic Noise	None required	Slight	-	L	D	IR	T
NSR1	Demolition and Construction Vibration	None required	Not significant	-	L	D	IR	T
NSR2-5	Demolition and Construction Vibration	None required	Slight	-	L	D	IR	T
Operation								
All NSRs	Scenario 1 (worst-case)	None required	Slight	-	L	D	IR	Lt to P
All NSRs	Scenario 2 (best-case)	None required	Slight	-	L	D	IR	Lt to P
All NSRs	Scenario 3 (emergency)	None required	Slight	-	L	D	IR	B to T

Notes:
* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;
L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.
** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

9.157 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

9.158 Table 9-32 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 9-32: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
1. Microsoft - Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 [SD20A/0283]	No	Demolition and construction phases do not overlap and therefore no effects considered likely	No	Site emissions calculated to be up to 38 dB $L_{Ar,Tr}$ at the NSRs and Microsoft site has been designed to 45 dB $L_{Ar,Tr}$ emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
2. UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the UBC site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Site, and therefore are not considered significant.	No	Site emissions calculated to be up to 38 dB $L_{Ar,Tr}$ at the NSRs receptors and UBC Properties site has been designed to 45 dB $L_{Ar,Tr}$ emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
3. UBC Properties - Grange Castle South Business Park, Dublin 22 [An Bord Pleanála Reference – 308585]	No		No	Site emissions calculated to be up to 38 dB $L_{Ar,Tr}$ at the NSRs and UBC Properties site has been designed to 45 dB $L_{Ar,Tr}$ emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
4. Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	No	Already constructed	No	Operational noise included within the baseline characterisation for the site.
5. Cyrus One - Grange Castle Business Park,	No	Already constructed	No	Operational noise included within the baseline characterisation for the site.

Table 9-32: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Clondalkin, Dublin 22 [SD18A/0134]				
6. Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0295]	No	Already constructed	No	Operational noise included within the baseline characterisation for the site.
7. Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [An Bord Pleanála Ref - 309146]	No	Demolition and construction phases do not overlap and therefore no effects considered likely	No	Site emissions calculated to be up to 38 dB $L_{Ar,Tr}$ at the NSRs and Cyrus site has been designed to 45 dB $L_{Ar,Tr}$ emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
8. Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the Centrica site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Site, and therefore are not considered significant	No	Site emissions calculated to be up to 38 dBA at the NSRs and Centrica site has been designed to 45 dBA emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
9. Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the Site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Equinix Site, and	No	Site emissions calculated to be up to 38dB $L_{Ar,Tr}$ at the NSRs and Equinix site has been designed to 45dB $L_{Ar,Tr}$ emissions limit. Worst-case 1dB cumulative level expected which is not significant.

Table 9-32: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
		therefore are not considered significant		
10. Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD22A/0156]	No	Details of the proposed construction phase are not known. If constructed at the same time as the proposed development, there is potential for cumulative effects to occur. However, the construction assessment for the proposed development has shown that significant effects are not likely as predicted construction noise levels are below the relevant construction noise threshold. The Equinix site is of greater distance from the assessed receptors. Therefore, construction noise levels would be attenuated due to distance to the nearest receptors. Significant effects are not expected.	No	The proposed development noise emissions are not expected to exceed the criteria. Therefore, if the cumulative scheme is designed to the same criteria, there is potential for background noise levels to increase slightly but would not be deemed to be significant.
11. Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0217]	No	The predicted construction noise levels from the Digital Netherlands site are compliant with the construction noise thresholds. If constructed simultaneously with the proposed development, there is potential for cumulative effects to occur although effects would not be expected to be significant. The predicted construction noise levels in assessment INXN DUB15/16 dated 29/07/2021 would	No	The levels from the Digital Netherlands site are predicted to be 41 dBA and 55 dBA during typical and emergency operation, respectively, at NSR4 (NSR1 of assessment INXN DUB15/16 dated 29/07/2021). The cumulative scheme is predicted to have a greater impact on NSR4, as the site is closer to the receptor location. The cumulative levels could increase by 2dB for Scenario 1 of this assessment, 0 dB for Scenario 2 and 2 dB for

Table 9-32: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
		dominate at the nearest receptor for the proposed development assessment (NSR4) due to the distance between the receptor location and the Digital Netherlands site.		Scenario 3, which are not considered significant.
12. Vantage Data Centers Dub 11 Limited - Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22 [An Bord Pleanála Ref - 312793]	No	The predicted construction noise levels as far below the relevant construction noise thresholds. Significant effects are not expected to occur.	No	Predicted noise emissions from the site are below the predicted noise emissions for the proposed development and are compliant with the limiting noise criteria. The noise emissions from this scheme have been considered in Scenario 2 of the assessments contained in this chapter. Significant effects are not expected.

Demolition and Construction Cumulative Effects

9.159 Whilst construction noise levels could increase for the NSRs if cumulative schemes are constructed simultaneously with the proposed development, it is not expected that the construction noise thresholds would be exceeded. Therefore, effects would be expected to be direct temporary Not Significant/Slight (low magnitude), **Negative** effects for the identified receptors (medium-high receptor sensitivity). Effects would not be **Not Significant** in terms of EIA.

Operation Cumulative Effects

9.160 On the basis of the above table, the background noise levels are likely to increase as a result of the committed developments shown. The baseline characterisation undertaken for the site would have therefore been undertaken when background levels were lower and, as such, the noise emissions limits set out in this assessment are likely to be significantly below future baseline noise levels. Therefore, effects would be expected to be direct long-term to permanent Not Significant/Slight (low magnitude), **Negative** effects for the identified receptors (medium-high receptor sensitivity). Effects would not be **Not Significant** in terms of EIA.

9.161 In the event of a power failure from the national grid, cumulative impacts would be expected from emergency plant from each development. This would be expected to result in a direct brief to temporary **Slight**, **Negative** (low magnitude) effect (Not-significant in terms of EIA) (medium-high receptor sensitivity) for all NSRs.

Summary of Assessment

Background

9.162 This chapter has detailed the potential noise and vibration effects due to the construction and operation stages of the proposed development. The assessment of has considered the relevant national and local guidance and regulations.

9.163 Attended and unattended noise monitoring surveys were undertaken to establish the existing noise climate across the site. The existing baseline noise climate is generally dominated by road traffic noise and noise from fixed plant installations associated with other industrial activity in the nearby vicinity (data centers). The results of the noise surveys have been used to assess construction, and operation effects attributable to the site.

Demolition and Construction Effects

9.164 The assessment of noise and vibration during the demolition and construction phase was undertaken in accordance with BS 5228:2009+A1:2014, using representative data for the various phases of the works. The assessment has considered the following phases of construction:

- Demolition;
- Enabling Works;
- Substructure;
- Superstructure;
- Internal Fit-out; and
- External works.

9.165 An assessment of demolition and construction traffic noise has also been undertaken to calculate the number of HGV movements permissible per hour, along with consideration of the distance at which perceptible levels of vibration may occur from construction activities.

9.166 With the adoption of a CEMP and BAT implemented as part of the demolition and construction stage embedded mitigation, it is considered that the noise and vibration impacts can be controlled sufficiently to achieve acceptable levels at the surrounding sensitive receptors.

9.167 Overall, it is considered that the demolition of the existing residential buildings and construction of the proposed development would result in direct temporary Not Significant/Slight (low magnitude), Negative effects for the identified receptors (medium-high receptor sensitivity), and as such **would not give rise to Significant Effects** in terms of EIA.

Operation Effects

9.168 The proposed development would be designed to achieve the noise emission limits as stipulated by SDCC, which requires that the rating noise level does not exceed the representative background noise level, set in accordance with the principles of BS 4142:2014+A1 2019. The effects of noise emissions from proposed fixed items of plant have been considered for worst-case and best-case scenarios, along with consideration of emergency conditions in the event of the proposed development losing grid power. On the basis of the proposed design, noise emissions are predicted to meet the prescribed limits at the nearest noise sensitive receptors.

9.169 Overall, it is considered that the operation stage would result in a direct permanent long-term Slight, Negative effect (low magnitude), and as such **would not give rise to Significant Effects** on noise and vibration in terms of EIA (medium-high receptor sensitivity). During emergency conditions, there would be direct brief temporary Slight, Negative effect (low magnitude) that **would not give rise to Significant Effects** in terms of EIA (medium-high receptor sensitivity).

Cumulative Effects

9.170 The proposed development has the potential to result in cumulative effects when considered in combination with other committed developments. However, the proposed development has been designed to lower noise emissions levels than other committed developments. As such it is expected that the future baseline noise levels would be higher, irrespective of whether this development went ahead. As such, cumulative effects are **not considered significant** (low magnitude) in terms of EIA (medium-high receptor sensitivity).

10A WATER RESOURCES AND FLOOD RISK

Introduction

10.1 This chapter of the EIAR reports on the likely significant water resources and flood risk effects to arise from the demolition and construction stage and the operation stage of the proposed development.

10.2 The chapter describes the water resources and flood risk policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely water resources and flood risk effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

10.3A This chapter is supported by the following technical appendices in EIAR Volume 3:

- Technical Appendix 10.1A: Kilgallen and Partners Consulting Engineers, Report on Site-Specific Flood Risk Assessment, 22050-R-SSFRA~~DUB13-RP-00-C002-V0-PL-PIN~~, Issue ~~PR1~~PL3
- Technical Appendix 10.2: Pinnacle Consulting Engineers, Engineering Planning Report, DUB13-RP-00-C001-V0-WS3-PIN (includes drainage proposals)
- Technical Appendix 10.3A: Pinnacle Consulting Engineers, Foul and Surface Water Drainage Layout, Drawing No. 201
- Technical Appendix 10.4N: Engineering Planning Report Letter of Consent

10.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - Water Framework Directive (WFD) (2000/60/EC)[1];
  - Environmental Quality Standards (EQS) Directive (2008/105/EC)[2] (as amended)[3];
  - Priority Substances Directive (2008/105/EC)[4];
  - Directive 2014/52/EU. The assessment of the effects of certain public and private projects on the environment[5]
- National Legislation and Policy:
  - Planning and Development Act, 2000, Updated to 16 July 2021[6];
  - The Planning System and Flood Risk Management, Guidelines for Planning Authorities[7]
  - Department of Housing, Local Government and Heritage's Guidelines for Planning Authorities and An Board Pleanála on carrying out Environmental Impact Assessment (2018)[8].
  - Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (National Roads Authority (NRA), 2009)[9];
  - Government of Ireland Climate Action Plan (2021)[10];
- Regional and Local Policy:
  - South Dublin City Council (2005) Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council[11];
  - Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0[12];
- Guidance and Industry Standards:
  - Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB)[13];
  - Inland Fisheries Ireland, 2016, Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters[14]
  - Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors[15];
  - Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements[16]

Assessment Scope

Technical Scope

10.5 Chapter 2: EIA Process and Methodology explains the assessment methodology used throughout this EIAR. The assessment in this chapter qualitative, and the evaluation of significance and effects is based on professional judgement.

10.6 This assessment has taken account of applicable legislation, guidance and policy.

10.7 The technical scope of the assessment has considered the following:

- Contamination of controlled waters (surface water and/or groundwater) arising from demolition and construction works and associated drainage;
- Regular discharge of surface water, during operational use, and the associated effects on the water quality of the downstream receiving waterbodies;
- Tidal or fluvial flood risk, both in terms of impacts to the proposed development and changes to flood risk in the study areas or to downstream receptors as a result of the proposed development;
- Changes to the surface water runoff regime and associated downstream flood risks;
- Changes to local hydrogeology; and
- Demand of the local potable water network and on foul drainage infrastructure.

[1] European Union, 2000. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Document 32000L0060.
[2] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[3] European Union, 2013. Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy Text with EEA relevance. Document 32013L0039.
[4] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[5] European Union, 2014. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.
[6] Government of Ireland, 2000. Planning and Development Act, Updated to 16 July 2021
[7] Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW), 2009. The Planning System and Flood Risk Management, Guidelines for Planning Authorities.
[8] Government of Ireland, 2019. Guidelines for Planning Authorities and An Bord Pleanala om carrying out Environmental Impact Assessment 2018 (last updated 19 December 2019)
[9] National Roads Authority (NRA), 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. NRA.
[10] Government of Ireland. Climate Action Plan (2021). Available at https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/ [Accessed 24/11/2021].
[11] Drainage Dublin, 2005. Greater Dublin Strategic Drainage Study Final Strategy Report
[12] Wicklow County Council, South Dublin County Council, Meath County Council, Kildare County Council, Fingal County Council, Dún Laoghaire- Rathdown County Council & Dublin City Council. Greater Dublin Regional Code of Practice V6.0
[13] Eastern Regional Fisheries Board, Fisheries Protection Guidelines. Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites
[14] Inland Fisheries Ireland, 2016, Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters
[15] CIRIA, 2001. Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, CIRIA 532, 2001
[16] Institute of Geologists of Ireland, Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements

Spatial Scope

10.8 The study area has been defined based on professional judgment and comprises a 1 km radius from the site boundary as it is considered unlikely that effects would extend beyond this extent. However, surface water and groundwater quality are typically assessed at a river catchment level. Therefore, the potential for impacts on downstream water quality has been considered at a river catchment level in addition to the 1 km radius.

Temporal Scope

10.9 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (<1 year) and from the operational stage which would be expected to be long-term (15-60 years) to permanent (>60 years) in nature.

Baseline Characterisation Method

Desk Study

10.10A In order to establish the existing baseline (discipline) conditions in the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- Kilgallen and Partners Consulting Engineers, Report on Site-Specific Flood Risk Assessment, 22050-R-SSFRA Issue PL3~~DUB13-RP-00-C002-V0-PL-PIN, Issue PR1~~ (Technical Appendix 10.1);
- Technical Appendix 10.2: Pinnacle Consulting Engineers, Engineering Planning Report, DUB13-RP-00-C001-V0-WS3-PIN (Technical Appendix 10.2);
- Pinnacle Consulting Engineers, Foul and Surface Water Drainage Layout, Drawing No. 201 (Technical Appendix 10.3);
- Technical Appendix 10.4N: Engineering Planning Report Letter of Consent;
- Environmental Protection Agency (EPA) Online Environmental Mapping and Spatial Data[17] ;
- Office of Public Works (OPW) flood mapping data[18] (www.floodmaps.ie);
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports; and
- Strategic Flood Risk Assessment (SFRA) for South Dublin County Council[19] .

Field Study

10.11 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

Assessment Method

Methodology

Demolition and Construction Stage

10.12 The identification of likely significant effects during the demolition and construction stage was based on a review of the presence of potential receptors, a qualitative assessment of the sensitivity of the receptors, the identification of potential impact pathways and an assessment of the magnitude of the potential impacts.

10.13 The assessment of potential impacts and likely effects has, therefore, comprised the following approach:

- Identification and establishment of the sensitivity of water resource receptors on the basis of their use, proximity to the site, existing quality or resource value;
- Consideration of potential source-pathway-receptor' linkages;
- Evaluation of the magnitude of potential impacts to water quality and hydrology as a result of the introduction of the demolition and enabling works;
- Consideration of embedded mitigation measures integral to the proposed development;
- Classification of the significance of likely effects;
- Identification of additional mitigation measures to eliminate or reduce adverse effects, where considered necessary; and
- Re-assessment to conclude the significance of residual effects.

Operation Stage

10.14 The demolition and construction stage methodologies have been applied to the identification of potential significant effects during the operation stage. The assessment has also been informed by the Flood Risk Assessment and Foul and Surface Water Drainage Layout (see Technical Appendices 10.1 and 10.2), which have been undertaken to assess in more detail the flood risk and to inform the design of the proposed development, and associated mitigation strategies, in order to minimise any increase in flood risk to both on-site and off-site receptors and to the proposed development itself.

Cumulative Stage

10.15 The potential for cumulative impacts to arise from the combined effects of several existing or proposed developments in combination with the proposed development, on water resources and flood risk have been considered in the assessment.

Assessment Criteria

10.16 The assessment of significance of effect with regards to Water Resources and Flood Risk is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

10.17 The general criteria used to assess if an effect is significant or not, is set out in Chapter 2, further details are provided herein. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement

Receptor Sensitivity/Value Criteria

10.18 The sensitivity of receptors has been classified as low, medium or high in accordance with the criteria set out in Table 10-1.

Table 10-1: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	Feature of low quality and rarity, with potential for substitution or tolerant of some change: • Surface water quality classified by EPA as A3 waters or seriously polluted • Heavily engineered or artificially modified watercourses • No surface water abstractions for public or private water supplies

[17] The EPA Geoportal website (available at https://gis.epa.ie)

[18] OPWs national flood information portal, providing location specific access to flood risk and flood management information (available at https://www.floodinfo.ie/)

[19] RPS, 2016. Strategic Flood Risk Assessment for South Dublin County Council Development Plan 2016-2022

Table 10-1: Receptor Sensitivity Criteria

Sensitivity	Criteria
	GSI groundwater vulnerability "Low" to "Medium" classification and "Poor" aquifer importance.
Medium	Feature of medium quality and rarity, with some potential for replacement and reasonably tolerant of some change: • Surface water quality classified by EPA as A2. • Salmonid species may be present in the watercourse which may be locally important for fisheries. • Abstractions for private water supplies. GSI groundwater vulnerability "High" classification and "Locally" important aquifer.
High	Feature of high quality and rarity, or with limited potential for replacement and highly sensitive to some change, e.g. • Receptor is of high environmental importance or of national or international value i.e. NHA or SAC. • Surface water quality classified by EPA as A1 and salmonid spawning grounds present. • Abstractions for public drinking water supply. GSI groundwater vulnerability "Extreme" classification and "Regionally" important aquifer

Impact Magnitude Criteria

10.19 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 10-2.

Table 10- 2: Impact Magnitude Criteria

Magnitude of Impact	Criteria
Negligible	No perceptible alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
Low	Small alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
Medium	Medium alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
High	Large alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.

Scale of Effect Criteria

10.20 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 10-3.

Table 10- 3: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors		
	Low	Medium	High
Negligible	Imperceptible	Imperceptible	Imperceptible/Not Significant
Low	Imperceptible	Imperceptible/Not Significant	Slight/Moderate
Medium	Imperceptible/Not Significant	Moderate	Moderate/Significant
High	Slight/Moderate	Moderate/Significant	Very Significant/Profound

10.21 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports[20] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

10.22 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

10.23 The assessment has relied on data included within the Flood Risk Assessment (Technical Appendix 10.1) as well as publicly available data reported via the EPA online Environmental Mapping and Spatial Data Service and the OPW online Flood Mapping. It has been assumed that these datasets were correct at the time of reference.

Baseline Conditions

Existing Baseline

Existing Site

10.24 The site is predominantly greenfield and is understood to have historically been in agricultural use with a single residential property present in the northwest of the site and outbuildings and an area of hardstanding in the southeast of the site.

Existing Surface Water Features

10.25 The Baldonnel Stream crosses under Falcon Avenue and flows through the south of the site, entering the site in the southeast before meandering north-west and then leaving the site. Approximately 190 m downstream (west) it enters a short 0.6 m culvert, and approximately 300 m downstream it discharges to a long twin-pipe culvert. A visual assessment of the channel of the stream and the culverts reported in the FRA suggests that the twin-pipe culverts have a lower hydraulic capacity than the open channel sections. The Baldonnel Stream ultimately discharges to the River Griffeen and then to the River Liffey.

10.26 There are several small lakes and ponds in a golf course 200 m south-east.

Surface Water Quality

10.27 The site is situated within the Liffey and Dublin Bay WFD Catchment, and the Liffy Sub-Catchment. Presently, the EPA classifies the Liffy sub-catchment as having a 'good' ecological status or potential and a 'Good' chemical surface water status.

[20] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

10.28 The closest EPA monitoring stations are:

- Baldonnel Stream (RS09B090400) 400 m west of the site, downstream of Bolands Garage; and
- Griffeen (RS09G010200), located approximately 1.2 km west of the site.

10.29 The latest EPA biological assessment of surface water from the latter location indicated a score of Q3 (poor) in 1991. The main pressure preventing the achievement of 'Good Status' for the River Liffey WMU (Water Management Unit) identified by the EPA is diffuse agricultural pollution. As part of the River Basin Management Plan 2009-2015, the water quality of the Griffeen Lower was assessed. The overall water quality status obtained for the Griffeen Lower was 'Bad' which was due to its fish status and overall chemical status which each obtained a 'Bad' classification.

Existing Surface Water Drainage

10.30 There is not considered to be any existing engineered surface water drainage assets within the site, and none was identified in the FRA. There is an open ditch running along a portion of the western boundary that connects to the Baldonnel Stream.

OPW and CFRAM Flood Mapping

10.31 The OPW online Flood Mapping service[21] which includes mapping prepared as part of the CFRAM programme does not indicate any records of historic flooding at the site. The closest instance of historic flooding is more than 1 km west and is not hydrologically connected to the site.

10.32 The majority of the site is shown in the mapping to be outside of the 'Low' fluvial flooding probability and is, therefore not predicted to be at risk of flooding during fluvial events with a 1 in 1,000 Annual Exceedance Probability (AEP). Only areas of the site directly adjacent to the Baldonnel Stream are indicated in the OPW mapping to be within an area of 'Low' fluvial flooding probability. A Low fluvial flooding probability designation represents the "*modelled extent of land that might be flooded by rivers in a very extreme flood event*". Low Probability flood events are indicated by the OPW to have a 1 in a 1000 AEP; i.e. they have a 0.1% chance of being exceeded in any year. The area of the site in the Low fluvial flood risk extent is very limited (<10 m from the stream).

10.33 The entire site is shown to be outside of the area of Medium fluvial flood probability (areas indicated by the OPW to have a 1 in a 100 AEP; i.e. land that could have a 1% chance of being flooded in any year).

10.34 The OPW mapping shows the 'Present Day' scenario (referred to as the Current Scenario in the Maps and Plans) which "were generated using methodologies based on historic flood data, without taking account of potential changes due to climate change". Flood level data is not provided by the OPW for the site.

10.35 The National Indicative Fluvial Mapping available in the OPW mapping indicates no potential flooding within the site.

SFRA Flood Mapping

10.36 Alternative mapping prepared as part of the SFRA for South Dublin County Council (SFRA Flood Zone Mapping Sheet 4) indicates the Baldonnel Stream channel through the site could be affected by the 0.1% AEP and 1.0% AEP flood events.

Hydraulic Modelling

10.37 A hydrological model was prepared as part of the FRA (Technical Appendix 10.1) to simulate flow patterns during the 1% and 0.1% (1 in 100 and 1 in 1,000) annual exceedance probability (AEP) rainfall events. Peak flood flows were estimated using statistical methods for ungauged small catchments and the responses of the catchment to these flows was modelled using the River and Flood Analysis module of the industry standard package Infrastructure Ultimate Design Suite produced by Autodesk. The hydrological modelling within this module is itself based on the HEC-RAS modelling software produced by the US Army Corps of Engineers peak flood flows were estimated using statistical methods for ungauged small catchments. The site was found to be not affected by either 1% or 0.1% AEP flood risk zones.

Flood Defences and Structures

10.38 The Baldonnel Stream flows through two parallel 0.6 m internal diameter culverts downstream of the western boundary of the site. There are further culverted sections downstream of this between the site and the River Griffeen.

Groundwater

10.39 As set out in Chapter 12: Ground Conditions, there are three main bedrock aquifer classifications in Ireland (regionally important, locally important and poor aquifers) and the bedrock aquifers underlying the site (Dinantian Limestones) are classified as Locally Important; i.e. an aquifer which is moderately productive only in local zones. It is also reported in Chapter 12: Ground Conditions that, during a 2022 ground investigation, groundwater strikes were recorded as either seepages or slow ingress. In the case of trial pits, groundwater was recorded between 1.80 m below ground level and 2.0 m below ground level. The groundwater strikes are typically associated with recorded stratum of grey sandy clayey angular gravel of possible weathered rock; and within stiff gravelly clay. In case of the boreholes, groundwater was recorded between 1.50 m and 1.90 m. The groundwater strikes are typically associated with recorded stratum of stiff to very stiff sandy silty and gravelly clay of glacial till deposits. Groundwater is likely to be in continuity with the Baldonnel stream which runs through the centre of the site and given this the groundwater flow direction is likely to be towards the north.

10.40 The WFD Groundwater Body underlying the site is the Dublin GWB (EU GWB Code: IE_EA_G_008), which currently has 'good' status and has a GWB risk score of 'not at risk' (2010-2015 WFD status). The GSI classifies the aquifer vulnerability underlying the site to be high (H), with the subsoils being of low permeability.

10.41 The site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA. There are no wells or springs within 1 km of the site and the closest being approximately 3 km southeast. There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or adjacent the site.

Future Baseline

10.42 Per the methodology set out in Chapter 2: EIA Process and Methodology, effects of the proposed development are to be assessed against a future baseline comprising the implementation of the July 2022 consented DUB-1 development. This development proposes improvements to the Baldonnel stream floodplain, as well as maintenance regime for all drainage features within the site and for regular inspection of drainage features immediately upstream and downstream of the site as part of the Site-Specific Flood Risk Mitigation Plan. The only other additional changes to the future baseline with regard to water resources and flood risk are associated with climate change. The FRA and surface water drainage strategy (which is included within the Engineering Planning Report) are provided in Technical Appendices 10.1 and 10.2 respectively and take account of potential for increased fluvial flood risk and increased rainfall rates associated with climate change.

Sensitive Receptors

10.43 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 10-4.

[21] OPW online flood mapping (available at https://www.floodinfo.ie/map/floodmaps)

Table 10- 4: Summary of Sensitive Receptors

Receptor	Sensitivity
Surface Water Features Baldonnel Stream	Medium Baldonnel stream is heavily altered. Although the stream is classified as being of moderate WFD status, it is also given a biological assessment score of 'poor' downstream of the site.
Flood Risk (on-site or downstream terrestrial receptors within the catchment)	High The flood risk status of a site or receptor is considered to be of high sensitivity due to the potential implications of a flood event.
Groundwater	Medium The Dublin GWB underlying the site is of 'good status' and has a GWB risk score of 'not at risk', however the site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA.

10.44 Direct impacts on groundwater quality are scoped out of the subsequent assessment. Although groundworks and installation of foundations during the demolition and construction phase of the proposed development would involve an interaction with the on-site soils and water environment, the potential impacts are considered separately within Chapter 12: Ground Conditions. It is noted that demolition and construction works are to be undertaken in compliance with a CEMP which would be established and maintained by the contractors during the demolition and construction stage which will cover all potentially polluting activities and emergency response procedures. Chapter 12: Ground Conditions does not assess the potential for the proposed development to affect local recharge to the underlying aquifer. However, as the overall area of aquifer is large relative to the site area, the potential reduction in local recharge is considered in to have no potential for significant change in the natural hydrogeological regime and is therefore not considered further. However, the potential for localised disruption of groundwater is considered.

Assessment of Effects

Demolition and Construction Effects

10.45 The following effects on water resources and the water environment could arise during the demolition and construction stage of the proposed development:

- Contamination of Surface Water as a result of silt-laden runoff across the demolition and construction site and from stockpiles, polluting substances (e.g. fuels and chemicals) from accidental spillages and other wastes during general demolition and construction activity;
- Change in Surface Water Quality and Hydrodynamic Status (as a result of the proposed works/enhancements in the Baldonnel Stream floodplain);
- Disruption of Groundwater during construction excavations;
- Changes to Fluvial Flood Risk; and
- Water Supply and Foul Drainage During Construction.

Contamination of Surface Water

10.46 There are a range of embedded mitigation measures that are incorporated within the Proposed Development in order to reduce the potential for effects on the surface water environment. A project-specific Construction and Environmental Management Plan (CEMP) would be established and maintained by the contractors during the demolition and construction stage which would cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures. The measures identified in this section and in Chapter 12, and those provided in Chapter 5: Demolition and Construction, would be included in the CEMP.

10.47 Subsoil would be excavated to facilitate the proposed development. Such works would be carefully planned to ensure as much material is left in situ as possible. Reuse of on-site excavated soil and capping with hardstand will minimise any increase in aquifer vulnerability. Construction works will require local removal of soil cover where levelling of the site is required and its use for re-instatement elsewhere on the site. It is envisaged that any soil excavated will be retained on-site and reused as fill material or landscaping. Excavation works will be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil.

10.48 Stockpiles have the potential to cause negative impacts on and water quality through increased potential for sediment release to watercourses. The effects of soil stripping and stockpiling would be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body.

10.49 The following procedures will be included in the CEMP in order to prevent any spillages of fuels to the Baldonnel Stream, or groundwater, and to prevent any resulting water quality impacts:

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures would be taken:
- Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
- Pumps or valves would be fitted with a lock and would be secured when not in use;
- All bowsers to carry a spill kit;
- Operatives must have spill response training; and
- Drip trays used on any required mobile fuel units.
- In the case of drummed fuel or other potentially polluting substances which may be used during the demolition and construction stage the following procedures will be adopted:
- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they would be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

10.50 The aforementioned list of measures is non-exhaustive and would be included in the CEMP.

10.51 Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthworks operations will be carried out with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management, as set out in the CEMP, will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation.

10.52 Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any off-site impacts. All runoff will be prevented from directly entering into any water courses or drainage ditches.

10.53 Should any discharge of demolition or construction related water be required, discharge would be to foul sewer. Pre-treatment and silt reduction measures on-site would include a combination of silt fencing, settlement measures (e.g. silt traps, 20 m buffer zone between machinery and watercourses, off-site

refuelling of machinery) and use of hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits.

10.54 Considering the embedded mitigation that would be specified within the CEMP, which in turn would be secured by means of an appropriately worded planning condition the effects would be of a low magnitude. Although the Baldonnel Stream passes through the south of the site, and is considered to be of Medium sensitivity, the likely effect would be only **Temporary, Imperceptible**/**Not Significant, Negative** (**Not Significant** in terms of EIA) and no further mitigation beyond that to be set out in the CEMP is necessary.

Change in Surface Water Quality and Hydrodynamic Status as a Result of Proposed Works in the Baldonnel Stream Floodplain

10.55 In order to reduce the potential effects of the proposed construction works in the floodplain on surface water quality and hydrodynamic status, mitigation is embedded within the design and within construction methodologies. It is proposed that the works would be carried out in line with the Irish Fisheries Guidelines on Protection of Fisheries During Construction Works and Adjacent to Waters, with appropriate protection measures to channel during construction works.

10.56A As described in the FRA, where the Baldonnel Stream crosses under the Falcon Avenue upstream of the site, this is through a twin-pipe culvert, each pipe 1400mm diameter. The proposed road crossing within the site is 20m downstream from the existing Falcon culvert and would be designed as a bridge crossing. The ~~initial~~ designs of the crossing would ~~considered within the FRA propose a box culvert to convey the Stream under the proposed crossing. The internal dimensions of the box culvert would be 1.4m in height and 3.5m in width such that it would~~ have a significantly greater hydraulic capacity than that of the existing Falcon Avenue culvert and include a widening of the channel under the bridge.

10.57 Therefore, over the short term, improvements to the landscaping in the floodplain would be expected to result in a beneficial impact of low magnitude on the Baldonnel Stream (medium sensitivity) which equates to a **Temporary**, **Imperceptible/Not Significant**, **positive** effect i.e. **Not significant** in terms of EIA.

Effects on Groundwater during Construction Excavations

10.58 As set out previously, a ground investigation at the site encountered groundwater generally between 1.5m and 2.0m blow existing ground level. This groundwater is likely to be in continuity with the Baldonnel stream which runs through the south of the site. Given this, the groundwater flow direction is likely to be towards the south. Excavations could result in short-term changes to groundwater patterns. However, this is unlikely to lead to a significant change to hydrogeological conditions beyond the site boundary.

10.59 The proposed development would involve groundworks. This would therefore have an interaction with the on-site soils and water environment. Correct management of the excavations would be set out in the CEMP and would seek to minimise inflow of shallow/perched groundwater into any excavation. It is anticipated that water arising from excavations would be disposed of to the local sewer network if uncontaminated and following the removal of silt via settlement ponds or alternative sediment control measures.

10.60 Whilst the excavations and associated dewatering could result in a localised draw down of groundwater levels, given the scale of works relative to the total contributing catchment to the Baldonnel Stream, it is unlikely that the works would have a significant effect on overall groundwater contribution to the watercourse.

10.61 Therefore, it is assessed that the potential impact of the proposed development on groundwater flows (medium sensitivity) would be of negligible magnitude and the effect **Temporary, Imperceptible and Negative, i.e Not Significant** in terms of EIA.

Effects on Fluvial Flood Risk

10.62 The FRA assessed the site as not being affected by 1% or 0.1% AEP events. Changes to ground level as part of the proposed development would therefore not displace floodplain storage associated with fluvial flood risk.

10.63A The design of the proposed bridge road crossing ~~box culvert~~ of the Baldonnel Stream would ensure that the hydrological capacity of the crossing ~~culvert~~ is greater than that of the upstream culvert so that there is no restriction on flows and therefore, no effect on fluvial flood risk.

10.64 Therefore, the floodplain capacity of Baldonnel Stream would be unimpacted at all stages during construction such that the proposed works would result in low magnitude changes to the watercourse's floodplain capacity which would have low sensitivity on site, which equates to a **Temporary**, **Imperceptible** and **Neutral** effect i.e. **Not Significant** in terms of EIA.

Water Supply and Foul Drainage Capacity During Construction

10.65 As set out in Chapter 15: Material Assets, welfare facilities portable toilets would be required for the construction compound and workers. A temporary connection to the foul water drainage network may also be required to accommodate the site welfare facilities during construction. It will need to be confirmed that the network has sufficient available capacity for the wastewater discharges for the short-term demolition and construction stage. An alternative but less desirable option would be to collect and transport waste off-site.

10.66 Accordingly, foul drainage effects on the public sewerage network during the demolition and construction stage are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e. **Not significant in terms of EIA**.

10.67 A temporary connection to the public mains water supply would be established for the construction phase. The water demand by site occupants during the construction phase will likely not be significant enough to affect existing pressures in the area. Effects associated with water supply during the demolition and construction stage are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e. **Not Significant** in terms of EIA.

Operation Effects

10.68 The following potential impacts on water resources and flood risk could arise during the operation stage of the proposed development:

- Increased flood risk from the Baldonnel Stream;
- Surface Water Flood Risk: Increased surface water runoff volumes leading to flood risks off-site;
- Disruption of Groundwater: Potential to alter local groundwater flow paths and levels;
- Water Demand: Increase in water demand from the site to supply the new occupants of the proposed development; and
- Foul Sewer Capacity: Increase in discharge volumes of effluent to foul sewer.

Increased Flood Risk from the Baldonnel Stream

10.69 As set out previously, the site is not affected by either the 0.1% AEP and 1.0% AEP flood events. The proposed development and operation of the development are unlikely to change this fact unless there is blockage of the proposed crossing resulting in a backing up of the watercourse during a flood event.

10.70A As described previously, the Baldonnel Stream crosses under the Falcon Avenue through a twin-pipe culvert (each pipe 1400 mm diameter). The proposed road crossing is 20 m downstream from the Falcon Avenue culvert and would be designed as a bridge crossing with minimal impact on the stream bed. ~~A box culvert 1.4m in height and 3.5m in width is currently~~ The proposed ~~under the~~ bridge crossing would have ~~, which is~~ a greater hydraulic capacity than the Park Road culvert. ~~As noted in the FRA~~ To meet the requirements of the Office of Public Works (OPW) for granting Section 50 approval under the Arterial Drainage Act, culverts or crossings would ~~are~~ typically be required to have a minimum 300mm clearance between the 1% AEP water level and the soffit of the ~~culvert~~ structure. The bridge would have over 1000mm clearance between the 1% AEP water level and the soffit level, thus comfortably exceeding OPW requirements ~~Because the box culvert will have 650mm clearance between the 1% AEP water level and the soffit level, it would meet and exceed OPW requirements.~~

10.71A ~~As set out previously, a box culvert is proposed at the crossing.~~ The design approach~~(which is not yet finalised)~~ of the bridge crossing would ~~need to~~ ensure that the hydrological capacity of the culvert is greater than that of the upstream culvert so that there is no restriction on flows

10.72A In light of the existing upstream culvert, flood risk upstream of this location would be unaffected. Flood risk immediately upstream of the proposed ~~box culvert~~ bridge would remain unaffected based on the assumption there is a sufficient hydrological capacity. With the positive impact of improvement to the Baldonnel stream in the form of wetland features and incorporated SuDS, overall, this would be considered a low magnitude impact on a high sensitivity receptor, and is a **long-term Positive, Slight/Moderate** impact and **Not Significant** in terms of EIA.

Surface Water Flood Risk

10.73 The FRA assessed that the site is not at risk of pluvial flood risk. Therefore, if unmitigated, the introduction of impermeable surfaces to the site would inhibit surface water infiltration and increase the discharge of surface water runoff compared to baseline levels.

10.74 Included in Technical Appendices 10.2 and 10.3, Pinnacle Consulting Engineers has produced a drainage design in compliance with the Greater Dublin Regional Code of Practice for Drainage Works and in accordance with the Irish Water Code of Practice. Additionally, the surface water drainage system for the proposed development is to comply with the Greater Dublin Strategic Drainage Study (GDSDS). Full compliance with GDSDS ensures the drainage system will have sufficient capacity to accommodate rainfall events up to 1% AEP (also taking int account the effects of climate change) without causing pluvial flood risk within the development and without leading to an increase in pluvial flood risk elsewhere.

10.75 The drainage strategy includes ~~two~~ three attenuation ponds and a permeable paving sub-base to provide the required surface water attenuation, taking into account allowances for climate change. ~~One~~ two ponds will discharge to the Baldonnel Stream and the other attenuation pond and the permeable paving sub-base will discharge to the existing surface water sewer network. The outflow from the proposed development will be restricted by way of a Hydrobrake facility and will limit the total discharge to 2.8l/s, which is the calculated QBAR greenfield run-off rate.

10.76 With the implementation of the drainage strategy in compliance with the GDSDS, pluvial flood risk to the site would not be introduced and it is not expected that the proposed development would negatively impact on flood risk for downstream receptors and neighbouring sites. The proposed surface water management, which would include an allowance for climate change, would result in a positive impact of low magnitude on the flood risk status (High sensitivity) which equates to a **long-term Sight/Moderate, Positive** effect that is **Not significant** in terms of EIA.

Disruption of Groundwater: Potential to Alter Local Groundwater Flow Paths and Levels

10.77 No cuts greater than 1m are proposed based on the Pinnacle Consulting Engineers cut and fill information (sheet no. C126) with the exception of the retention ponds. Therefore, with ground levels not expected to decrease to elevations where groundwater is known to be present (1.5-2m below existing baseline ground level), groundwater flood risk at site is not expected increase. It is expected that foundations would require moderate scale excavations. However, it is also expected that the method of foundations would take account of the ground conditions and environmental considerations such that any long-term effects on groundwater flows (medium sensitivity) are therefore likely to be of low magnitude and the effect **long-term, Imperceptible/Not Significant, Negative** i.e**. Not Significant** in terms of EIA.

Water Demand and Foul Sewer Capacity

10.78 It is intended to serve the potable demand of the proposed development via connection off a 150mm diameter network water mains, as required. A Pre-Connection Enquiry application has been submitted to Irish Water in respect of the water supply and a response is still awaited at the time of writing. Assuming the applicant receives confirmation from Irish Water for potable and foul water, effects on water supply during the operation stage are considered to be **Permanent, Imperceptible** and **Neutral** i.e. **Not Significant**.

10.79 All foul connections and foul sewers are to comply with the requirements of the Irish Water specifications. The permanent foul connection to the wider network in Profile Park would be undertaken in consultation with Irish Water to ensure there is no impact on the network when the connection is made. Accordingly, foul drainage effects on the public sewerage network during the operation stage are considered to be **long term, Imperceptible** and **Neutral** i.e. **Not Significant** in terms of EIA.

Additional Mitigation

10.80 As explained in the FRA, all developments include an element of residual flood risk that must be addressed during their operational life. To address this residual risk, it is recommended that a Site-Specific Flood Risk Mitigation Plan be prepared implemented, in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities. This would apply throughout the operational life of the proposed development and include a maintenance regime for all drainage features within the site in addition to regular inspection of drainage features immediately upstream and downstream.

10.81 It was revealed in a CCTV survey that a culvert downstream had significant blockages that greatly reduce its capacity. The condition and size of the culvert downstream of the blockages is unknown and there is potential of the stream surcharging to the site in the event of a collapse. It is therefore recommended that an overflow be constructed which would allow discharge to the stream immediately downstream of Nangor Road. This overflow could discharge to existing surface water drainage in the Nangor Road subject to available capacity.

Enhancement Measures

10.82 No enhancement measures are proposed.

Assessment of Residual Effects

Demolition and Construction Residual Effects

10.83 As no additional mitigation would be required, the residual construction effects remain as reported in the assessment of effects section:

- The likely effect of contamination of surface water is likely to be only **Temporary** and **Imperceptible/Not Significant, Negative** (**Not Significant** in terms of EIA) and no further mitigation beyond that to be set out in the CEMP is deemed necessary;
- Over the short term, improvements to the watercourse and associated landscaping would be expected to result in a beneficial impact of low magnitude on the Baldonnel Stream (medium sensitivity) which equates to a **Temporary**, **Imperceptible/Not Significant, Positive** effect (**Not Significant** in terms of EIA) on surface water quality and hydrodynamic status of the Baldonnel. Stream.
- The potential impact of the proposed development on groundwater flows (medium sensitivity) would be of negligible magnitude and the effect **Temporary**, **Imperceptible, Negative** i.e. **Not Significant** in terms of EIA.
- The floodplain capacity would be unchanged during construction such that the proposed works in the floodplain would result in no impact to the already low flood risk status (High sensitivity) which equates to a **Temporary Imperceptible, Neutral** effect i.e. **Not Significant** in terms of EIA; and
- Effects on the public sewerage and potable water supply networks during the demolition and construction stage are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e. **Not Significant** in terms of EIA.

Operation Residual Effects

10.84 The FRA (Technical Appendix 10.1) mentions all developments would involve some element of residual flood risk. The Baldonnel Stream is culverted downstream of the site and there are presently blockages that reduce the capacity of the culvert. The condition of the culvert downstream of the blockages is unknown and there may be a potential for the stream to surcharge in the event of the culvert being compromised although backing up of such flood waters would not be expected to reach the site due to the distance upstream.

10.85 To mitigate this risk, the FRA for the July 2022 DUB-1 consented development, considered part of the future baseline, recommended that consideration be given to the construction of an overflow which would allow such excess flows to bypass the culvert.

10.86 The July 2022 DUB-1 consented development Site-Specific Flood Risk Mitigation Plan included a maintenance regime for all drainage features within the site and for regular inspection of drainage features immediately upstream and downstream of the site. Procedures have also been put in place for temporary measures to divert waters from the stream around the downstream culverts in the event that inspections identify defects in the culvert or if waters are observed to be surcharging upstream of the culvert. Such that flood risk could be managed until remedial works to repair the culvert could be implemented. The proposed development would also benefit from these measures.

10.87 The Site-Specific Flood Risk Mitigation Plan and associated maintenance regime for the proposed development would ensure that the long-term residual operation effects would remain as reported in the assessment of effects section:

- The proposed landscaping improvements and SuDS would result in some long-term improvements to the Baldonnel Stream such that there would be a beneficial impact of low magnitude on the flood risk status (High sensitivity) which equates to a **long-term, Slight/Moderate, Positive** effect which would be **Not Significant** in terms of EIA.
- The proposed surface water management, which would include an allowance for climate change, would result in a positive impact of low magnitude on the flood risk status (High sensitivity) which equates to a **Long-term, Slight/Moderate, Positive** effect which would be **Not Significant** in terms of EIA.
- Any long-term effects on groundwater flows (medium sensitivity) would be likely to be of negligible magnitude and the effect **long-term, Imperceptible/Not Significant, Negative** i.e. **Not Significant** in terms of EIA; and
- It is understood that there is adequate capacity within the existing foul drainage and water main network to supply the proposed development. As such, effects during the operation stage are considered to be **long-term, Imperceptible** and **Neutra**l i.e. **Not Significant** in terms of EIA.

Summary of Residual Effects

10.88 Table 10-5 provides a summary of the outcomes of the Water Resources and Flood Risk assessment of the proposed development. Where **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 10-5: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and Construction								
Surface Water Receptors	Potential contamination as a result of silt-laden runoff across the demolition and construction site and potential for contaminants to be introduced to surface water by construction activities through leakages/spillages	None Required	Imperceptible/Not Significant	-	L	D	R	T
Surface Water Receptors	Direct impacts on surface water quality and hydrodynamic status as a result of construction works	None Required	Imperceptible/Not Significant	+	L	D	R	T
Groundwater Supply	Disruption of Groundwater during Construction Excavations	None Required	Imperceptible	-	L	D	R	T
Fluvial Flood Risk	Flood risk from the Baldonnel Stream	None Required	Imperceptible	+/-	U	D	R	T
Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Construction	None Required	Imperceptible	+/-	U	D	R	T
Operation								
Fluvial Flood Risk	Flood risk from the Baldonnel Stream	Site-Specific Flood Risk Mitigation Plan and associated maintenance regime	Slight/Moderate	+	L	D	IR	LT
Surface Water Flood Risk	Changes to flood risk as a result of changes to the surface water runoff regime of the site	None Required	Slight/Moderate	+	L	D	IR	LT
Groundwater	Potential to alter local groundwater flow paths and levels	None Required	Imperceptible/Not Significant	-	L	D	IR	LT
Water Supply and Foul	Water Supply and Foul Drainage Capacity During Operation	None Required	Imperceptible	+/-	L	D	IR	LT

Table 10-5: Summary of Residual Effects								
Drainage Network								

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

10.89 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

10.90 Consent would not be granted for any development that would increase flood risks off-site. Additionally, consent would not be granted to any surface water discharge from a proposed development if it would increase downstream flood risk. Discharge to sewer or to a fluvial watercourse would need to be restricted so that it provides betterment in terms of downstream capacity, taking account of predicted climate change. Because the proposed development would discharge at greenfield rates, there would be no detrimental impact on downstream flood risk. It is therefore reasonable to assume that any other development would similarly need to decrease flood risk and reduce pressures on downstream sewer or watercourse capacity such that any cumulative impact during the operation stage would be beneficial.

10.91 It is reasonable to assume that other schemes would similarly be required to demonstrate suitable surface water runoff management measures during construction in accordance with national and local policy, and that discharges of surface water would be subject to suitable treatment such that there would be no cumulative significant effects on downstream water quality during demolition and construction or operation. It would be expected to deliver improvements in respect of contamination, groundwater disruption, water demand and sewer capacity.

10.92 In light of this, it is unlikely that there would be any significant negative inter-project cumulative effects on flood risk or surface water quality resulting from the proposed development.

Summary of Assessment

Background

10.93 This chapter has assessed the potential water resources and flood risk effects arising from the demolition and construction and operation phases of the proposed development. The assessment of demolition and construction and operation stages has been undertaken taking into account the national and local guidance and regulations where applicable.

10.94 The site consists of undeveloped greenfield and one residential property. It is understood to have historically been agricultural in use. There is no evidence of existing drainage at the site other than an open ditch which runs along a portion of the western boundary, and the single property is assumed to have connections to septic tank. The FRA states that there is no evidence of standing groundwater. The Baldonnel Stream flows through the south of the site, entering in the southeast and flowing west. It flows under Falcon Avenue through a twin-pipe culvert upstream of the site and eventually enters a twin-pipe culvert further downstream beyond the site. A visual assessment of the channel of the stream and the culverts reported in the FRA suggests that the culverts will have a lower hydraulic capacity than the channel within the site so the restriction in flow caused by the upstream culvert (outside of the site demise) would reduce flood risk at the site, as confirmed in OPW mapping and hydraulic modelling.

10.95 The areas of the site which are in very close proximity to Baldonnel Stream are shown in the OPW mapping to have a 'Low' fluvial flooding probability, but this is not applicable to most of the site. Low Probability flood events are indicated by the OPW to have a 1 in a 1000 Annual Exceedance Probability (AEP); i.e. they have a 0.1% chance of being exceeded in any year. The site is shown to be entirely outside of the area of Medium fluvial flood probability (indicated by the OPW to have a 1 in a 100 AEP; i.e. they have a 1% chance of being exceeded in any year).

10.96 A hydrological model was prepared as part of the FRA (Technical Appendix 10.1) to simulate flow patterns during the 1% and 0.1% (1 in 100 and 1 in 1,000) annual exceedance probability (AEP) rainfall events. The site was found to be not affected by either 1% or 0.1% AEP flood events.

10.97 The bedrock aquifer underlying the site (Dinantian Limestones) is classified as 'Locally Important'; i.e. an aquifer which is moderately productive only in local zones. The site is not situated in a Groundwater Drinking Water Protection Area or Groundwater SPA. There are no wells or springs within 1 km of the site and the closest is approximately 3 km southeast and east of the site. There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or adjacent the site.

Demolition and Construction Effects

10.98 During demolition and construction, there is the potential for the following impacts on water resources and flood risk:

- Disruption or contamination of groundwater during construction excavations;
- Contamination of surface water as a result of silt-laden runoff across the demolition and construction site and from stockpiles, polluting substances (e.g. fuels and chemicals), accidental spillages and other wastes during general demolition and construction activity;
- Changes to surface water quality and hydrodynamic status as a result of the proposed works in the Baldonnel Stream floodplain;

10.99 Overall, when considering the embedded mitigation through the CEMP and the design of the proposed crossing of the stream, it is considered that the demolition and construction of the proposed development would **not give rise to significant effects** on water resources and flood risk.

Operation Effects

10.100 During operation, there is the potential for the following impacts on water resources and flood risk:

- Residual flood risk from the Baldonnel Stream due to culvert blockage;
- Increased surface water runoff volumes leading to increased surface water flood risks on-site and off-site;
- Some disruption to groundwater from small alterations to local groundwater flow paths and levels;
- Increase in water demand from the site to supply the new occupants of the proposed development; and
- Increase in discharge volumes of foul water effluent to foul sewer.

10.101 The proposed development includes a drainage strategy designed to mitigate any increase in surface water discharge and limit it to greenfield rates through attenuation methods including a new pond with a native wetland margin. This would result in no increase in pluvial flood risk. A Site-Specific Flood Risk Mitigation Plan would be prepared to set out measures required to maintain proposed surface water drainage and flood risk mitigation measures, and to indicate proposed response to flood incidents. This management of residual flood risk considered in the operation stage of development would result in a Slight Positive effect on flood risk at the site and for downstream receptors, and as such would be expected to give rise to Slight to Moderate Positive effects.

10.102 Improved landscaping and habitat setting of the Baldonnel Stream floodplain would also be expected to result in long term slight positive changes in terms of surface water quality and hydrodynamic status. As such, no significant effects are expected. Additionally, any long-term changes to groundwater flow paths, as well as to water supply and foul water assets, are expected to be **not significant**.

Cumulative Effects

10.103 Consent would not be granted for any development that might increase off-site flood risks. Consent would also not be granted to any surface water discharge from a proposed development if it would lead to increased downstream flood risk. For this reason, the overall scale of water resources and flood risk cumulative effects would be no greater than that of the proposed development in isolation. Therefore, it is **unlikely that there would be any significant negative cumulative effects** on flood risk or surface water quality.

11A ECOLOGY/BIODIVERSITY

Introduction

11.1 This chapter of the EIAR reports on the likely significant ecological effects to arise from the demolition and construction stage, and the operation stage of the proposed development.

11.2 The chapter describes the ecological policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely ecological effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

11.3A This chapter is supported by the following technical appendices in EIAR Volume 3:

- Appendix 11.1A~~8.1~~: Ecological Impact Assessment;
- Appendix 11.2A~~8.2~~: Appropriate Assessment Screening;
- Appendix 11.3A~~8.3~~: Biodiversity Management Plan.

11.3 The assessment has been informed by the following legislation, policies, and published guidance:

11.4 International Legislation:

- EU Habitats Directive 92/43/EEC[1];
- The Birds Directive 2009/147/EC[2];
- Environmental Liability Directive 2004/35/EC[3]; and
- Bern Convention[4].

11.5 National Legislation and Policy:

- The Wildlife Act 1976 (as amended)[5];
- EC (Birds and Natural Habitats) Regulations 2011 (amended 2015)[6];
- Flora Protection Order 2015[7];
- The EC (Water Policy) Regulations 2003[8]; and,
- The National Development Plan 2021-2030[9].

11.6 Local Policy:

- South Dublin Development Plan 2022–2028[10].

11.7 National guidance and industry standards:

- BS 42020:2013 Biodiversity[11]
- CIEEM Guidelines:
- Ecological Impact Assessment[12]
- Ecological Report Writing[13].

11.8A Further details are provided in EIAR Volume 3: Technical Appendix ~~8~~11-1A.

Assessment Scope

Technical Scope

11.8 The technical scope of the assessment has considered the following:

- Disturbance/injury/death of a protected species, both during the demolition and construction stage and the operation stage (including lighting impacts and effects on bats);
- Disturbance of breeding birds;
- Direct loss of habitats;
- Reduction in local biodiversity;
- Damage to local ecology through pollution;
- Chemical or physical pollution of aquatic habitats and consequent effects on designated sites;
- Accidental trapping of mammals in excavations;
- Habitat fragmentation and loss of ecological connectivity / commuting pathways for wild and protected species;
- Loss or damage of habitats as a result of dust and other air- or water-borne pollution; and
- Potentially consequent population-level effects of these impacts on wild species and groups including bats, badger, otter, birds, herptiles, invertebrates and flora.

11.9 The following have been considered in terms of embedded mitigation:

- Standard practice pollution prevention measures (see Chapter 5: Demolition and Construction Environmental Management);
- Preparation and implementation of a Site Waste Management Plan (SWMP);
- Environmental monitoring during the demolition and construction stage, to be specified in a Construction Environmental Management Plan (CEMP) as outlined in Chapter 5 Demolition and Construction Environmental Management;
- Cowling of lighting, plus reduction of light levels to 1 lux where possible Setting of noise and vibration limits, with associated monitoring during the Demolition and Construction stage (see Chapter 5: Demolition and Construction Environmental Management).

Spatial Scope

11.10 The study area for international/European statutory designations has been determined by means of reference to published guidance (Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities[14]), and covers an area of 15 km from the site boundary. The study area for national

[1] Council Directive 92/43/EEC of 21 May 1992 on The Conservation of Natural Habitats and of Wild Fauna and Flora.
[2] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the Conservation of Wild Birds.
[3] Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on Environmental Liability with Regard to The Prevention and Remedying of Environmental Damage.
[4] The Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats, 1979. Bern.
[5] Government of Ireland. The Wildlife Act 1976 (as amended). Available from: http://www.irishstatutebook.ie/eli/1976/act/39/enacted/en/html#zza39y1976
[6] Government of Ireland. S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).
[7] Government of Ireland. S.I. No. 356/2015 - Flora (Protection) Order, 2015.
[8] Government of Ireland. S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003.
[9] Government of Ireland, 2021. National Development Plan 2021-2030 (last updated 4 October 2021) [online]. Available at: https://www.gov.ie/en/publication/774e2-national-development-plan-2021-2030/ [Accessed on 23/08/2022].
[10] South Dublin County Council. South Dublin Development Plan 2022-2016. Dublin. South Dublin County Council
[11] British Standards Institution, 2013. BS 42020:2013 Biodiversity. Code of practice for planning and development. London. BSI
[12] Chartered Institute of Ecology and Environmental Management, 2019. Guidelines for the Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Winchester. CIEEM
[13] Chartered Institute of Ecology and Environmental Management, 2017. Guidelines on Ecological Report Writing. Winchester. CIEEM
[14] Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities. Available at www.npws.ie

statutory designations follows standard professional practice as accepted in a number of similar planning applications. This covers an area of 5 km from the site boundary. The study area for protected and priority species has been derived by reference to CIEEM Guidelines for Preliminary Ecological Appraisal[15] and consideration of their ecological characteristics, and covers an area of 2 km from the site boundary. The study area for the Fossitt habitat survey has been determined with reference to CIEEM Guidelines for Preliminary Ecological Appraisal[16]. All of the above also consider the scale and nature of the proposed development.

11.11 Sensitive receptors in the study area include;

- Rye Water Valley/Carton Special Area of Conservation (SAC; 5.88 km north-west of the site),
- Glenasmole Valley SAC (8.05 km south-east of the site),
- Wicklow Mountains SAC (9.76 km south-east),
- Red Bog, Kildare SAC (14.44 km south-west),
- South Dublin Bay SAC (15.21 km east),
- North Dublin Bay SAC (17.90 km north-east),
- Wicklow Mountains Special Protection Area (SPA; 12.88 km south-east),
- South Dublin Bay and River Tolka SPA (14.81 km east),
- North Bull Island SPA (19.71k m east),
- Grand Canal proposed Natural Heritage Area (pNHA; 1.39 km north) and
- Liffey Valley pNHA (4.57 km north).

Temporal Scope

11.12 The assessment has considered impacts arising during the demolition and construction stage, which would be expected to be temporary(less than a year) in nature, and from the operation stage which would be expected to be long-term (15 to 60 years) to permanent in nature (i.e. more than 60 years).

Baseline Characterisation Method

Desk Study

11.13 In order to establish the existing baseline (discipline) conditions in the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- National Biodiversity Data Centre (NBDC); and
- National Parks and Wildlife Service (NPWS).

11.14 Further details are provided in EIAR Volume 3: Technical Appendix 8.1.

Field Study

11.15 A Fossitt habitat survey was undertaken on 20 July 2022 by Eiméar Rose Cunningham. This encompassed all lands within the red line boundary and up to 50 m outside, where access allowed.

11.16 Bat activity surveys were completed in August 2022. Two dusk emergence surveys; one of the shed in the south-west and one of the house in the north-west of the site were undertaken by Eiméar Rose Cunningham, Dylan Donoghue and Dara Dunlop on the 3 August and the 30 August 2022. All bat surveys were designed based on Bat Conservation Trust guidance[16].

11.17 Further details are provided in EIAR Volume 3: Technical Appendix 8.1.

Assessment Method

Methodology

Demolition and Construction Stage

11.18 The evaluation of ecological receptors is based upon CIEEM guidelines , which suggests that the value or potential value of an ecological resource or feature (for example a habitat type, species or ecosystems) should be determined within a geographical context (e.g. rare at a local level).

11.19 At the demolition and construction stage, the impact assessment process involves:

- Identifying and characterising impacts and their effects, giving regard to embedded mitigation;
- Incorporating measures to avoid and mitigate negative impacts and effects;
- Assessing the significance of any residual effects after additional mitigation;
- Identifying appropriate compensation measures to offset significant residual effects; and
- Identifying opportunities for ecological enhancement.

11.20 Potential impacts and effects have been assessed in accord with the following proposals for the demolition and construction stage:

11.21 Treelines and hedgerows at the boundaries of the site would be retained and enhanced where possible. Additional planting of trees and shrubs would occur within the riparian strip alongside the stream channel, with native shrubs adding shelter and food sources for a variety of different species. Trees and shrubs planted would be managed in line with the Biodiversity Management Plan (BMP) (see Technical Appendix 8.3) and the landscape proposals.

11.22 Planting on the banks of the Baldonnel stream would include aquatic species such as yellow iris and fool's watercress.

11.23 Areas of wet wildflower meadow would be created in the north-west of the site. This area would also act as an attenuation pond, in periods of heavier flow. Species in this area have been selected in order to thrive in a wetter area and create habitat for wetland species, particularly invertebrates.

11.24 All habitats on site would be managed sensitively, to promote biodiversity. Further detailed are outlined in the BMP (Technical Appendix 11.3).

Operation Stage

11.25 Assessment methods used for the operation stage follow the same process as demolition and construction stage with only slight variation.

11.26 Impact assessment during the operation stage emphasises the potential for disturbance of wild and protected species, including through lighting impacts on bats, rather than the wider range of potential impacts during the demolition and construction stage.

Cumulative Stage

11.27 The potential for cumulative impacts to arise from the combined effects of a number of existing or proposed developments in combination with the proposed development on ecology has been considered as set out in Chapter 2: EIA Process and Methodology.

Assessment Criteria

11.28 The assessment of significance of effect with regards to Ecology is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

[15] CIEEM, 2017. Guidelines for Preliminary Ecological Appraisal. Available at www.cieem.net

[16] Collins, J. (ed.), 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines. 3rd edition. London. The Bat Conservation Trust

11.29 The general criteria used to assess if an effect is significant or not, is set out in Chapter 2: EIA Methodology, further details are provided herein. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement

Receptor Sensitivity/Value Criteria

11.30 The sensitivity of receptors has been classified as low, medium or high in accordance with the criteria set out in Table 11-1.

Table 11-1: Receptor Sensitivity Criteria

Sensitivity	Criteria
International	An internationally designated site (e.g. SAC, SPA, Ramsar site). Site meeting criteria for international designations or qualifying species of a SAC where there is connectivity. Species present in internationally important numbers (>1% of biogeographic populations).
National	A nationally designated site (NHA, pNHA), or sites meeting the criteria for national designation or qualifying species where there is connectivity. Species present in nationally important numbers (>1% Irish population).
Regional	Species present in regionally important numbers (>1% of regional population). Areas of valuable habitat falling below criteria for selection as an NHA (e.g. areas of ancient woodland larger than 0.25 ha).
Local	Areas of ancient woodland smaller than 0.25 ha. Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g. species-rich flushes or hedgerows. Baldonnel Stream.
Negligible	Usually widespread and common habitats and species. Features falling below local value are not normally considered in detail in the assessment process.

Impact Magnitude Criteria

11.31 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 11-2.

Table 11-2: Impact Magnitude Criteria

Magnitude of Impact	Criteria
Negligible	Minimal impact on a very small scale; effects not dissimilar to those expected within a 'do nothing' scenario.
Low	Would lead to a not significant effect upon the feature or its viability. For example, less than 10% habitat loss, damage or gain.
Medium	Would lead to a slight to moderate effect on the feature or its viability. For example, between 10 - 20% habitat loss, damage or gain.
High	Would lead to a significant effect on the feature or its viability. For example, more than 20% habitat loss, damage or gain.
Very High	Would cause the loss of the majority of a feature (>80%) or would be sufficient to damage a feature enough to affect its viability immediately. For positive effects, would e.g. create over 80% habitat gain.

Scale of Effect Criteria

11.32 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 11-3.

Table 11-3: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors				
	Negligible	**Local**	**Regional**	**National**	**International**
Negligible	Imperceptible	Imperceptible	Imperceptible / Not Significant	Imperceptible / Not Significant	Imperceptible / Not Significant
Low	Imperceptible	Imperceptible	Not Significant / Slight	Moderate	Moderate
Medium	Imperceptible	Not Significant	Moderate	Significant	Significant
High	Imperceptible	Slight	Significant	Significant	Very Significant / Profound
Very High	Imperceptible	Slight	Significant	Very Significant / Profound	Very Significant / Profound

11.33 In line with CIEEM guidance, the duration of effects should be defined in relation to the lifespan of each organism in question. The criteria used to determine duration of effects under this approach is provided in Table 11-4.

Table 11-4: Effect Duration Criteria

Magnitude	Criteria
Momentary	Effects lasting from seconds to minutes.
Short-term	Up to (but not including) 5 years; for short-lived species, a single season or part of a season.
Medium-term	From 5 years up to (but not including) 15 years; for short-lived species, a single generation.
Long-term	From 15 years up to (and including) 30 years; for short-lived species such as invertebrates, multiple generations.
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken here as 30+ years), except where there is likely to be substantial improvement after this period in which case the category Long-term may be more appropriate.

Table 11-4: Effect Duration Criteria	
Reversible	Effects that can be undone, for example through remediation or restoration.

11.34 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports[17] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

11.35 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

11.36 The assessment has relied on data provided by NBDC and NPWS. It has been assumed that these data sets have been reported correctly.

11.37 At the time of the Fossitt survey, access was only permitted within the landownership boundary. The areas of land which formed the Ecological Study Area (ESA) which were not within the landownership boundary were viewed from field boundaries, with the use of binoculars, where needed. Areas that could not be assessed have not been mapped in the habitat map (Please see Figure 8-1 below). It is considered that the limited access to areas of land directly adjacent to the Proposed Development boundary has not unduly impacted upon the findings of the habitat or species scoping surveys.

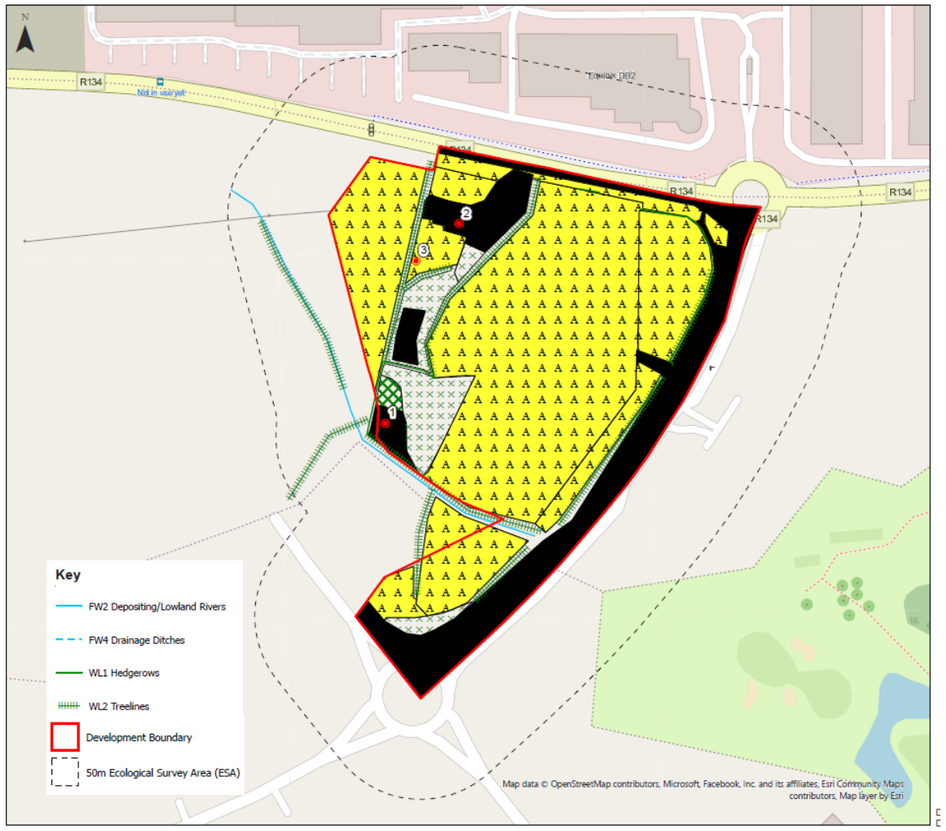


Figure 11-1: Ecological Study Area

11.38 Results of the survey undertaken are representative of the time that surveying was undertaken.

11.39 The absence of specific species records returned during the data search does not necessarily indicate absence of a species or habitat from an area, but rather that these have not been recorded or are perhaps under-recorded within the search area.

11.40 A Fossitt habitat survey does not aim to produce a full botanical or faunal species list or provide a full protected species survey, but enables competent ecologists to ascertain an understanding of the ecology of the site in order to:

- Identify broadly the nature conservation value of a site and preliminary assess the significance of any potential impacts on habitat/species recorded; and/or
- Confirm the need and extent of any additional specific ecological surveys that are required to identify the true nature conservation value of a site.

[17] Environmental Protection Agency, 2022. Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

Baseline Conditions

Existing Baseline

11.41N1 It is noted that a 5m section of existing hedge located in the north-west of the site (no.H7-C2) was removed by a Contractor on an adjacent site, this has since been reinstated through remedial works on the site.

Desk Study

11.42 The data search conducted via the NBDC identified the presence of 5 bat species/groups, hedgehog, badger, otter, pine martin, four invasive mammals (grey squirrel, rabbit, greater white-toothed shrew and American mink), 25 bird species and four invasive plant species within 2 km of the site. Six SACs, four SPAs and two pNHAs were identified within the relevant national and international search areas. Further details are presented in EIAR Volume 3: Technical Appendix 11-1.

Fossitt Habitat Survey

11.43 A Fossitt habitat survey was undertaken on the 20 of July 2022 by Eiméar Rose Cunningham. This encompassed all lands within the red line boundary and up to 50 m outside, where access allowed.

11.44 Survey work was carried out in accordance with Fossitt habitat survey guidance[18]. Habitats were mapped electronically in the field in order to produce a habitat map (Figure 2, Appendix A of Appendix 8.1).

11.45 The following habitat types were identified within the site:

- Buildings and artificial surfaces (BL3);
- Recolonising bare ground (ED3);
- Depositing/lowland rivers (FW2);
- Amenity grassland (improved) (GA2);
- Scrub (WS1);
- Hedgerows (WL1) and
- Treelines (WL2).

Species Scoping Survey

11.46 A species scoping survey was carried out to identify the presence of protected species, or the potential of the site to support protected species. The aim of the survey was to provide an overview of the site and to determine whether any further survey work was required.

11.47 No additional protected species surveys were undertaken at this time.

11.48 Table 11-5 below outlines the relevant habitat and field signs that indicate the potential presence of protected or notable species within the ESA.

Table 11-5: Indicative Habitats and Field Signs of Protected Species

Taxon	Indicative Habitat(s)	Field Signs (In Addition to Sightings)
Bats	Roosts – trees, buildings, bridges, caves, etc. Foraging areas – e.g. parkland, water bodies, streams, wetlands, woodland edges and hedgerow.	In or on potential roost sites: droppings stuck to walls, urine spotting in roof spaces, oil from fur staining round roost entrances, feeding remains (e.g. moth wings under a feeding perch).
	Commuting routes – linear features (e.g.) hedgerows, water courses, tree lines).	
Badger Meles meles	Found in most rural and many urban habitats.	Excavations and tracks: sett entrances, latrines, hairs, well-worn paths, prints, scratch marks on trees.
Otter Lutra lutra	Watercourses.	Holts (or dens), prints, spraints (droppings), slide marks into watercourses, feeding signs (e.g. fish bones).
Birds	Trees, scrub, hedgerow, field margins, grassland, buildings.	Nests, droppings below nest sites (especially in buildings of trees), tree holes.
Common lizard Zootoca vivipara	Rough grassland, log and rubble piles.	Sloughed skins.

Weather Conditions

11.49 Table 11-6 describes the weather conditions at the time of survey giving air temperature (°C), wind speed (Beaufort force), cloud cover (percentage) and precipitation.

Table 11-6: Indicative Habitats and Field Signs of Protected Species

Survey Date	Temperature (°C)	Wind (Beaufort)	Cloud Cover (%)	Precipitation
20/07/2022	17-19°C	3	60	None
03/08/2022	15-17°C	2	50	None
31/08/2022	14-16°C	1	20	None

Additional Surveys

11.50 Bat emergence surveys were carried out on each of the buildings proposed to be demolished. The emergence surveys did not reveal any bats emerging from or entering the house or shed. A total of 141 bat passes were recorded during the emergence survey of the shed, and 14 bat passes were recorded during the emergence survey of the house. The overall picture suggested is one of low numbers of commuting/foraging bat, primarily around the south of the site near the shed.

11.51 An assessment of benthic macroinvertebrates was completed on the section of the Baldonnel stream as part of the July 2022 DUB-1 permitted development. No notable species were identified during this stream assessment. The dominant species were freshwater shrimp (*Gammarus* sp.) and stone clingers (*Baetidae* sp.). Macroinvertebrate biodiversity was considered to be low.

11.52 Receptors identified through undertaking surveys and a desk study are as follows:

- Nine internationally designated sites (SACs and SPAs) – International sensitivity;
- Two pNHAs – National sensitivity;
- Baldonnel stream – Local sensitivity;
- Other habitats – Negligible to Local sensitivity;
- Bats – Negligible to Local sensitivity;

[18] Fossitt, J.A., 2000. A Guide to Habitats in Ireland.

- Badger – Negligible sensitivity;
- Otter (population not connected to European sites) – Negligible sensitivity;
- Hedgehog – Negligible sensitivity;
- Other mammals – Negligible sensitivity;
- Birds – Negligible to Local to sensitivity;
- Herptiles (amphibians and reptiles) – Negligible sensitivity;
- Terrestrial and aquatic invertebrates – Negligible sensitivity; and
- Flora – Negligible sensitivity.

Future Baseline

11.53 At the year of completion, biodiversity enhancement measures as proposed under the July 2022 DUB-1 permitted development would be implemented. The existing groundcover of this area (currently primarily improved agricultural grassland) will be replaced by a mix of wet grassland, wildflower meads and native woodland. Existing hedgerows will be enhanced, and new hedgerow created. Therefore, the future baseline of terrestrial habitats will be an improvement upon the existing baseline.

11.54A There will be riparian planting along the banks of the Baldonnel stream, providing food and shelter for aquatic species, which will in turn support species such as birds and bats. Herptile hibernaculum, and bird and bat boxes and mammal passes will be present within the site, providing shelter for local species, improving the biodiversity of the current site.

Sensitive Receptors

11.55 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 11-7.

Table 11-7: Summary of Sensitive Receptors

Receptor	Sensitivity
South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA	International
Proposed Natural Heritage Areas (Grand Canal pNHA and Liffey Valley pNHA)	National
Baldonnel stream	Local
Other habitats on site	Negligible to Local
Bats	Negligible to Local
Birds	Negligible to Local
Badger	Negligible to Local

11.56 Based on the baseline characterisation, the following receptors have been scoped out of the subsequent assessment:

- Rye Water Valley/Carton SAC: this international site has no connectivity with the site; (see EIAR Volume 3: Technical Appendix 8.2);
- Glenasmole Valley SAC: this international site has no connectivity with the site;
- Wicklow Mountains SAC: this international site has no connectivity with the site;
- Red Bog, Kildare SAC: this international site has no connectivity with the site;
- Wicklow Mountains SPA: this international site has no connectivity with the site; (see EIAR Volume 3: Technical Appendix 8.2);
- Otter: negligible sensitivity;
- Hedgehog: negligible sensitivity (common and widespread in Ireland);
- Other mammals: negligible sensitivity;
- Herptiles: negligible sensitivity;
- Terrestrial and aquatic invertebrates: negligible sensitivity;
- Flora: negligible sensitivity; and
- Invasive species: no invasive species identified within the site boundary or in the immediate vicinity.

11.57 Please note that EIAR Volume 3: Technical Appendix 8.1 considers impacts and effects for the species/groups scoped out above. This highlights that there would be long-term positive effects for a number of species and groups. It also ensures legal responsibilities towards protected species are met.

Assessment of Effects

Demolition and Construction Effects

Designated Sites of the South Dublin Bay

11.58 Due to a lack of suitable habitat within the site, it is considered highly unlikely that any species associated with Natura 2000 sites would be present on site.

11.59 There is hydrological connectivity between the site and the South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA. All of this connectivity is roughly 28 km downstream via the Baldonnel stream which flows adjacent to the western site boundary and along the southern boundary within the Site and feeds into the River Liffey. However, embedded avoidance measures (including the following of all relevant pollution prevention guidelines to prevent pollutants including hydrocarbons and silt entering the watercourse (Chapter 10: Water Resources and Flood Risk)) reduces the likelihood of negative impact. Given this and the distances and dilution factors involved (negligible), predicted effects on designated sites of the South Dublin Bay (International) during demolition and construction would be **short-term Imperceptible/Not Significant** and **Negative** in nature and **Not Significant** in terms of EIA.

Proposed Natural Heritage Areas (Grand Canal pNHA and Liffey Valley pNHA)

11.60 Both the Grand Canal pNHA and Liffey Valley pNHA are hydrologically connected to the site via the Baldonnel stream. As outlined above, embedded avoidance measures (including the following of all relevant pollution prevention guidelines to prevent pollutants including hydrocarbons and silt entering the watercourse (Chapter 10: Water Resources and Flood Risk)) reduces the likelihood of negative impact. Given this and the distances and dilution factors involved (negligible), predicted effects on designated sites of the Grand Canal and Liffey Valley pNHA (National) during demolition and construction would be **Short-Term, Imperceptible/Not Significant** and **Negative** in nature and **Not Significant** in terms of EIA.

Baldonnel Stream

11.61 Potential impacts arising during the demolition and construction phase include indirect loss or damage of the Baldonnel stream as a result of dust and other air- or water-borne pollution and the construction of the proposed culvert beneath the internal road which crosses the Baldonnel Stream. As the demolition and construction stage would adhere to all relevant legislation and best practice construction and pollution prevention methods, this is expected to cause only negligible impact upon the locally sensitive Baldonnel stream. Effects would be **Short-Term, Imperceptible and Negative** in nature and **Not Significant** in terms of EIA.

Terrestrial Habitats

11.62 The proposed development would also require the removal of trees (local) and amenity grassland habitat (negligible). These habitats are abundant in the surrounding area, and it is considered that the small amount of habitat loss would be of low magnitude. Effects would be **Short-Term Imperceptible and Negative** in nature and **Not Significant** in terms of EIA. Effects for the demolition and construction stage are not considered permanent for habitats or species owing to enhancements that would be implemented during the operation stage.

Bats

11.62A Demolition within the current site includes the demolition of one former residential property and one outbuilding. Both these buildings have been surveyed for the presence or likely absence of roosting bats (local). No bats roosts were identified. The majority of the site is comprised of amenity grassland; this habitat offers sub-optimal foraging habitat for bat species due to the limited number of prey species present. In total, ~~162 m~~ 98 m of hedgerow (or ~~62%~~ 37% of the total surveyed hedges) would need to be removed to facilitate the construction of the proposed development. The loss of these habitats under the proposed development footprint would not lead to a significant reduction in foraging habitat for local bats. Hedgerows and treelines provide suitable habitat for foraging and commuting bats. The proposal involved the removal of ~~72~~ 79 trees ~~located in the treeline adjacent to the residential property~~ (or 60% of the total surveyed trees). Treeline removal proposed would not lead to a significant reduction in foraging habitat for local bats, given the abundance of similar habitat in the surrounding landscape, and the poor quality of this habitat on site. This is because the site is currently subjected to high amounts of artificial light from neighbouring similar developments and streetlighting. The increased amount of artificial light has the potential to reduce the suitability of this habitat to commuting and foraging bats. Low levels of bat activity were recorded (low). **Short-Term, Imperceptible, Negative** effects on bats are predicted during the demolition and construction stage which are **Not Significant** in terms of EIA.

Badger

11.63 Habitats on site are suitable to support badger (local), however no badger setts, or evidence of badger was identified on site during the site surveys. Given that badgers are a highly mobile species and new setts may be built prior to demolition and construction, there is the potential for the disturbance of badger during the demolition and construction phase of the proposed development. During the demolition and construction phase, the proposed development can cause undue stress in a number of ways. Installation of security fencing or hoarding can disrupt badger paths and cut off foraging areas within a clan's territory. Excavations can destroy badger setts, and any excavations lefts overnight can trap badgers. The magnitude of impact on badgers during the demolition and construction stage is anticipated to be low. **Short-Term Imperceptible, Negative** effects on badger are predicted during the demolition and construction stage which are **Not Significant** in terms of EIA.

Birds

11.64 Main impacts on bird species from developments include direct loss or deterioration of habitats, and indirect habitat loss as a result of displacement by disturbance. Swallows were observed flying in and out of potential nesting sites within the garage of the residential home and in the shed at the south-west of the site (local sensitivity).

11.65 In the absence of mitigation, there is potential for loss of breeding attempts in and adjacent to the site if demolition and construction works are undertaken between the months of April – October. The effect may continue beyond a single bird generation, but is expected to be sufficiently small for the local population to recover relatively soon. The magnitude of impact for the commoner species during the demolition and construction stage is anticipated to be low, but for birds of conservation concern the impact could be medium. However, due to the Local sensitivity of the site's bird assemblage, overall effects during this stage would be **Short-Term, Imperceptible to Not significant, Negative** and **Not Significant** in terms of EIA.

Operation Effects

11.66 Designated Sites of the South Dublin Bay

11.67 Possible longer-term effects of the proposed development on the South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA (International sensitivity) could arise. This would be via the indirect loss of habitat due to water-borne pollutants entering the stream on and adjacent to the site. However, with embedded pollution prevention/mitigation measures included in the proposed development design, it is unlikely that any waterbird or wetland bird would be affected by the proposed development via habitat loss. Potential long-term imperceptible/not significant, negative effects would be anticipated from pollution.

11.68 However, these are not considered likely to be permanent owing to the proposed stream enhancements for the proposed development and the implemented stream enhancements as part of the July 2022 DUB-1 permitted development. The proposed stream enhancement measures would be considered likely to improve the Baldonnel Stream ecologically over time, mitigating any negative effects downstream. **Permanent, Imperceptible Neutral** effects would therefore be expected overall which are **Not Significant** in terms of EIA.

Baldonnel Stream

11.69 The landscape masterplan by KFLA Architects includes the planting of a wetland wildflower mix, wildflower meadow mix, berms and woodland on site. Substantial enhancements are proposed for the Baldonnel stream (local sensitivity), and would be in place for the entire operation stage. These measures are outlined in Appendix 8.3: Biodiversity Management Plan. These are expected to be high (over 20%) (high magnitude), leading to a **Permanent, Slight Positive** ecological effect which is **Not Significant** in terms of EIA.

Terrestrial Habitats

11.70 Gains would be forecast to be below 10% in terrestrial habitat terms (negligible sensitivity). This is because the majority of the site would be occupied by the proposed buildings. The operation stage would therefore be expected to lead to a **Permanent, Imperceptible, Positive** effect on other habitats which are **Not Significant** in terms of EIA.

Bats

11.71 To retain dark zones for commuting bats, lighting would be cowled in order to direct artificial light from retained hedgerows which are currently used by bats (local) to commute and forage. The lighting plan would be consistent with the adjacent July 2022 DUB-1 permitted development.

11.72 The landscape masterplan and BMP (EIAR Volume 3: Technical Appendix 11.3) also include the planting of native tree, shrub, and wildflower species. These would attract insects and provide foraging opportunities for bats, enhancing the situation over the current agricultural context. The magnitude of impact on bats during operational stage is anticipated to be low. Overall effects would be **Permanent, Imperceptible, Positive** for bats which are **Not Significant** in terms of EIA.

Badgers

11.73 Habitats on site suitable for supporting badger (local sensitivity), would be subject to a slight raise in disturbance (of negligible to low magnitude) during the operation stage. However, the creation of invertebrate-rich habitats would provide suitable foraging habitats for this species throughout the lifetime of the development (low magnitude). The overall magnitude of impact on badgers during the operational stage is anticipated to be low. **Permanent, Imperceptible**, **Positive** effects on badger are predicted during the operational stage, which are **Not Significant** in terms of EIA.

Birds

11.74 During the operation stage disturbance may be raised slightly, but the creation of invertebrate-rich habitats would provide a suitable food source for many bird species (local) throughout this stage. The magnitude of impact on birds during the operational stage is anticipated to be low. This is considered likely to result in a **Permanent, Imperceptible, Positive** impact on this Local to Negligible sensitivity receptor which is **Not Significant** in terms of EIA.

11.75 Further details of all impacts and enhancements predicted during the operation stage can be found in EIAR Volume 3: Technical Appendices 11.1 and 11.3.

Additional Mitigation

Demolition and Construction Stage

11.76 No significant effects are predicted, and consequently no additional mitigation is required in terms of EIA. Please note that EIAR Volume 3: Technical Appendix 8.1 refers to mitigation to meet legal obligations for Negligible-/ Local to Negligible-sensitivity receptors.

Operation Stage

11.77 No significant effects are predicted. Consequently, no additional mitigation is required in terms of EIA.

Enhancement Measures

11.78 Enhancements to the Baldonnel stream, terrestrial habitats and (as a consequence) protected species are proposed. These have already been described in part above under a consideration of effects during the operation stage. Full details of enhancements are given in EIAR Volume 3: Technical Appendix 8.3.

Assessment of Residual Effects

Demolition and Construction Residual Effects

11.79 As no additional mitigation would be required, the residual demolition and construction effects remain as reported in the assessment of effects section.

Operation Residual Effects

11.80 As no additional mitigation would be required, the residual demolition and construction effects remain as reported in the assessment of effects section.

Summary of Residual Effects

11.81 Table 11-8 provides a summary of the outcomes of the Ecology assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 11-8: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and Construction								
South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA	Pollution	None required	Imperceptible/Not Significant	-	L	I	IR	St
Grand Canal pNHA and Liffey Valley pNHA	Pollution	None required	Imperceptible/Not Significant	-	L	D	IR	St
Baldonnel stream	Pollution	None required	Imperceptible	-	L	D	IR	St
Terrestrial habitats	Habitat loss	None required	Imperceptible	-	L	D	R/IR	St
Terrestrial habitats	Pollution	None required	Imperceptible	-	L	I	R	St
Bats	Commuting and foraging habitat loss	None required	Imperceptible	-	L	D	R	St
Badger	Disturbance / destruction of setts	Pre-construction badger survey	Imperceptible	-	L	D	R	St
	Accidental trapping within excavations	All excavations should be securely covered, or a suitable means of escape provided at the end of each working day.						
Birds	Disturbance / destruction of nest	Pre-construction breeding bird survey (Only if works are undertaken between March and August) No demolition of buildings within the swallow summer breeding season April – October. Pre-demolition check of building for nesting birds.	Imperceptible to Not-significant	-	L	D	IR	St
	Habitat loss as a result of	None required						

Table 11-8: Summary of Residual Effects

	displacement by disturbance							
Operation								
South Dublin Bay and River Tolka SPA	Pollution Ecological enhancement	None required	Imperceptible	+/-	L	I	IR	P
Grand Canal pNHA and Liffey Valley pNHA	Pollution Ecological enhancement	None required	Imperceptible to Not-significant	+/-	L	I	IR	P
Baldonnel stream	Ecological enhancement	None required	Slight	+	L	D	R	P
Terrestrial habitats	Ecological enhancement	None required	Imperceptible	+	L	D	R	P
Bats	Disturbance through lighting	None required	Imperceptible	+	L	D	R	P
Badger	Foraging habitat enhancement	None required	Imperceptible	+	L	D	R	P
Birds	Foraging habitat enhancement	None required	Imperceptible	+	L	D	R	P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

11.82 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

11.83 Table 8.9 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 11-8: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
SD20A/0283 Microsoft - Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22	No	All effects during Demolition and Construction stage of proposed development are imperceptible or not significant	No	All effects during Operation stage of proposed development are imperceptible, not significant and/or positive – therefore no negative cumulative effects
SD20A/0121 UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22				
VA06S.308585 UBC Properties - Grange Castle South Business Park, Dublin 22				
SD17A/0377 Digital Reality Trust - Profile Park, Baldonnell, Dublin 22, D22 TY06				
SD18A/0134 Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22				
SD20A/0295 (amendment to SD18A/0134) Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22				
VA06S.309146 Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22.				
SD21A/0167 Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22				
SD21A/0186 Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22				

Table 11-8: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
SD21A/0217 Digital Netherlands VIII B.V ABP Ref: VA06S.312793 Vantage Data Centers Dub 11 Limited Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22.				

Demolition and Construction Cumulative Effects

11.84 It has been concluded that, with embedded mitigation measures included in the proposed development, it is likely that there would be no significant cumulative effects on designated sites or any other ecological feature in combination with any other development during these stages.

Operation Cumulative Effects

11.85 It has been concluded that, with embedded mitigation measures included in the proposed development, it is likely that there would be no significant negative cumulative effects on designated sites or any other ecological feature in combination with any other development during the operation stage.

Summary of Assessment

Background

11.86 This chapter has detailed the potential ecology effects due to the construction and operation development stages of the proposed development. The assessment of demolition, construction and operation stages has been undertaken taking into account the relevant national and local guidance and regulations.

11.87 The desk-based assessment identified six Special Areas of Conservation (SACs) and three Special Protection Areas (SPA) within 15km of the site boundary. Within 5km of the site boundary there are two proposed Natural Heritage Areas (pNHAs). The site has a hydrological connection with South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA via the Baldonnel stream and the River Liffey.

11.88 Seven habitat types were identified within the site during a Fossitt habitat survey undertaken in July 2022. The main habitat types recorded within the site is Amenity Grassland (GA2). The lands directly under and adjacent to the proposed development are considered to be of low ecological value.

11.89 Bat surveys did not reveal any bats emerging from or entering the house or shed. Low levels of commuting/foraging bat use of the site by three common Irish species were recorded overall.

Demolition and Construction Effects

11.90 During demolition and construction works, there may be disturbance of protected species or breeding birds, loss of habitats, habitat damage though air- or water-borne pollutants, accidental trapping of mammals in excavations, and habitat fragmentation and loss of commuting routes for wild mammals. These have the potential to lead to effects on protected species populations and one internationally designated site. However, considering the importance and sensitivity of these designated sites, habitats and species, and embedded mitigation measures designed into the proposed development, these effects are considered to be short-term, **Imperceptible** and **Not Significant** in terms of EIA.

11.91 Overall, it is considered that demolition and construction of the proposed development would result in a negative but **Imperceptible** effect on ecology and identified receptors. As such, it would **not give rise to Significant Effects** on ecology in terms of EIA.

Operation Effects

11.92 During the operation stage, pollution to aquatic habitats and disturbance of bats through lighting are expected. However, the residual effects would be expected to be imperceptible for the local bat population, and imperceptible and neutral for badgers and for the designated sites of the Dublin Bay.

11.93 The proposed landscape masterplan includes a range of landscape enhancements including those to the Baldonnel Stream, the planting of a wetland wildflower mix, wildflower meadow mix, berms and woodland on site. Substantial enhancements are proposed for the wildlife and the stream, leading to positive effects for habitat interest and for species groups including birds and those associated with the stream.

11.94 Overall, it is considered that the operation stage would result in a permanent **Slight, Positive** effect on ecology and identified receptors. It would therefore **not give rise to Significant Effects** on ecology in terms of EIA.

Cumulative Effects

11.95 No significant effects are predicted on ecology as a result of the proposed development alone in either the demolition and construction or the operation stage so there is **no potential for cumulative effects**

12A GROUND CONDITIONS

Introduction

12.1 This chapter of the EIAR reports on the likely significant ground condition effects to arise from the demolition and construction stage and the operation stage of the proposed development.

12.2 The chapter describes the ground condition policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely ground condition effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

12.3 This chapter is supported by the following technical appendices in EIAR Volume 3:

- Technical Appendix 12.1: IGSL Ltd, 2022. Data Center Project 3 Profile Park – Ground Investigation Report Factual; and
- Technical Appendix 12.2: Ramboll UK Limited, 2022. Vantage Data Centers DUB13, Dublin. Contaminated Land Interpretative Report.

12.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - Water Framework Directive (WFD) (2000/60/EC)[1];
  - Environmental Quality Standards (EQS) Directive (2008/105/EC)[2] (as amended)[3];
  - Priority Substances Directive (2008/105/EC)[4];
- National Legislation and Policy:
  - European Communities Environmental Objectives (Groundwater) Regulations 2010[5];
  - Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements' (Institute of Geologists of Ireland (IGI), 2013)[6];
  - Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (National Roads Authority (NRA), 2009)[7];
  - Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (Environmental Protection Agency (EPA), 2013)[8]; and
  - Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites (EPA, 2007)[9].

12.5 For human health assessments from impacts to soil, there are no statutory thresholds in Ireland for the assessment of soil contamination. For human health, the EPA recommends the use of Generic Assessment Criteria (GAC), based on the UK Environment Agency Contaminated Land Exposure Assessment (CLEA) model, either produced by the UKEA itself (known as Soil Guideline Values (SGV)) or values generated using the CLEA model by reputable third-party organisations. Where GAC have not been published or if practitioners do not use human health GAC publications, values should be generated by appropriately qualified and experienced professionals using the CLEA model for consistency with the EPA approach.

12.6 The 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' indicates that values for screening of the impact on groundwater may come from several sources, including the European Communities Environmental Objectives (Groundwater) Regulations 2010, the EPA's Groundwater Threshold Values (GTV), the EPA's Interim Guideline Values (IGV) or relevant Environmental Quality Standards (EQS). The latter guidelines are used when considering a surface water receptor.

12.7 There are no provisions to create a contaminated land database in the Republic of Ireland (RoI) and since contaminated land regulations have not yet been enforced. It is unlikely that there is a dedicated contaminated land officer at South Dublin County Council (SDCC), however, most counties have an Environmental Department responsible for waste management; environmental enforcement; litter control; pollution control; environment education and awareness; and water quality.

Assessment Scope

12.8 There is no statutory definition of 'contaminated land' in the RoI, and in contrast to the UK, there is no framework within which the regulatory agencies are required to undertake an assessment of contaminated sites or create a register of contaminated land. Furthermore, there are currently no Irish standards in relation to the clean up or rehabilitation of contaminated land.

12.9 The 'Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites' (2007) established a risk based approach for soil and groundwater assessment and remediation in line with the UK Environment Agency's document 'Model Procedures for the Management of Land Contamination: Contaminated Land Report No. 11 (CLR 11) – Note CLR 11' (2004) , now replaced in the UK by 'Contaminated Land Risk Management' (2020) guidance. In 2013, the EPA published 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (e.g. large scale industrial activities, large petrol storage facilities, waste sites).

12.10 As there is no published or formalised technical guidance relating to the assessment of ground contamination (including controlled waters) effects, professional judgement, experience and best practice methods have therefore been drawn upon to assess the significance of the potential ground contamination (including controlled waters) effects of the proposed development. The assessment has taken account of all applicable legislation, guidance and policy as previously outlined.

Technical Scope

12.11 The potential pollutant linkages and contamination impacts for both the demolition and construction stage and the operation stage of the proposed development have been assessed.

12.12 The technical scope of the assessment includes the potential for existing contamination to be present within the soil and shallow groundwater on the site and the risks to human health and the water environment waters associated with the potential presence and mobilisation of existing contamination.

12.13 Accordingly, the following potential pollutant linkages, which have the potential to present an unacceptable risk, have been considered:

- Exposure of construction workers to contaminated soil;
- Generation of dust and potentially contaminated dusts, including asbestos;

[1] European Union, 2000. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Document 32000L0060.
[2] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[3] European Union, 2013. Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy Text with EEA relevance. Document 32013L0039.
[4] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[5] Government of Ireland, 2010. European Communities Environmental Objectives (Groundwater) Regulations 2010. S.I. No. 9 of 2010.
[6] Institute of Geologists of Ireland (IGI), 2013. Guidelines for the preparation of the Soils, Geology and Hydrogeology chapters of an Environmental Impact Assessment Report (EIARs). Published 30 April 2013. IGI.
[7] National Roads Authority (NRA), 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. NRA.
[8] Environmental Protection Agency (EPA), 2013. Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. EPA.
[9] EPA, 2007. Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites. EPA.

- Exposure of construction workers to ground gases;
- Exposure of construction workers to contaminated groundwater (if present);
- Mobilisation of contamination in surface water and groundwater through excavations and foundation works, including those for the underground fuel storage tanks;
- Mobilisation of site materials and pollutants during rainfall events;
- Changes in ground level as a result of earthworks and cut and fill activities may increase vulnerability of the underlying bedrock aquifer;
- Contaminants introduced by construction activities through leakages/spillages; and
- Loss of agricultural land.

12.14 During the operation stage there would be no interaction between the proposed development and deep groundwater beneath the site. As such, deep groundwater has not been assessed for the operation stage.

Spatial Scope

12.15 The study area is defined as that within a radius of up to 2 kilometres (km) from the site boundary. The study area has been used to identify potential historical land uses which may have contributed to contamination issues associated within the site; as well as potentially sensitive land uses in the wider surrounding area that could be impacted if existing contaminants were mobilised as a result of the proposed development.

Temporal Scope

12.16 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (less than a year) in nature; and from the operation stage which would be expected to be long term (15 to 60 years) to permanent (> 60years) in nature.

Baseline Characterisation Method

Desk Study

12.17 In order to establish baseline geology and soil conditions in the study area, relevant data was reviewed and assessed. Data was also obtained from the following sources:

- Geological Society of Ireland (GSI)[10] - online Public Viewer mapping , which includes Geohazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping;
- Teagasc soil and subsoil database[11];
- EPA website mapping and database information[12]; and
- National Parks and Wildlife Services (NPWS) – Protected Site Register[13].

Field Study

12.18 An intrusive ground investigation was undertaken between July and August 2022 by IGSL to characterise the ground of the site. The factual results of this investigation are reported within Appendix 12.1 of EIAR Volume 3.

12.19 Interpretation of the IGSL data is provided in Appendix 12.2 of EIAR Volume 3.

[10] Geological Survey Ireland, 2021. Data and Maps [online]. Available at: https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx (Accessed on 15/09/2022).
[11] Teagasc, 2017. County Soils Maps [online]. Available at: https://www.teagasc.ie/crops/soil--soil-fertility/county-soil-maps/
[12] Environment Protection Agency, 2021. Maps [online]. Available at: https://gis.epa.ie/EPAMaps/
[13] National Parks and Wildlife Service, 2020. Information [online]. Available at: https://www.gov.ie/en/organisation-information/09575-national-parks-and-wildlife-service/

Assessment Method

Methodology

Demolition and Construction Stage

12.20 The identification of likely significant effects during the demolition and construction stage was based on a review of the presence of potential receptors, a qualitative assessment of the sensitivity of the receptors, the identification of potential impact pathways and an assessment of the magnitude of the potential impacts.

12.21 The assessment of potential impacts and likely effects has, therefore, comprised the following approach:

- Identification and establishment of the sensitivity of receptors on the basis of their use, proximity to the site, existing quality or resource value;
- Consideration of potential source-pathway-receptor linkages;
- Evaluation of the magnitude of potential impacts from potential contamination as a result of the introduction of the proposed development;
- Consideration of embedded mitigation measures integral to the proposed development;
- Classification of the significance of likely effects;
- Identification of additional mitigation measures to eliminate or reduce residual effects, where considered necessary; and
- Re-assessment to conclude the likely significance of residual effects.

Operation Stage

12.22 The demolition and construction stage methodology has been applied to the identification of likely significant effects during the operational stage.

Cumulative Stage

12.23 With respect to potential inter-cumulative effects, the assessment reviews the potential effects on geology and soils of the cumulative development (through review of project details for potential effects on geology of their sites and locality) and discusses whether and how any likely effects of the proposed development may interact with them, resulting in a cumulative effect.

Assessment Criteria

12.24 The criteria used to assess if an effect is significant or not in terms of EIA, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

12.25 Although there is no framework or Irish standards in relation to the assessment of risks associated with contamination, often the UK framework is adopted. This framework allows for the categorisation of risks and is undertaken in terms of consequence (i.e., severity of risk) and probability (i.e., likelihood of the risk being realised), which are combined to produce an overall classification of the risk of harm occurring. Whilst this classification is not directly translatable into the EIA process, the principles and land use scenarios from the framework have been used to allocate criteria that can be used in EIA.

12.26 The human health criteria, set out in Tables 12-1 and 12-2, have been based on that principle for the assessment of risks associated with contaminated land. Criteria for surface and groundwater have been based on a variety of sources including Water Framework Directive (WFD) Protected Area designations, GSI and EPA aquifer classifications.

Receptor Sensitivity/Value Criteria

12.27 The sensitivity of receptors has been classified as low, medium or high in accordance with the criteria set out in Table 12-1.

Table 12-1: Receptor Sensitivity/Importance Criteria

Sensitivity	Criteria (Examples)
Low	Human health: low sensitivity land use such as commercial or industrial.
	Surface water: • Has no or minimal ecosystem present; • Does not form or supply water to a designated site; • Provides low/no amenity value; • Is not used as a commercial or private water supply; • Is substitutable in short-term; and • Does not form part of a designated fishery.
	Groundwater: • Poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu). • Is classified as having low aquifer vulnerability; • Does not supply baseflow to local rivers; • Resource is such that there is some potential for substitution; • Is classified by the EPA as not being at risk; • Is not located within a groundwater source protection area (SPA); • Is not used as a commercial or private water supply; • Does not supply a groundwater dependent terrestrial ecosystem (GWTE); • No hazardous substances recorded within the aquifer; and • Is not threatened by, or sensitive to, saline intrusion.
Medium	Human health: medium sensitivity land use such as public open space.
	Surface water: • Has an ecosystem that has low sensitivity to water quality or quantity changes; • Provides amenity value on a local basis; • Is used as a water supply for industrial, commercial or agricultural purposes; • May be substitutable in the long-term; and • Is or forms part of a cyprinid fishery.
	Groundwater: • Is a locally important aquifer. These are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). • Is classified as having low or intermediate aquifer vulnerability; • Contributes some baseflow to local rivers; • May be substitutable in the long-term; • Is classified by the GSI as probably not being at risk; • Is located within a groundwater SPA (source catchment area); • Provides water for agricultural or industrial use with limited connection to surface water; • Supplies a GWTE that has species that are not protected or listed. They are abundant/common and not critical for GWDTE functions;

Table 12-1: Receptor Sensitivity/Importance Criteria

Sensitivity	Criteria (Examples)
	• Shows a downward trend in hazardous substances; • Is potentially at risk from or sensitive to saline intrusion; and • Is extracted such that extraction could potentially put water balance at risk.
High	• Human health: high sensitivity land use such as schools or residential without private gardens.
	Surface water: • Has an ecosystem that has moderate sensitivity to water quality or quantity changes; • Supports protected aquatic flora and fauna of national importance; • Is or supplies water to nationally designated sites (e.g. National Park or Nature Reserve); • Is regularly used for recreation (where water immersion sports are practiced regularly) and commercial navigation, important on a local or regional basis; • Is used as a local water supply for potable water supply purposes; • Is not substitutable in the short- or long-term; • Is or forms part of a salmonid fishery; and • Is a designated Shellfish water.
	Groundwater: • Is a regionally important aquifer. These are subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). • Regionally important aquifer with high vulnerability; • Contributes some baseflow to regionally important rivers; • Is not substitutable in the short- or long-term; • Is classified by the GSI as being probably at risk; • Is located within a groundwater SPA (outer catchment); • Provides water for a private water supply or locally important industrial, commercial or agricultural purposes; • Provides locally important resource or supports aquatic ecosystems; • Shows a stable pattern of hazardous substances; • Quality is sensitive to or likely to be threatened by saline intrusion; and • Is extracted such that extraction is putting water at risk.
Very High	Human health: very high sensitivity land use such as allotments or residential with private gardens.
	Surface water: • Has an ecosystem that has high sensitivity to water quality or quantity changes; • Supports nationally or internationally protected species or supplies a site that has these characteristics; • Is or supplies water to internationally designated sites (e.g. Ramsar sites); • Is a major commercially significant navigational or recreational water body (where water immersion sports are practiced regularly); • Is used as a regional water supply for potable water supply purposes; • Is not substitutable in the short- or long-term; and • Is or forms part of a salmonid fishery.
	Groundwater:

Table 12-1: Receptor Sensitivity/Importance Criteria

Sensitivity	Criteria (Examples)
	• Is a regionally important aquifer. These are subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). • Regionally important aquifer with high vulnerability; • Provides significant baseflow to rivers; • Is not substitutable in the short- or long-term; • Is classified by the GSI as being at risk; • Is located within a groundwater SPA (inner catchment); • Provides water for a public water supply or regionally important industrial, commercial or agricultural purposes; • Supports aquatic ecosystems incorporating protected species; • Shows an upward trend in hazardous substances; • Is subject to saline intrusion causing damage to quality of the groundwater; and • Is extracted such that extraction is putting water balance at severe risk.

Impact Magnitude Criteria

12.28 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 12-2.

Table 12.2: Impact Magnitude Criteria

Magnitude of Impact	Criteria
Low	Human health: • Contaminant concentrations substantially below relevant screening criteria as detailed in Appendix 12.2 of EIAR Volume 3; • Resulting exposure to contamination is unlikely to represent significant harm or significant potential of significant harm (SPOSH) to receptors; and • No requirement for specific control measures to reduce risks to human health and/or make land suitable for intended use.
	Surface water: • Small alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Water quality/quantity within screening levels and unlikely to affect most sensitive receptors; • Localised changes in groundwater levels or quality but no appreciable change in wider groundwater regime; and • Short-term changes that would recover in the short- to medium-term.
	Buildings: • Damage to buildings or property easily repairable as part of normal maintenance routines.
Medium	Human health: • Contaminant concentrations are below relevant screening criteria as detailed in Appendix 12.3 of EIAR Volume 3; • Significant contamination is unlikely with a low risk to human health; and

Table 12.2: Impact Magnitude Criteria

Magnitude of Impact	Criteria
	• Best practice measures can be required to minimise risk to human health.
	Surface water: • Medium alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Non-compliance with water quality/quantity standards on a short-term basis; • Localised changes in groundwater levels or quality with small-scale measurable changes in wider groundwater regime but no significant impact on local private water supplies; and • Change in water body but not enough to change its WFD status.
	Buildings: • Damage to buildings or property requiring investment in excess of normal maintenance routines.
High	Human health: • Contamination levels exceed background levels and relevant screening criteria as detailed in Appendix 12.3 of EIAR Volume 3 with potential for significant harm to human health; and • Control/remediation measures are required to reduce risks to human health and/or make land suitable for intended use.
	Surface water: • Large alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Non-compliance with water quality/quantity standards on a long-term basis; • Measurable changes in groundwater levels or quality in wider groundwater regime with significant impact on local private or public water supplies; and • Changes in quantity or quality that result in a reduction in WFD status.
	Buildings: • Significant or material damage to buildings or property.

Scale of Effect Criteria

12.29 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 12-3.

Table 12-3: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors			
	Low	**Medium**	**High**	**Very High**
Low	Imperceptible	Imperceptible/Not Significant	Slight/Moderate	Moderate
Medium	Imperceptible/Not Significant	Moderate	Moderate/Significant	Significant/Very Significant
High	Slight/Moderate	Moderate/Significant	Very Significant/Profound	Profound

12.30 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports[14] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

12.31 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

12.32 The assessment relied on data which was provided within public domain. It has been assumed that the data within the report is correct and up-to date.

12.33 The field data comprising soil quality was collected for the site by IGSL. It has been assumed that the data sets within the IGSL report have been reported correctly.

12.34 In absence to groundwater data for the site, groundwater data for the adjacent development (DUB-1) immediately west of the site has been used.

Baseline Conditions

Existing Baseline

Current and Historical Use

12.35 The site currently consists of mostly relatively flat agricultural land, with the land surrounding the site comprising a mixture of agricultural, commercial and industrial uses. A residential property is situated in the north-west of the site, and outbuildings are present in the south-west of the site. There is a raised embankment along the eastern boundary.

12.36 The site is situated within Profile Park area, with various data centre developments within the vicinity of the site. The site is bound by New Nangor Road in the north, and Falcon Avenue (access road) along the south-eastern site perimeter. The nearest residential area is located approximately 730 m north-east of the site, comprising of terraced houses with gardens.

12.37 Historically, the site was occupied by undeveloped fields, likely used for agriculture. By 1958, single residential dwelling had been developed in the north-west of the site, and by 1968 multiple outbuildings had been developed in the west and south-west. A single (gravel) track was noted in 1991 running from the north of the site to the outbuildings in the south-west. The track was overgrown with vegetation by 2018. The residential property and the outbuildings currently remain on site.

Geology

12.38 According to the Geological Society of Ireland, the site is anticipated to be underlain by (in sequence) Quaternary Glacial Till Deposits, and the Lucan Formation which comprises dark grey to black limestone and shale (also known as Dinantian (Upper Impure) Limestone or Calp Limestone). It is also anticipated that topsoil and Made Ground will be present within the site.

12.39 The following ground investigation conditions were identified in the site-specific ground investigation undertaken by IGSL in 2022. The ground investigation comprised 10 trial pits, and 6 cable percussive holes which were followed-on with a rotary core rig. The boreholes and the trial pits were spread across the site, within readily accessible areas. Figure 12-1 illustrates the borehole and trial pit locations.

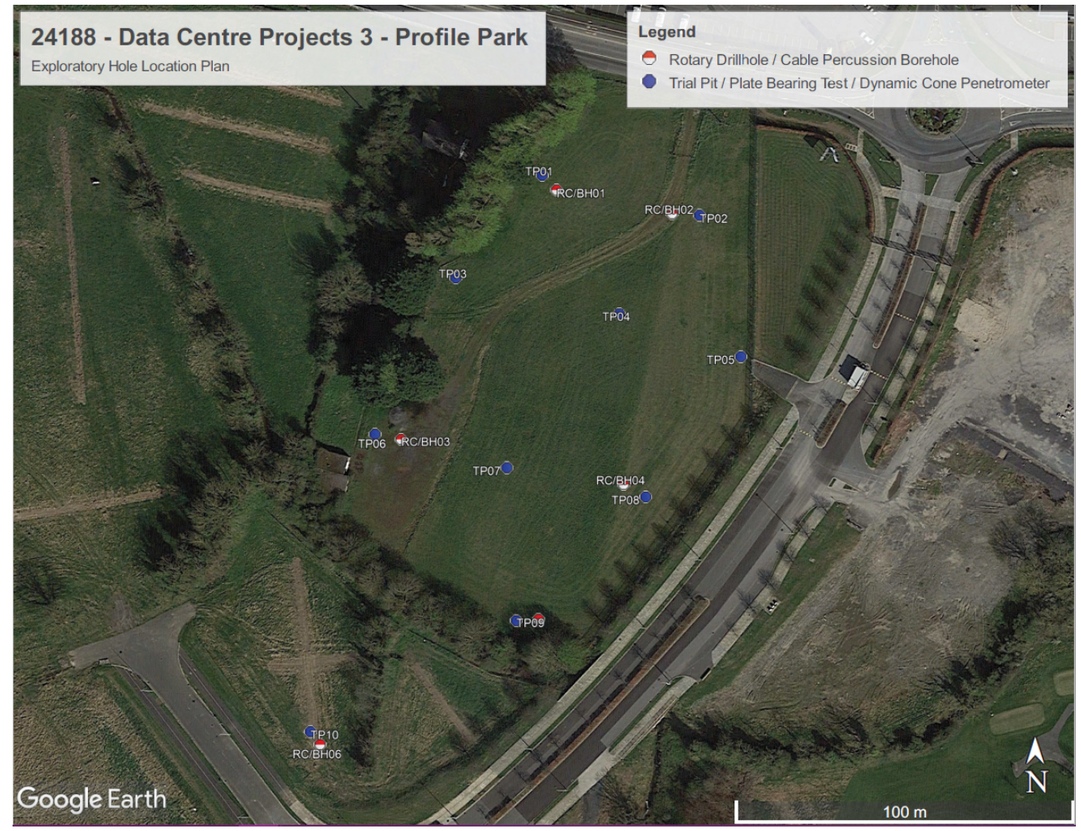


Figure 12-1 Site Investigation Borehole / Trial Pit Location Plan (extracted from IGSL 2022 Report)

12.40 The ground investigation has revealed the ground conditions at the site to typically comprise:

- TOPSOIL across the site, apart from the gravel track in the south-west of the site;
- Glacial Till of firm grey sandy gravelly CLAY / SILT with occasional cobbles;
- Glacial Till of stiff to very stiff dark brown sandy silty gravelly CLAY with occasional cobbles;
- Variably weathered rockhead recovered as dark grey sandy clayey angular GRAVEL within the trial pits; and
- Bedrock consisting of dark grey and black LIMESTONE with thin horizons of fissile SHALE or MUDSTONE.

12.41 Published GSI mapping indicates faults to be present to the south and north-west of the site but not within the site boundary.

12.42 The GSI Public Viewer was reviewed to identify sites of geological heritage for the site and surrounding area. There are no recorded geological heritage sites on the site and there is no evidence of any geological heritage site which could be considered suitable for protection from the proposed development. Likewise, there are no identified geological heritage sites in the SDCC Development Plan 2016-2022 associated with the site.

Hydrogeology

12.43 The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3/d; cubic meters per day), specific capacity ($m^3/d/m$; cubic meters per day per m depth) and

[14] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

groundwater throughput (mm^3/d; cubic millimeters per day). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division comprises regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

12.44 The bedrock aquifers underlying the site according to the GSI National Draft Bedrock Aquifer Map (see earlier reference to GSI – online Public Viewer mapping) are classified as Dinantian Limestones (Calp). The GSI has classified this aquifer as Locally Important (Ll), i.e., an aquifer which is moderately productive only in local zones.

12.45 During the IGSL 2022 ground investigation, the groundwater strikes were recorded as either seepages or slow ingress in TP06 to TP10, and in RC/BH-01, RC/BH-03 and RC/BH-06. In the case of trial pits, groundwater was recorded between 1.80 m below ground level (in TP07 and TP09) and 2.0 m below ground level (in TP06, TP08 and TP10). The groundwater strikes are typically associated with recorded stratum of grey sandy clayey angular gravel of possible weathered rock (in TP07 to TP09); and within the stiff gravelly clay in TP10. In case of the boreholes, groundwater was recorded between 1.50 m (in RC/BH-03) and 1.90 m (in RC/BH-06). The groundwater strikes are typically associated with recorded stratum of stiff to very stiff sandy silty and gravelly clay of glacial till deposits.

12.46 The groundwater is likely to be in continuity with the Baldonnel Stream which runs through the southern portion of the site, flowing from east to west. Given this, the groundwater flow direction is likely to be towards the stream.

12.47 There is no evidence of springs or karstification in this area according to the GSI Karst database[10].

Groundwater Quality Status and Groundwater Bodies

12.48 With reference to the WFD, the Groundwater Body (GWB) underlying the site is the Dublin GWB (EU GWB Code: IE_EA_G_008), which under WFD is of 'good status'. The risk score is currently under review, however, in previous cycle the GWB risk score was marked as 'not at risk' (2013-2018 WFD status).

12.49 The GSI currently classifies the aquifer vulnerability underlying the site to be high (H) with the subsoils being of low permeability.

12.50 The site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA and there are no wells or springs within 1km of the site, with the closest being approximately 3km south-east and east of the site.

12.51 There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or immediately adjacent to the site.

Hydrology

12.52 The site is situated within the sub-catchment of the Griffeen River and Baldonnel Stream which are tributaries of the River Liffey. The Baldonnel Stream runs approximately east to west through the south of the site.

Surface Water Quality Status and Surface Water Bodies

12.53 The review of WFD waterbody status (2013-2018) indicates that the Baldonnel Stream is classified as having 'moderate status'. The nearest EPA monitoring stations are at Baldonnel Stream (RS09B090300 and RS09B090400) located approximately 430 m south and 660 m west of the site, respectively; and at Griffeen (RS09G010200), located approximately 2.1 km west of the site. The latest EPA biological assessment of surface water from Griffeen monitoring location indicated a score of Q3 (poor) in 1991.

Ground Gases (including Radon)

12.54 According to the Radon Risk Map (EPA, Environmental Protection Agency), 'about 1 in 20 homes in the area is likely to have high radon levels'.

Mining and Quarrying

12.55 According to the GSI there are no active quarries located in the immediate vicinity of the site with the nearest quarry being located approximately 3.1 km south-east at Belgard Quarry. EPA mapping indicates there are no mines on or near the site.

Geomorphology and Designated Sites

12.56 No designated geological or geomorphological areas or sites are present on-site or adjacent to the site. As such, the proposed development is not considered to adversely impact on such receptors. The closest geological heritage site is the Belgard Quarry, located 3.1 km to the south-east of the site.

Current Regulated Activities and Industrial Uses including Landfills

12.57 According to the EPA, there are a number of licensed Integrated Pollution Prevention and Control (IPPC) and waste facilities; however, these are located approximately 5 km from the site.

12.58 Information gained from surrounding planning applications indicates that there no known illegal or historic landfills within 500 m of the site, however it is understood that uncontrolled waste operations are undertaken at the car centre 240 m west of the site.

Sources of Contamination

12.59 Based on review of desk study information, the current and former uses of the site indicated that there is a low to moderate potential for significant or widespread soil and groundwater contamination. However, due to the lack of development at the site and the generally agricultural uses of the site, the risk of contamination is more likely to be low.

12.60 No particular types of potential contaminants were identified from the current and historical use of the site, and therefore the 2022 ground investigation carried out by ISGL included a typical contaminated land chemical testing suite comprising of; heavy metals, total petroleum hydrocarbons (TPHs), asbestos, organic contaminants such as polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs).

12.61 The findings of the initial contaminated land assessment (i.e., comparison of soil and leachate contaminant levels against GAC) as detailed in Appendix 12.2 of EIAR Volume 3 is as follows:

- There are no potentially significant contaminative activities on-site;
- No significant visual or olfactory field evidence of contamination within soils was found on-site;
- Very low levels of soil and soil leachate contamination were recorded on-site, typical of a greenfield site at concentrations that do not present a significant risk to potential receptors;
- No asbestos was detected on-site; and
- No significant potential off-site contamination sources were identified.

12.62 Additionally, low levels of contamination in groundwater typical of a greenfield site were found at the site immediately west of the subject site. The concentrations were deemed to be representative of general background groundwater quality in the site's urban industrial setting reflective of the subject site's groundwater quality in absence of sources of potential contamination at the subject site.

12.63 Below is a summary of the site sensitivity in relation to geology, hydrogeology, hydrology and contamination:

- The site has been predominantly greenfield and agricultural use historically. There is no evidence of any historical waste disposal or source of contamination.

- The site is underlain by a LI aquifer.
- The site is underlain by the Lucan formation comprising dark grey to black limestone and shale from the Carboniferous Age.
- Very low levels of soil and soil leachate contamination were recorded typical of a greenfield site at concentrations that do not present a significant risk to potential receptors.

Future Baseline

12.64 As per the methodology set out in Chapter 2: EIA Process and Methodology, effects of the proposed development are to be assessed against a future baseline, which considers the July 2022 DUB-1 permitted development as operational.

Sensitive Receptors

12.65 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 12-4.

Table 12-4: Summary of Sensitive Receptors

Receptor	Sensitivity
Construction workers	Low
Adjacent site users	Low
Future site users	Low
Water environment (Baldonnel Stream)	Medium
Groundwater beneath the site (aquifers)	Medium

Assessment of Effects

Demolition and Construction Effects

Embedded Mitigation

12.66 This section identifies a range of embedded mitigation measures that are incorporated within the Proposed Development.

Construction Environment Management Plan

12.67 A project-specific Construction and Environmental Management Plan (CEMP) will be established and maintained by the contractors during the demolition and construction stage which will cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures.

12.68 The measures identified in this section (including those in relation to control of soil excavation, material export, fill materials, fuel and chemical handling, transport and storage and control of water) would be included in the CEMP.

Control of soil excavation

12.69 Subsoil will be excavated to facilitate the construction of access roads, car parking areas, expansion of drainage connections and other ancillary works (SUDs / attenuation ponds etc.). The proposed development will incorporate the reduction, reuse and recycle approach in terms of on-site soil excavations. The proposed works will be carefully planned to ensure only material required to be excavated will be, with as much material left in situ as possible. Reuse of on-site excavated soil and capping with hardstand will minimise any increase in aquifer vulnerability. Construction works will require local removal of soil cover where levelling of the site is required and its use for re-instatement elsewhere on the site. It is envisaged that any soil excavated will be retained on-site and reused as fill material orlandscaping.

12.70 Excavation works will be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil should be tested and classified as hazardous or non-hazardous in accordance with the EPA's Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous'[15] publication, HazWasteOnline tool[16] or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with EC Decision 2003/33/EC[17]. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

12.71 Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body.

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

Export of material from site

12.73 It is currently envisioned that all soil/stones arising on the site will be re-used on site. In the event that any excavated material requires removal off-site, it may be removed as either a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (andnot as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011[18]. EPA agreement will be obtained before re-using the spoil as a by- product. However, it is not currently anticipated that any excavated material will be removed offsite orimported onto the site for reuse as a by-product. Where material cannot be reused off site it will be sent for recovery or disposal at an appropriately authorised facility.

12.74 If any waste soil requires removal from site, it will be classified by an experienced and qualified environmental professional to ensure that the waste soil is correctly classified for transportation and recovery/disposal offsite. Refer to Chapter 14: Waste for further information.

Sources of fill and aggregates

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

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

Fuel and chemical handling

12.76 The following procedures will be included in the CEMP in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;

[15] EPA, 2018. Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous. July 2018 EPA

[16] HazWasteOnline, 2012. Waste Assessment Tool [online]. Available at: https://www.hazwasteonline.com/ [Accessed on 28/07/2021].

[17] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

[18] Article 27 of the European Communities (Waste Directive) Regulations 2011,

- Where mobile fuel bowsers are used the following measures would be taken:
  - Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
  - The pump or valve would be fitted with a lock and would be secured when not in use;
  - All bowsers to carry a spill kit;
  - Operatives must have spill response training; and
  - Drip trays used on any required mobile fuel units.

12.77 In the case of drummed fuel or other potentially polluting substances which may be used during the demolition and construction stage the following procedures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they would be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriateequipment.

12.78 The aforementioned list of measures is non-exhaustive and would be included in the CEMP.

Control of water during construction

12.79 Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations will be carried out with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management, as set out in the CEMP, will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation.

12.80 Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any off-site impacts. All run-off will be prevented from directly entering into any water courses or drainage ditches.

12.81 Should any discharge of demolition or construction related water be required, discharge would be to foul sewer. Pre-treatment and silt reduction measures on-site would include a combination of silt fencing, settlement measures (e.g., silt traps, 20 m buffer zone between machinery and watercourses, off-site refuelling of machinery) and use of hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits.

Groundworks

12.82 The proposed development would involve groundworks, which would inevitably have an interaction with the on-site soils and water environment. As outlined above, demolition and construction works will be undertaken in compliance with a CEMP.

12.83 Proposed activities that are likely to be occurring at the site during the demolition and construction stage which could involve, or which could affect the ground, are as follows:

- Formation of landscape bunds, SUDs / attenuation ponds and improvements to the Baldonnel Stream;
- Re-use of excavated material within construction works where possible in order to minimise off-site material movements, including excavated soils, roads and demolition materials;
- Foundations;
- Soil stripping, excavation and/or exposure of underlying materials;
- Topsoil and subsoils would be segregated during the works;
- Excavations for foundations, drainage works or services (standard open trenching techniques would be used for excavations);
- Dewatering of excavations (if required);
- Site-won material would be re-used on-site wherever possible, subject to relevant geotechnical testing. Imported materials would also be required to provide engineered fill as part of the construction of structures and embankments;
- Where waste material is to be disposed of off-site this would be to a licensed waste facility in accordance with a Materials Management Plan (MMP) or equivalent;
- Establishment of a temporary construction compound(s), storage and use of fuels or chemicals – the establishment stage sits prior to the installation of appropriate bunds and other pollution control measures and as such represents the highest risk. All storage areas for fuels and oils would be appropriately bunded in line with best practice guidance;
- Movement of plant and machinery within the proposed development and to/from the compound;
- Wheel washing facilities would be provided during the demolition and construction stage for plant and vehicles; and
- Vehicles moving across soils within the site.

12.84 As outlined above the activities required for the demolition and construction stage of the proposed development represents the greatest risk of potential impact on the geological environment. These activities primarily pertain to the site preparation, excavation, levelling and infilling activities required to facilitate construction of proposed development and ancillary services.

12.85 Taking the above into account, the likely effects associated with contamination during the demolition and construction stage are as follows:

- A proportion of the development area would be covered in hardstanding, which provides protection to the underlying aquifer, but also reduces local recharge in this area of the aquifer. As the area of aquifer is large this reduction in local recharge would have no significant change in the natural hydrogeological regime.
- Excavated and stripped soil can be disturbed and eroded by site vehicles during the works. Rainfall and wind can also impact on non-vegetated/uncovered areas within the excavation or where soil is stockpiled. This can lead to run-off with high suspended solid content which can impact on water bodies. The potential risk from this indirect impact to water bodies and/or habitats from contaminated water would depend on the magnitude and duration of any water quality impact.
- Due to the lack of development at the site and the historical agricultural use the risk of contaminated soils being present on-site is low. Nonetheless material, which is exported from site, if not correctly managed or handled, could impact negatively on human beings (on-site and off-site) as well as water and soil environments. However, it is currently anticipated that all soil would be reused on-site.
- As with all construction projects, there is potential for water (e.g., surface water, groundwater) to become contaminated with pollutants associated with the demolition and construction works. Contaminated water which arises from construction sites can pose a risk to groundwater quality for the duration of the construction if contaminated water is allowed to percolate to the underlying aquifer. The potential main contaminants include:
  - Increase in suspended solids due to muddy water with increase turbidity, arising from excavation and ground disturbance;
  - Spills and releases of cement and concrete causing an increase turbidity and pH arising from the use of these construction materials; and
  - Spills and releases of wastewater (nutrient and microbial rich) arising from poor on-site toilets and washrooms.

12.86 With consideration of the embedded mitigation measures outlined above predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the demolition and construction stage (low magnitude). Effects would be temporary to temporary, **Imperceptible** to **Imperceptible/Not Significant Negative** i.e., **Not Significant** in EIA terms.

Accidental spills and leaks

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

- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on site; and
- run-off from concrete and cement during pad foundation construction.

12.88 Accidental spillages may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoils and impact underlying groundwater. Groundwater vulnerability at the site is currently classified as extreme and high. Any soil stripping will also further reduce the thickness of subsoil and the natural protectionthey provide to the underlying aquifer. However, capping of site with impermeable paving and building and associated drainage infrastructure will provide additional protection following construction.

12.89 With consideration of the embedded mitigation measures outlined predicted impacts on the hydrogeological environment from accidental spills and leaks would be unlikely to occur during the demolition and construction stage (low magnitude). Effects would be temporary to short-term, **Imperceptible/Not Significant Negative** i.e., **Not Significant** in EIA terms.

Loss of agricultural land

12.90 There would be local loss of approximately 2.30 Ha of agricultural soil within the site as a result of the proposed development; however, the area of development is small in the context of the overall agricultural land available in the region. Furthermore, the site has been zoned under Objective EE of the SDCC Development Plan 2016-2022 to provide for enterprise and employment uses.

12.91 There would be no impact to mineral resources (such as sands and gravels / or quarried stone) in the area as a result of the proposed development.

12.92 As such effects would be permanent and **Imperceptible Negative** i.e., **Not Significant** in EIA terms.

Operation Effects

Embedded Mitigation

Environmental procedures & Fuel Storage

12.93 As detailed in Chapter 4: Description of Development, the Applicant would implement an Environmental Safety and Health Management System for the proposed development. Prior to operation of the proposed development, a comprehensive set of operational procedures would be established which will include site-specific mitigation measures and emergency response measures.

12.94 The primary potential impact relates to a failure or accidental spill of diesel fuel which is stored and used on-site for back-up power generation.

12.95 In order to minimise any impact on the underlying subsurface strata from material spillages, the fuel storage tank is located above ground in designated fuel storage bund with an impervious base. One 40,000 litre bunded tank will be provided next to the data centre. The tank will be bunded to volume of 110 % of the capacity of the tank within the bund (plus an allowance of 30 mm for infiltration). Drainage from the bunds is be diverted for collection and safe disposal. Fuel delivery to the bulk storage tank would take place within designated bunded unloading area. Diesel would be piped from the bulk storage tank to belly tank at the back-up generator unit. The belly tank would be double skinned. Delivery of fuel will be undertaken following a documented procedure which minimises risk of spills and spill containment or clean-up kit shall be readily available on-site. It is anticipated, based on the Applicant's experience, that the back-up generator would rarely be used.

Operational Activities

12.96 Reasonably foreseeable activities or factors during the operational stage which could affect or be affected by the ground are as follows:

- Periodic maintenance which could involve small scale excavations;
- Areas of soft landscaping and planting; and
- Drainage and storm water attenuation.

12.97 These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined below.

12.98 With consideration of the embedded mitigation measures outlined above predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the operation stage (low magnitude). Effects would be long term to permanent, **Imperceptible** to **Imperceptible / Not Significant Negative**, and **Not Significant** in EIA terms.

Accidental spills and leaks

12.99 During the operational stage there is a potential for leaks and spillages from the fuel storage (bulk storage and local storage at the back-up generators) to occur on-site. In addition, there is a potential for leaks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental spillages and leaks of oil, petrol or diesel could cause soil/groundwater contamination if the spillages and leaks are unmitigated.

12.100 In the event of an on-site fire, firewater would also need to be contained or it may contaminate soils and/or groundwater.

12.101 With consideration of the embedded mitigation measures outlined above predicted impacts on the hydrogeological environment would be unlikely to occur during the operation stage (low magnitude). Effects would be long term to permanent, **Imperceptible / Not Significant Negative**, and **Not Significant** in EIA terms.

Additional Mitigation

12.102 No additional mitigation measures are proposed.

Enhancement Measures

12.103 No enhancement measures are proposed.

Assessment of Residual Effects

Demolition and Construction Residual Effects

12.104 The residual demolition and construction effects remain as reported in the assessment of effects section:

- Temporary Imperceptible to Imperceptible/Not Significant effect from groundworks.
- Temporary **Imperceptible/Not Significant** effect from accidental spills/leaks.
- Permanent **Imperceptible** effects from loss of agricultural land.

Operation Residual Effects

12.105 The residual operation stage effects remain as reported in the assessment of effects section:

- Permanent, **Imperceptible** to **Imperceptible/Not Significant** effects associated with general operation activities such as periodic maintenance including with areas of soft landscaping and planting and use of the site's drainage network.
- Permanent, **Imperceptible/Not Significant** effects associated with accidental spills and leaks.

Summary of Residual Effects

12.106 Table 12-5 provides a summary of the outcomes of the ground conditions assessment of the proposed development. Where **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 12-5: Summary of Residual Ground Conditions Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
Demolition and Construction								
Construction workers	Impact to human health from exposure to contaminated soils / dust / ground gases / water during enabling and construction works.	None required	Imperceptible	-	U	D	IR	T
Adjacent site users	Impact to human health from exposure to contaminated dust during enabling and construction works.	None required	Imperceptible	-	U	I	IR	T
Water environment (Baldonnel Stream)	Increased potential for leaching of contaminants from soils and mobilisation of contamination in surface water and groundwater during earthworks and foundation works. Also, contaminants introduced to surface water by construction activities through leakages/spillages.	None required	Imperceptible/not significant	-	U	D	IR	T
Groundwater beneath the site (aquifers)		None required	Imperceptible/not significant	-	U	D	IR	T
Agricultural Land	Loss of agricultural land	None required	Imperceptible	-	U	D	IR	P
Operation								
Adjacent site users	Impact to human health from exposure to residual contaminated soils / dust / ground gases / water.	None required	Imperceptible	-	U	I	IR	Lt to P
Future site users		None required	Imperceptible	-	U	D	IR	Lt to P
Water environment (Baldonnel Stream)	Contaminants released by operation activities through leakages/spillages.	None required	Imperceptible/not significant	-	U	D	IR	Lt to P
Groundwater beneath the site (aquifers)		None required	Imperceptible/not significant	-	U	D	IR	Lt to P

Notes:
* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;
L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.
** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

12.107 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Intra-Cumulative Effects.

Inter-Project Effects

12.108 Table 12-6 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 12-6: Inter-Project Cumulative Effects

Cumulative Schemes	Demolition and Construction & Operation	
	Cumulative Effects Likely?	Reason
SD20A/0283 Microsoft, Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22	No	Cumulative effects are unlikely as each site would be mitigated through an appropriate staged approach to contaminated land assessment and ground investigation as required under EPA (2013) guidance, *Guidance on the*

Table 12-6: Inter-Project Cumulative Effects

Cumulative Schemes	Demolition and Construction & Operation	
	Cumulative Effects Likely?	Reason
VA06S.308585 SD20A/0121 UBC Properties, townlands within Grange Castle Business Park, Baldonnel, Dublin 22 308585 UBC Properties - Grange Castle South Business Park, Dublin 22 SD17A/0377 Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 SD18A/0134 Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 SD20A/0295 (amendment to SD18A/0134) Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 VA06S.309146 Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 SD21A/0167 Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 SD21A/0186 Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD22A/0156 amendment to SD21A/0186) SD21A/0217 Digital Netherlands VIII B.V -		*Management of Contaminated Land and Groundwater at EPA Licensed Sites*. Cumulative effects are unlikely from other operational sites nearby as each site would have spill response procedures and will have been subject to contaminated land assessment and ground investigation as required under EPA (2013) guidance. Similarly, each development site would have embedded mitigation through their site specific contaminated land management procedures documented in the site environmental management systems.

Table 12-6: Inter-Project Cumulative Effects

Cumulative Schemes	Demolition and Construction & Operation	
	Cumulative Effects Likely?	Reason
Profile Park, Nangor Road, Clondalkin, Dublin 22 312793 Vantage Data Centers Dub 11 Limited - Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22		

Demolition and Construction Cumulative Effects

12.109 Cumulative effects from other developments nearby are unlikely as each development site would be mitigated through an appropriate staged approach to contaminated land assessment and ground investigation as required under EPA (2013) guidance, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. Similarly, each development site would have embedded mitigation through their site-specific contaminated land management procedures documented in the site CEMP.

Operation Cumulative Effects

12.110 Cumulative effects from other operational sites nearby are unlikely as each site would have spill response procedures to manage storage and use of potential polluting fuels and chemicals and will have been subject to contaminated land assessment and ground investigation as required under EPA (2013) guidance, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. Similarly, each development site would have embedded mitigation through their site-specific contaminated land management procedures documented in the site environmental management systems.

Summary of Assessment

Background

12.111 This chapter has detailed the potential ground condition effects due to the demolition and construction and operational stages of the Proposed Development. The assessment of effects has been undertaken using the relevant national and local guidance and regulations.

12.112 Baseline assessment has been made using, publicly available information supplemented by a ground investigation assessing soil quality. The assessment of the baseline information and ground investigation results indicate that:

- The site has been predominantly greenfield and agricultural use historically. There is no evidence of any historical waste disposal or source of contamination within the site itself.
- The site is underlain by the Lucan formation comprising dark grey to black limestone and shale from the Carboniferous Age.
- The site is underlain by a locally important aquifer with the Baldonnel Stream running through the southern area of the site.
- Very low levels of soil contamination were recorded typical of a greenfield site at concentrations that do not present a significant risk to potential receptors.

12.113 Overall, the results of the baseline assessment identified no significant sources of ground contamination in soils.

Demolition and Construction Effects

12.114 The proposed development would involve groundworks, which would have an interaction with the on-site soils and water environment.

12.115A The activities that could affect the ground, are:

- Formation of landscape bunds, SUDs / attenuation ponds and improvements to the Baldonnel Stream;
- Re-use of excavated material within construction works where possible in order to minimise off-site material movements, including excavated soils, roads and demolition materials;
- Excavations for foundations (including building foundations and piled foundations for the bridge structure which will cross the attenuation pond and the Baldonnel Stream), drainage works or services (standard open trenching techniques would be used for excavations) and any dewatering of excavations (if required);
- Movement of plant and machinery within the proposed development and to/from the compound;
- Wheel washing facilities would be provided during the demolition and construction stage for plant and vehicles; and
- Vehicles moving across soils within the site.

12.116 With consideration of the embedded mitigation measures outlined above, predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the demolition and construction stage. Effects would be temporary, Imperceptible to Imperceptible/Not Significant i.e., not significant in EIA terms.

12.117 Also, during the construction, there is a risk of accidental pollution incidences from the following sources:

- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on site; and
- run-off from concrete and cement during pad foundation construction.

12.118 Again, with consideration of the embedded mitigation measures outlined predicted impacts on the hydrogeological environment from accidental spills and leaks would be unlikely to occur during the demolition and construction stage. Effects would be Imperceptible/Not Significant Negative i.e., not significant in EIA terms.

12.119 Overall, it is considered that the demolition of the existing site and construction of the proposed development would result in a temporary and Imperceptible/Not Significant effect on the ground conditions and identified receptors, and as such **would not give rise to significant effects**.

Operational Effects

12.120 During the operational stage there is a potential for leaks and spillages from the fuel storage (bulk storage and local storage at the back-up generators) to occur on-site. In addition, there is a potential for leaks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental spillages and leaks of oil, petrol or diesel could cause soil/groundwater contamination if the spillages and leaks are unmitigated.

12.121 With consideration of the embedded mitigation measures predicted impacts on the hydrogeological environment would be unlikely to occur during the operation stage. Effects would be permanent, Imperceptible to Imperceptible/Not Significant i.e., not significant in EIA terms.

12.122 Reasonably foreseeable activities or factors during the operational stage which could affect or be affected by the ground are as follows:

- Periodic maintenance which could involve small scale excavations;
- Areas of soft landscaping and planting; and
- Drainage and storm water attenuation.

12.123 With consideration of the embedded mitigation measures predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the operation stage. Effects would be permanent, Imperceptible/Not Significant i.e., not significant in EIA terms.

12.124 Overall, it is considered that the operation of the proposed development would result in an imperceptible/Not Significant effect on the ground conditions and identified receptors, and as such **would not give rise to significant effects**.

Cumulative Effects

12.125 **No significant effects** are predicted on the ground conditions as a result of the proposed development alone in either the demolition and construction or the operation stage so there is no potential for cumulative effects.

13 CLIMATE CHANGE

Introduction

13.1 This chapter of the EIAR reports on the likely significant Climate Change effects to arise from the demolition and construction stage, and the operation stage of the proposed development.

13.2 The chapter describes the climate change policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely climate change effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

13.3 There are no technical appendices associated with this chapter.

13.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - The Paris Agreement, which builds upon the United National Framework Convention on Climate Change (UNFCC)[1];
  - Kyoto Protocol of the UNFCCC[2];
  - European Union (EU) Nationally Determined Contribution (INDCs)[3] under the UNFCCC;
  - European Union Emission Trading Scheme (2015)[4];
- National Legislation and Policy:
  - The Climate Action and Low Carbon Development Act 2015 (Amendment Bill 2021)[5];
  - Government of Ireland National Mitigation Plan (2017)[6];
  - Government of Ireland Climate Action Plan (2021)[7];
  - Climate Action and Low Carbon Development (Amendment) Act 2021[8];
- Regional Policy:
  - Eastern and Midland Regional Assembly Corporate Plan 2019-2024[9];
  - Eastern and Midland Regional Assembly Regional Spatial & Economic Strategy[10];
- Local Policy:
  - South Dublin County Council (SDCC) Climate Change Action Plan 2019-2024[11];
  - SDCC 2020 - 2024 Corporate Plan, Theme 4 Environment, water and climate change, Objective 1: Create a sustainable low carbon and climate-resilient county[12];
  - South Dublin County Council Development Plan 2022-2028 (2022)[13]
- Guidance and Industry Standards:
  - Institute of Environmental Management and Assessment (IEMA), Environmental Impact Assessment: Guide to assessing GHG emissions and evaluating their significance 2nd edition (2022)[14];
  - IEMA's Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (2020)[15];
  - Environmental Protection Agency research, National Risk Assessment of Impacts of Climate Change: Bridging the Gap to Adaptation Action (2016)[16];
  - Ireland's Climate Change Advisory council report (2018)[17];
  - EPA's Guidelines on the information to be contained in Environment Impact Assessment Reports (2022)[18];
  - PAS 2080:2016 Carbon management in infrastructure[19]; and
  - RICS Guidance Whole life carbon assessment for the built environment (2017)[20].

Assessment Scope

13.5 There is currently no specific climate change assessment guidance in Ireland and therefore, this chapter provides a preliminary assessment of the potential climate impacts and effects from the demolition and construction, and operation stages of the proposed development, following the methodology set out in IEMA's aforementioned guidances[14][15]. However, terminology regarding the scale of impacts has been altered to reflect that set out in the Environmental Protection Agency's (EPA) Guidelines[18] on the information to be contained in Environment Impact Assessment Reports.

13.6 The technical scope of the assessment has considered the following:

- Climate Change Resilience (CCR);
- In-combination climate impacts (ICCI); and
- GHG emissions.

13.7 This chapter presents the proposed development's demolition, construction and operational stages' sources of GHG emissions. GHG emissions have been measured in carbon dioxide equivalent emissions (CO_2e),

[1] UNFCCC, 2015, Paris Agreement. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement [Accessed 12/04/2021].

[2] UNFCCC, 1998, Kyoto Agreement. Available at https://unfccc.int/kyoto_protocol. [Accessed 25/08/2022]

[3] UNFCCC, 2016. NDC User Guide. Available at: https://unfccc.int/files/focus/indc_portal/application/pdf/ndc_parties_userguide_version_1__may_2016_(2).pdf [Accessed 25/08/2022].

[4] EU Emissions Trading System (EU ETS). Available at: https://ec.europa.eu/clima/policies/ets_en [Accessed 25/08/2022].

[5] Climate Action and Low Carbon Development (Amendment) Bill 2021. Available at: https://www.gov.ie/en/publication/984d2-climate-action-and-low-carbon-development-amendment-bill-2020/ [Accessed 25/08/2022].

[6] Department of Communications, Climate Action & Environment. National Mitigation Plan (2017). Available at: https://www.climatecaseireland.ie/wp-content/uploads/2018/04/National-Mitigation-Plan-2017.pdf [Accessed 25/08/2022].

[7] Government of Ireland. Climate Action Plan (2021). Available at https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/ [Accessed 25/08/2022].

[8] Climate Action and Low Carbon Development (Amendment) Act 2021. Available at: Climate Action and Low Carbon Development (Amendment) Act 2021 (irishstatutebook.ie) [Accessed 25/08/22].

[9] Eastern and Midland Regional Assembly. Corporate Plan 2019-2024 (2019). Available at: https://emra.ie/dubh/wp-content/uploads/2020/11/EMRA_CorpPlan19-24-final.pdf [Accessed 22/08/2022].

[10] Eastern and Midland Regional Assembly. Regional Spatial & Economic Strategy (2017). Available at: https://emra.ie/dubh/wp-content/uploads/2017/11/EMRA_IssuesPaper_Nov17.pdf [Accessed 22/08/2022].

[11] SDCC, 2019. South Dublin Climate Change Action Plan (CCAP) 2019-2024 [online]. Available at: SDCC's Climate Change Action Plan - SDCC [Accessed 25/08/2022].

[12] SDCC, 2020. Corporate Plan (2020) [online]. Available at: https://www.sdcc.ie/en/services/our-council/policies-and-plans/corporate-plan/ [Accessed 25/08/2022].

[13] SDCC, 2022. South Dublin County Council Development Plan 2022-2028 [online]. Available at: https://www.sdcc.ie/en/devplan2022/adopted-plan/county-development-plan-written-statement/county-development-plan-written-statement.pdf [Accessed on 25/08/2022].

[14] IEMA, 2022. Institute of Environmental Management & Assessment (IEMA) Guide to Assessing GHG Emissions and Evaluating Their Significance 2nd Edition. Lincoln. IEMA.. Available at: https://web.iema.net/iemanet-ay0iq/pages/edmcwxrjeeyjqwanoi1neg.html?PageId=c102d3116374ec118943000d3a2d6712 [Accessed 25/08/2022].

[15] IEMA, 2020, Climate Change Resilience and Adaptation. Available at: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020 [Accessed 25/08/2022].

[16] EPA Research. (2016). National Risk Assessment of Impacts of Climate Change: Bridging the Gap to Adaptation Action Available at: https://www.epa.ie/publications/research/climate-change/Research_Report_346.pdf [Accessed 25/08/2022].

[17] Climate Change Advisory Council. 2018. Annual Review 2018. Available at: https://www.climatecaseireland.ie/wp-content/uploads/2019/03/CCAC_AnnualReview2018.pdf [Accessed 30/09/2022].

[18] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR). Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf [Accessed 22/08/2022].

[19] BSi, 2016, PAS2080 Carbon management in infrastructure. Available at: https://shop.bsigroup.com/ProductDetail?pid=000000000030323493 [Accessed 25/08/2022].

[20] RICS., 2017., Whole life carbon assessment for the built environment. Available at: https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf [Accessed 22/08/2022].

which is a measure used to compare the emissions from various GHGs based upon their global warming potential.

13.8 Table 13-1 presents the GHG emissions assessment boundaries.

Table 13-1: GHG Emissions Assessment Boundaries

Item	Description	Input Data	Emissions Factors*
Demolition and Construction Stage			
Embodied GHG emissions	Embodied GHG emissions which are emitted during the manufacture, transport and construction of materials used in the construction works.	Estimated quantities construction materials	University of Bath Inventory of Carbon and Energy[21] and Average embodied carbon GHG emissions associated to PV from IEA (2015)[22], Ecoinvent V3[23] and M. Ito (2011)[24]
Waste disposal GHG emissions	GHG emissions associated with the disposal of waste from construction, demolition, and excavation (CDE) works.	Estimated volumes of waste arisings and demolition material	UK Government GHG Emissions Factors[25]
On-site GHG emissions	GHG emissions associated with on-site energy requirements during demolition and construction works (e.g. electricity and water consumption).	Estimated energy consumption associated with the demolition and construction works	UK Government GHG Emissions Factors[25]
Transport GHG emissions	GHG emissions associated with vehicles travelling to and from the proposed development.	Distances travelled by construction vehicles	UK Emissions Factors Toolkit (EFT) v11[26]
Operation Stage			
Operational energy demand	GHG emissions associated with the operation of the proposed development (emergency back-up generators)	Kilowatt hours (kWh) of energy and fuel consumption	UK Government GHG Emissions Factors[25]
Operational GHG emissions associated to traffic	GHG emissions associated with the operation of the proposed development (traffic)	Annual average daily traffic (AADT)	UK Emissions EFT v11[26]
Replacement	Replacement of solar photo-voltaic (PV) panels at the end of their design life (25 years) to cover for the assumed design life (60 years) of the proposed development.	PV panel kWp	Average embodied carbon GHG emissions associated to PV from IEA (2015)[27], Ecoinvent V3[28] and M. Ito (2011)[29]

* UK Government emissions factors have been used as there is no Irish Government equivalent available.

Technical Scope

CCR and ICCI

13.9 The assessment of the potential impacts and likely effects of the proposed development on climate has considered the following:

- Vulnerability of the proposed development to extreme weather and projected climate change; and
- The additive impact that climate and climate change may have on impacts identified by other environmental topics as a result of the proposed development, now and in future years.

GHG Emissions

13.10 The assessment of GHG emissions, associated to demolition, construction, and operational activities, has considered the following emissions sources:

- GHG emissions resulting from the demolition and construction stage, such as primary extraction, manufacturing and transportation of materials and other demolition and construction processes associated with the proposed development; and
- GHG emissions resulting from the operation stage of the proposed development.

13.11 Sources of GHG emissions during the demolition and construction stage include:

- GHG emissions associated with the required raw materials, including raw material supply, transport, and manufacture; and
- GHG emissions associated with construction processes, including transport to/from works sites and construction/installation processes.

13.12 Sources of potential GHG emissions during the operation stage include:

- GHG emissions associated with the powering of the data center; and
- Transport of workers to and from the site.

Spatial Scope

CCR and ICCI

13.13 The study area for the CCR and ICCI assessments comprised the demolition and construction footprint of the proposed development, including compounds and temporary land take (i.e. the site).

GHG Emissions

13.14 For the assessment of GHG emissions associated with the demolition and construction stage, the study area has taken account of GHG emissions associated with extraction, processing, and transport of materials from outside of the site (red line) boundary alongside site-based emissions that result from construction activities within the site (red line) boundary.

[21] University of Bath Inventory of Carbon and Energy (ICE) Version 2.0. Available at: http://www.circularecology.com/embodied-energy-and-carbon-footprint-database.html#.XPaGoFWWyUk [Accessed 25/08/2022]

[22] International Energy Agency. 2022. Technology Collaboration Programme. Available at: https://iea-pvps.org/?id=314&eID=dam_frontend_push&docID=2391 [Accessed 30/09/2022].

[23] EcoInvent. 2022. Available at: https://ecoinvent.org/ [Accessed 30/09/2022].

[24] M.Ito. 2011. Life Cycle Assessment of PV systems. Available at: https://www.intechopen.com/chapters/17733 [Accessed 30/09/2022].

[25] UK Government conversion factors for company reporting of greenhouse gas emissions. 2021. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021 [Accessed on 25/08/2022]

[26] UK Emissions Factors Toolkit (EFT) v11. Available at: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html [Accessed on 25/08/2022].

[27] International Energy Agency. 2022. Technology Collaboration Programme. Available at: https://iea-pvps.org/?id=314&eID=dam_frontend_push&docID=2391 [Accessed 30/09/2022].

[28] EcoInvent. 2022. Available at: https://ecoinvent.org/ [Accessed 30/09/2022].

[29] M.Ito. 2011. Life Cycle Assessment of PV systems. Available at: https://www.intechopen.com/chapters/17733 [Accessed 30/09/2022].

13.15 The study area for GHG emissions associated with operation energy consumption of the proposed development comprised the site (redline) boundary. The study area for operation stage GHG transport emissions was consistent with the area selected for the proposed development's traffic model. This area is described in the study area section of Chapter 8: Air quality of this EIAR Volume. Emissions that result from maintenance and repair activities arise from outside of the site (red line) boundary.

Temporal Scope

13.16 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (less than one year), and from the operational stage, which would be expected to be long-term (15 to 60 years) in nature.

13.17 The assessment of the proposed development has been undertaken in line with the information provided in Chapter 5: Construction Description of this EIAR Volume. The works are anticipated to be undertaken over a 11-month period, with a completion targeted of Q4 2024. The indicative start of operation is 2025 and the estimated design life of the proposed development is 60 years[30]. There is no phasing during the construction of the Proposed Development.

13.18 For the operation stage climate assessment, consideration has been given to the modelling scenarios outlined in Chapter 2: EIA Process and Methodology. Three scenarios have been proposed as the proposed development would be powered via the EirGrid connection through the wider DUB-1 campus or powered by the consented Multifuel Generation Plant (MFGP) on the DUB-1 campus. The MFGP has been designed to include the proposed development and no change in capacity will be required to power the proposed development. The proposed development would not result in an increase in the MFGP emissions, which have previously been assessed and reported within the DUB-1 EIAR. The proposed development does not create any additional MFGP emissions that have not already been assessed and permitted, and therefore no assessment of the MFGP emissions have been carried out in this EIAR.

13.19 From a climate perspective, Chapter 2: EIA Process and Methodology proposed scenario 1 and scenario 2 would not generate additional GHG emissions that have not already been assessed and permitted and have therefore been scoped out of this assessment. Only the Emergency scenario (Scenario 3) listed in Chapter 2: EIA Process and Methodology, has been assessed for the proposed development.

13.20 The proposed development is an extension to the July 2022 DUB-1 permitted development and would operate as part the wider data center campus. As per Chapter 2: EIA Process and Methodology, the future baseline includes the operation of the July 2022 DUB-1 permitted development reported within the DUB-1 EIAR. The proposed development operation future baseline has been assumed to be 2025, which is the projected year when the proposed development would become operational and is also when the July 2022 DUB-1 permitted development would become fully operational with the MFGP powered by gas.

Baseline Characterisation Method

Desk Study

13.21 In order to establish the existing climate change baseline within the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- Met Éireann, Dublin Airport 1981-2010 Averages[31];
- Met Éireann, A Summary of Climate Averages for Ireland 1981-2010[32];
- EPA, 2019 GHG Emissions Projections Report for 2018-2040 Field Study (2020)[33]; and
- Met Éireann, Irelands Climate: The Road Ahead (2013)[34].

Field Study

13.22 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

Assessment Method

Methodology

Demolition and Construction Stage and Operation Stage

CCR and ICCI

13.23 The CCR assessment has assessed the vulnerabilities of the proposed development to climate change during the demolition and construction and operation stages of the proposed development. The ICCI assessment has evaluated the potential additive impact that climate change may have on receptors identified by other environmental topics. Professional judgement has been used to assess whether projected climate change could increase the magnitude of the effects as identified by the disciplines, change the sensitivity of the receptors, or reduce the effectiveness of embedded mitigation measures. In line with IEMA guidance[15], qualitative assessments have been undertaken for the CCR and ICCI assessments by:

- Identifying sensitive receptors;
- Analysing the current and future climate in the study area using data from the EPA and Met Éireann and assessing projected changes on climate variables;
- Summary of embedded design and mitigation measures to improve resilience to extreme weather;
- Assessing the likelihood and consequence of the climate impact on the proposed development to determine the significance; and
- Identifying mitigation and adaptation measures for any significant effects, in liaison with the proposed development's design team and relevant environmental discipline specialists.

GHG Emissions

13.24 The goal of the GHG emissions assessment is to estimate the emissions that would be generated or avoided by the proposed development, within the redline boundary during the demolition and construction and operation stages. The GHG assessment considers emissions associated to buildings/structures within the site. The GHG emissions associated with the July 2022 DUB-1 permitted development have been previously assessed and are reported on within the DUB-1 EIAR. Therefore, the GHG assessment of the proposed development has given regard to the GHG emissions from the July 2022 DUB-1 permitted development qualitatively as part of the future baseline within the assessment of effects and a quantitative assessment has not been undertaken. A quantitative assessment for the proposed development has been undertaken. Therefore, this chapter has:

- Estimated GHG emissions associated to the proposed development for the relevant scenarios: 'Do-Something' (i.e. with the proposed development (quantitative) and assuming the July 2022 DUB-1 permitted development has been implemented (qualitative)) and 'Do-Nothing' (i.e. no proposed development but assuming the July 2022 DUB-1 permitted development has been implemented (qualitative));
- Enabled comparison of the 'Do-Something' scenario against the 'Do-Nothing scenario'; and

[30] For the purposes of the GHG emissions assessment and in line with the reference study period specified in the RICS guidance, which is based on the principles outlined in EN 15978, a 60-years design life has been assumed for the proposed development.
[31] Met Éireann. Dublin Airport 1981-2010 Averages (2022). Available at: https://www.met.ie/climate-ireland/1981-2010/dublin.html [Accessed on 25/08/2022].
[32] Met Éireann. A Summary of Climate Averages for Ireland 1981-2010 (2012). Available at: https://www.met.ie/climate-ireland/SummaryClimAvgs.pdf [Accessed on 25/08/2022].
[33] EPA, 2020. 2019 GHG Emissions Projections Report for 2018-2040 Field Study. Available at: https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Irelands-Greenhouse-Gas-Emissions-Projections-report-2020-2040v2.pdf [Accessed 25/08/2022].
[34] Met Éireann. Irelands Climate: the road Ahead (2013). Available at: http://edepositireland.ie/handle/2262/71304 [Accessed on 25/08/2022].

- Enabled identification of emissions hot spots within the 'Do-Something' scenario to inform identification and prioritisation of mitigation measures.

13.25 The 'Do-Nothing' scenario includes an assessment of 'Business as usual', and therefore considers GHG emissions associated to buildings/ structures within the site. In this case this includes an approximately sized 305m^2 residential building (quantitative), as well as the July 2022 DUB-1 permitted development (qualitative).

13.26 As outlined in the 'Temporal Scope' section, the 'Do Something' assessment has assessed 'Scenario 3' the Emergency Scenario only. Therefore, this chapter has:

- Estimated GHG emissions associated with the 13 diesel powered back-up generators;
- Estimated GHG emissions associated to the proposed development's additional traffic, using; and
- Estimated GHG emissions associated with the replacement of PV panels at the end of their design life (25 years).

13.27 Furthermore, the IEMA guidance indicates that it is appropriate to contextualise emissions[14]. Therefore, the estimated GHG emissions associated with the proposed development have been compared to the carbon budgets for Ireland to provide a national context. The proposed carbon budgets are listed as follows:

- Carbon Budget 1 (2021-2025)- 295 Mt CO_2e;
- Carbon Budget 2 (2026-2030)- 200 Mt CO_2e; and
- Carbon Budget 3 (2031-2035)- 151 Mt CO_2e.

13.28 Demolition and Construction GHG emissions: Carbon has been assessed based on information provided by the design team and information from similar projects, including the use of products or materials, construction transport, construction plant and construction waste;

13.29 Demolition and construction and operation activities have been broken down into a product's life cycle stages as specified in PAS2080[18].

13.30 End of life or decommissioning impacts have not been considered due to the long design life of the proposed development and given that emissions associated with end of life are commonly relatively small.

GHG emissions in each scenario have been compared to assess the contribution of the proposed development to climate change. Values are reported in MtCO_2e. This measure considers the six Kyoto Protocol gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). This calculation normalises the global warming potential of the main GHG into one measure, based on the global warming potential of CO_2e.

Cumulative Stage

CCR

13.31 The climate resilience effects resulting from the demolition and construction and operation stages would be limited in their spatial extent to the site boundary and the proposed development in isolation. Therefore, cumulative climate change resilience effects with other schemes would not be considered.

ICCI

13.32 The in-combination climate impacts resulting from the demolition and construction and operation stages would be limited in their spatial extent to the relevant technical assessments in the EIAR for the proposed development. Therefore, cumulative effects would not be considered for each technical discipline as opposed to in-combination with cumulative schemes.

GHG Emissions

13.33 GHG emissions contribute cumulatively, with all sources globally, to cause climate change. In line with IEMA guidance[14], the assessment would only consider GHG emissions in the context of those in local area and the UK.

Assessment Criteria

13.34 The assessment of significance of effect with regards to climate change is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

13.35 The general criteria used to assess if an effect is significant or not, is set out in Table 13-7 and Table 13-8. This is determined by consideration of the sensitivity of the receptor, probability of the impact and consequence of the impact for CCR and ICCI. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement

Receptor Sensitivity/Value Criteria

CCR

13.36 In line with IEMA guidance[15], the sensitivity of receptors to potential climate change impacts have been considered. In determining the sensitivity of receptors, the following factors have been considered as well as the value or importance of the receptor:

- Susceptibility of the receptor (e. g. ability to be affected by a change); and
- Vulnerability of the receptor (e. g. potential exposure to a change).

13.37 The susceptibility of the receptors has been classified as low, moderate or high in accordance with the criteria set out in Table 13.4.

Table 13-4: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	Climatic factors have little influence on the receptors (consider whether it is justifiable to assess such receptors further within the context of EIAR – i.e. it is likely that such issues should have been excluded through the EIAR scoping process).
Medium	Receptor has some limited ability to withstand/not be altered by the projected changes to the existing/prevailing climatic conditions (e.g. retain elements of its original function and form).
High	Receptor has no ability to withstand/not be substantially altered by the projected changes to the existing/prevailing climatic factors (e.g. lose much of its original function and form).

13.38 The vulnerability of a receptor can be defined on a scale from low to high in accordance with the criteria set out in Table 13-5.

Table 13-4: Receptor Vulnerability Criteria

Vulnerability	Criteria
Low	Climatic factors have little influence on the receptors (consider whether it is justifiable to assess such receptors further within the context of EIAR – i.e. it is likely that such issues should have been excluded through the EIAR scoping process).
Medium	Receptor is dependent on some climatic factors but able to tolerate a range of conditions (e.g. a species which has a wide geographic range across the entire UK but is not found in southern Spain);
High	Receptor is directly dependent on existing/prevailing climatic factors and reliant on these specific existing climate conditions continuing in future (e.g. river flows and groundwater level) or only able to tolerate a very limited variation in climate conditions);

ICCI

13.39 The ICCI assessment focuses on the potential for climate change to exacerbate the effects on receptors identified by individual environmental disciplines. For this reason, the sensitivity of the receptors is considered the same as that specified by the individual environmental assessments in the EIAR.

GHG Emissions

13.40 GHG emissions associated within the proposed development would be released to the global atmosphere. Therefore, the global atmosphere is considered to be the receptor and is considered to be of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within this assessment.

Impact Magnitude Criteria

CCR

13.41 The magnitude of impact has been assessed using professional judgement as a combination of both the probability (likelihood) of the impact and the consequence of the impact.

13.42 In line with IEMA guidance[15], the probability of the impact refers to the likelihood of a climate impact occurring and having an impact on the proposed development, over its lifespan. This includes consideration of embedded mitigation measures within the design. The probability of the impact is classified as unlikely, possible (as likely as not) and likely in accordance with the criteria set out in Table 13-5.

Table 13-5: Probability of Impact Criteria

Likelihood level	Criteria
Unlikely	The climate impact is not anticipated to occur during the lifetime of the proposed development (60 years).
Possible (as likely as not)	The climate impact may occur a limited number of times during the lifetime of the proposed development (60 years).
Likely	The climate impact may occur multiple times during the lifetime of the proposed development (60 years).

13.43 In line with IEMA guidance[15], consequence of the impact occurring considers the geographical extent of the effect or the number of receptors affected (e.g., scale), the complexity of the effect, degree of harm to those affected and the duration, frequency, and reversibility of effect. The consequence of the impact is classified as very low, low, medium, high, and very high in accordance with criteria set out in Table 13-6.

Table 13-6: Consequence of the Impact Criteria

Consequence Level	Health and Safety	Disruption to Construction/ Operation	Cost
Very High	Multiple fatalities	Site-wide disruption lasting more than one week	>10 % of the proposed development construction value
High	Single fatality / multiple long-term injuries	Site-wide disruption lasting more than one day but less than one week	8-10 % of the proposed development construction value
Medium	Long-term injury or illness, prolonged hospitalisation, or inability to work	Partial disruption across elements of the site / proposed development lasting more than one day but less than one week	4–8 % of the proposed development construction value
Low	Lost time injury or medical treatment required, short-term impact on persons affected	Partial disruption across elements of the site / proposed development lasting less than a day	1–3 % of the proposed development construction value
Very Low	Minor harm or near miss	Disruption to an isolated section of the site / proposed development lasting less than a day	<1 % of the proposed development construction value

13.44 The magnitude of climate change impacts have been assessed on the basis of the likelihood of impact and consequence as presented in matrix shown in Table 13-7.

Table 13-7: CCR Magnitude Criteria

Consequence Level	Probability/Likelihood of Impact		
	Unlikely	Possible	Likely
Very High	Medium	High	High
High	Medium	High	High
Medium	Low	Medium	High
Low	Low	Low	Medium
Very Low	Low	Low	Medium

ICCI

13.45 In line with the IEMA guidance, the ICCI assessment has been completed based on the likely environmental effects as identified and defined by the individual environmental assessments in the ES. Additional mitigation has been identified to address the potential for climate change to exacerbate these environmental effects.

GHG Emissions

13.46 In line with IEMA guidance[14], it should be noted that the crux of significance for the GHG assessment is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Contextualisation of the carbon footprint of a scheme determines whether or not it supports or undermines the trajectory towards net zero. Therefore, the total GHG emissions associated with the proposed development have been compared to the carbon budget for Ireland. Additional mitigation has been identified to reduce GHG emissions where necessary.

Scale of Effect Criteria

CCR and ICCI

13.47 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 13-7.

Table 13-8: CCR Scale of Effect Criteria

Magnitude	Value/Sensitivity		
	Unlikely	Possible	Likely
High	Slight to Moderate	Very Significant to Profound	Profound

Table 13-8: CCR Scale of Effect Criteria			
Medium	Imperceptible to Not Significant	Slight to Moderate	Very Significant to Profound
Low	Imperceptible	Imperceptible to Not Significant	Slight to Moderate

13.48 Based on EPA Guidelines on the information to be contained in Environment Impact Assessment Reports[18] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

GHG Emissions

13.49 In line with the updated IEMA guidance[15], the scale of effects for the GHG assessment has been described in Table 13-9 below. However, the terms have been altered to reflect the Environmental Protection Agency's (EPA) guidance[18].

Table 13-9: Greenhouse Gas Scale of Effect Criteria	
Scale	**Description**
Negative Effect	
Very Significant/ Profound	The proposed development's GHG emission impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing SDCC and Ireland's policy for projects of this type. The proposed development is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Significant	The proposed development's GHG emissions impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with SDCC and Ireland's policy goals for projects of this type. The proposed development falls short of fully contributing to the UK's trajectory towards net zero.
Non-Significant/ Slight/ Moderate	The proposed development's GHG emissions impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. The proposed development is fully in line with measures necessary to achieve Ireland's trajectory towards net zero.
Imperceptible Effect	
The proposed development's GHG emissions impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. The proposed development provides GHG emissions performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.	
Positive Effect	
The proposed development's net GHG emissions impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-proposed development baseline. The proposed development substantially exceeds net zero requirements with a positive climate impact.	

Nature of Effect Criteria

CCR and ICCI

13.50 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

GHG Emissions

13.51 In line with the EPA guidance[18], the nature of effects for the GHG assessment has been described as either negative, neutral or positive, as follows.

- Negative – when the project follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the Ireland's net zero trajectory or follows accepted aligned practice or area-based transition targets. Similarly, a project that is compatible with the budgeted, science-based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that can also be considered to have an adverse effect.
- Imperceptible – when the project achieves emissions mitigation that goes substantially beyond the Ireland's GHG reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory and has minimal residual emissions.
- Positive – the project's net GHG emissions impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-proposed development baseline. The proposed development substantially exceeds net zero requirements with a positive climate impact.

Assumptions and Limitations

CCR and ICCI

13.52 The assessments have relied on data provided by Met Éireann; the climate projections data are generated from Phase 5 of the Coupled Model Intercomparison Project (CMIP5) simulations. It has been assumed that these data sets have been reported correctly.

13.53 Climate projections can be used to determine likely future trends in climate conditions in the locality of the proposed development through its lifetime. The climate trends included in this assessment are based on a range of GHG emissions scenarios which are subject to a degree of uncertainty. How the climate would react to different levels of emissions is also uncertain. There are three key sources of uncertainty within climate projections:

- Natural climate variability: either from natural external influences on climate (e.g. change in atmospheric particulates due to volcanic activity), or changes in the energy received from the sun;
- Incomplete understanding of Earth system processes and their imperfect representation in climate models (modelling uncertainty); and
- Uncertainty in future man-made emissions of GHG emissions and other pollutants.

13.54 The ICCI assessment has also relied on the data and professional judgement of other chapters within this report.

GHG Emissions

13.55 The GHG emissions assessment presented in this chapter considers the demolition and construction, and operation stages GHG emissions, and should not be considered a full whole life carbon assessment. For example, emissions associated with end of life of the proposed development are not included in the GHG assessment as they are considered out of scope.

13.56 Estimated quantities of key materials associated to the construction of the proposed development were not available at the time of writing. Therefore, the estimated GHG emissions associated with the construction of the proposed development have been based on waste data included within Chapter 14: Waste of this EIAR. The waste estimates in this chapter were calculated from a detailed review as part of the July 2022 DUB-1 permitted development adjacent. When conducting the review, the proposed development's Gross Floor Area (GFA) was used to normalise the data and create key performance indicators (KPIs) to estimate potential waste volumes for the proposed development. In addition, the assessment took into consideration published data by the EPA in National Waste Reports. Demolition and construction material quantities were calculated by assuming the wastage quantities as a percentage of the total construction materials used in

the development; the percentages were equivalent to the wastage rates described in the Waste and Resources Action Programme (WRAP) Net Waste Tool. Additionally, construction and demolition waste quantities have also been extracted from Chapter 14: Waste.

13.57 Furthermore, GHG emissions associated with the sourcing of raw materials, manufacturing and transport of PV panels were estimated utilising the kWp (40) included within the Energy Statement accompanying this EIAR and the PV panel embodied carbon KPI (2560 $kgCO_2e/kWp$)[22,23,24].

13.58 The kwh required for the estimation GHG emissions associated to the use of the PV panel have been estimated using the Photovoltaic Geographical Information System (PVGIS) Tool[35] provided by the European Commission. For the purposes of this assessment, the following assumptions were considered:

- PVGIS-Sarah 2 solar radiation database;
- Installed peak PV power [kWp] of 40;
- Roof added / Building integrated mounting position;
- Profile Park business park location;
- PV panel Slope angle of 40°;
- PV panel Azimuth angle of 0°; and
- System loss of 14%.

13.59 This tool produced the annual Kwh. This was converted to tCO_2e by the UK government conversion factors[25], due to the Irish equivalent figures not being produced. It was assumed PV panels would need to be replaced every 25 years, as this is considered to be the industry standard[36].

13.60 As complete data on materials and proposed material quantities for embodied carbon calculations are not available at the planning stage, this assessment should therefore be considered indicative. The materials included are those which are considered to represent the majority of embodied carbon emissions. Given the design life of the proposed development (approximately 60 years), technological advancement, application and uptake of circular economy principles, and the recent commitments in Ireland as part of the Climate Action plan[7] and Climate Act 2021[5] to reach net zero emissions by no later than 2050, it is considered likely that accelerated carbon reduction would have occurred throughout the design life of the proposed development. The emissions from the deconstruction stage cannot be accurately quantified at this stage as a result of future uncertainty in methods of construction, deconstruction and decarbonisation across the industry. The full specification of construction materials is not anticipated to be known until detailed design has been completed.

13.61 In the assessment, there are assumed to be 13 back-up generators. This is the same number of generators as DUB-12, as per the July 2022 DUB-1 permitted development.

13.62 Power for the proposed development would be derived through the July 2022 DUB-1 permitted development via connection to the 110 kV substation south of Falcon Avenue or from the MFGP permitted as part of the July 2022 DUB-1 permitted development. As such GHG emissions associated with the proposed development during operation in normal circumstances (with power from these sources) have already been assessed as part of the DUB-1 EIAR and are not considered quantitatively as part of this assessment. Instead, the future baseline has been considered qualitatively within the assessment of effects section. Therefore, only GHG emissions from emergency back-up generators (Emergency scenario – 'Scenario 3') are assessed for the operation of the proposed development.

13.63 Emissions created by the transportation of materials to site and operation of on-site plant and machinery have been calculated using guidance from the Building Research Establish (BRE), which is 1,400kg of CO_2e per £100,000 of project value.

13.64 It has been assumed that the concrete hardstanding would not be demolished as part of this scheme, and therefore the associated quantities of concrete have not been included within the carbon calculations. However, if the concrete hardstanding is to be demolished, it is assumed that the concrete materials arising from demolition would be reused onsite, and therefore carbon emissions associated to the demolition of the concrete hardstanding would be minimum.

13.65 It has been assumed that the design life of the Proposed Development is 60 years, this has been based on the principles outlined in section 7.3 of the BS EN 15978: 2011 and the RICS guidance[20].

13.66 GHG emissions associated to the existing residential building have been estimated utilising the KPI (182.1 kWh/m_2) specified by the European commission for residential buildings[37].

13.67 Vehicle movements associated with access and construction would vary through the demolition and construction stage programme, with short periods of peak Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements associated with delivery of material resources and waste. Values have been calculated using the Central Statistics Office Transport Omnibus 2019 Transport statistics.

13.68 Information on Republic of Ireland (ROI) traffic emissions is not readily available. Therefore, traffic emissions for this GHG assessment have been calculated using Defra's Emission Factors Toolkit (EFT) (v11.0)[26]. The EFT allows users to calculate road vehicle pollutant emission rates for CO_2e for a specified year, road type, vehicle speed and vehicle fleet composition.

13.69 The EFT makes an estimate of future vehicle fleet mix and emission factors in the UK, including Northern Ireland, assumed as the representative region for the development area. In EFT v11, CO_2 emission factors have been factored to account for improved engine efficiency in future years, in line with DfT predictions. The EFT is updated periodically, considering the change in vehicle fleet compositions across the UK. For years 2031-2050, version 11 includes basic vehicle fleet composition data provided by DfT/HE for England (non-London) only. For Northern Ireland the EFT v11 provides predicted emission rates for all years up to 2030 only.

13.70 The traffic flows for construction and operational stages were provided by the projects Transport Consultant, Ramboll. The construction emissions for DUB 13 were based on Peak 2024 traffic flows. The operational emissions were based on 2025 traffic flows. No future traffic flows have been provided and therefore the proposed development traffic flows have been assumed to remain constant during the assessment period.

13.71 The proposed development traffic flows are expected to arrive via the main R roads, therefore, an average speed of the 80 kilometres per hour (kph) has been inputted into the EFT, based on the current speed limits. The average vehicle kilometres travelled per year and day were estimated based on information from the Central Statistics Office Transport Omnibus 2019 Transport statistics. Note that this data assumed a decrease in transport emissions overtime in response to committing to the ROI's national net zero targets.

Baseline Conditions

Existing Baseline

CCR and ICCI

13.72 A local climate baseline has been provided by Met Éireann[32] which presents a set of 30-year averages, covering the period 1981-2010 for a range of parameters and locations. The nearest meteorological station to the site is Dublin Airport[31]. Data from this station has been used to provide a baseline for this assessment and is a robust basis.

13.73 Climate data available for Dublin Airport shows a mean annual temperature of 9.8 °C (degrees Celsius), which is within the range for the whole of Ireland of 9-10 °C. The average annual maximum temperature at the vicinity of the proposed development is 13.3 °C; the average annual minimum temperature is 6.4°C

[35] European Commission.2022. Photovoltaic Geographical Information System (PVGIS). Available at: https://re.jrc.ec.europa.eu/pvg_tools/en/tools.html [Accessed 28/09/2022].

[36] Energy Saving Trust, Generating renewable electricity: Solar Panels (2022). Available at: https://energysavingtrust.org.uk/advice/solar-panels// [Accessed on 28/09/2022].

[37] European Commission, Energy Use in Buildings. Available at: https://ec.europa.eu/energy/eu-buildings-factsheets-topics-tree/energy-use-buildings_en [Accessed 28/09/2022]

with an annual mean of 29.4 air frost days. Higher temperature values in Ireland are generally found in coastal regions. The average annual rainfall within the proximity of the proposed development is 758.0 mm (millimetres), compared to an average for Ireland of 1,230 mm. The Dublin Airport station experiences a mean annual wind speed of 10.3 knots, with an average of 8.2 days with gales per year.

13.74 The Flood Risk Assessment (FRA) (Technical Appendix 10.2: Site-Specific Flood Risk Assessment, EIAR Volume 3) indicates the site is affected by the 0.1 % annual exceedance probability (AEP) and 1.0 % AEP flood events and it is suggested that the site is at risk from fluvial flooding.

13.75 Ireland's Climate: The Road Ahead (2013) details historic climate trends from 1900-2012, which can inform and provide context for future projections. The following trends have been observed across Ireland between 1900-2012:

- Mean annual temperature has increased by approximately 0.8 °C;
- A 5% increase in mean annual precipitation; and
- Increase in the number of days with heavy rain (10 mm or more) in the west and north-west of Ireland.

GHG Emissions

13.76 The site comprises a triangular parcel of agricultural land with a residential dwelling located in the north-west corner of the site, associated out-buildings and an area of hardstanding within the south-west of the site. It has been estimated that the existing building would produce 12 tCO_2e per year.

13.77 National CO_2 emissions statistics are published by the EPA[38]. Total emissions in 2021 were 61.53 Mt CO_2e, which is +4.7 % lower than emission in 2020. There was a decrease of 3.4 % in emissions reported for 2020 compared to 2019. Emissions are over 1% higher than pre-pandemic 2019 figures. Since 2020, residential, waste and commercial and public services sector showed decreases in emissions. However, emissions from the Agriculture, Transport, Energy and Industrial sectors increased since 2020.

13.78 Ireland's CO_2 emissions in 2021 consisted of 37.5 % from agriculture, 17.7 % from transport, 16.7 % from energy industries and 11.4 % from residential, 7.5 % from manufacturing combustion, and 4.0 % from industrial processes.

13.79 The total CO_2 emissions in South Dublin in 2021 was 1,874,753 tonnes of CO_2, equivalent to 6.7 tCO_2e per capita. The sectors that produced the most emissions were transport, commercial and residential, producing 39 %, 32 % and 24 % respectively, of total emissions in South Dublin[39]. By 2021 South Dublin County had achieved a 34.4 % improvement in energy efficiency in the intervening years since 2009, reaching its target one year ahead of schedule. In addition, CO_2 emissions had been reduced by 33.6 % in the same period[13].

13.80 However nationally, in the most recent review by the EPA, which details emissions up to 2018, the data published in 2020 states that Ireland has exceeded its 2018 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by 5.59 $MtCO_2e$.

13.81 Carbon Budgets

13.82 The National Policy Position provides a high-level policy direction for the adoption and implementation by Government of plans to enable Ireland to move to a low carbon economy by 2050. The Government of Ireland have committed to reducing its greenhouse gas emissions by 51 % by 2030 and reaching net zero by 2050 at the latest, across the electricity generation, built environment and transport sectors.

13.83 Note that this means operational emissions from electricity would begin to decline due to the gradual greening of the national grid if the substation follows Scenario 3, in which the proposed development is connected to via a substation.

13.84 The Minister for Communications, Climate Action and Environment has brought forward a new Climate Action (Amendment) Act that adopted the three five-year period carbon budgets presented below. Details of these carbon budgets were released in October 2021 within the Climate Change Advisory Council Carbon Budget Technical Report[40], although they have not yet been legislated by the government and Oireachtas.

- Carbon Budget 1 (2021-2025)- 295 Mt CO_2e;
- Carbon Budget 2 (2026-2030)- 200 Mt CO_2e; and
- Carbon Budget 3 (2031-2035)- 151 Mt CO_2e.

Future Baseline

CCR and ICCI

13.85 Future climate projections have been published by EPA through the Regional Climate Model (RCM) simulations which take the outputs from global climate models to produce more refined projections of the potential local and regional impacts of climate change. Climate projections can be used to determine the likely future climate conditions in the locality of the proposed development through its operational life. RCM simulations include projections of a range of climate variables, such as temperature and precipitation.

13.86 Climate projections are subject to uncertainty due to both natural variability and an incomplete understanding of the climate system. These uncertainties can create large outliers in the model ensemble which skew the mean projections. To allow for this, different percentiles are considered which allows a quantification of the likelihood of projections. There are also several Representative Concentrations Pathways (RCP) available for RCM simulations with each pathway resulting in a different range of global mean temperature increases over the 21st century. Simulating climatic changes under different RCP scenarios accounts for the uncertainty surrounding future GHG emissions. IEMA guidance recommends the use of RCP 8.5 at the 50 % percentile, for the 2071-2100 timeline to ensure a suitably conservative approach.

13.87 The projections informing this assessment were generated from a regional scale-down of eight datasets from phase 5 of the Coupled Model Intercomparison Project, using three RCMs for Ireland. The high spatial resolution (3.8 and 4 km) of these projections provides a good evaluation of regional climate variation. The RCM simulations were found to be robust when compared to observational datasets.

13.88 The general climate trends for Ireland have been described below, summarised from the RCM projections. The projections are for the future period of 2041-2060 compared to the baseline period of 1981-2000, simulated for RCP8.5:

- An increase of 1.3-1.6 °C in mean annual temperatures, with the largest increases seen in the east of the country;
- Warming would be enhanced at the extremes with an increase in summer daytime and winter night-time temperatures of 1-2.4 °C;
- Summer heatwave events are expected to occur more frequently, with the largest increases in the south of the country;
- Precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events;
- A mean reduction in wind speed of 2.6 %, with a decrease in all seasons; and
- A decrease in the number of frost days of 58 % and ice days of 78 %.

13.89 The climate projections for Dublin indicate increased likelihood of milder wetter winters for the future assessment period in comparison to the 1981-2000 baseline, as shown in Figure 13-1 and Figure 13-3 respectively. However, due to natural variability, some cold and dry winters would still occur. Mean wind

[38] Environment Protection Agency. Greenhouse Gas Emissions. Current Situation [online]. Available at: https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/ [Accessed on 22/08/2022].

[39] South Dublin County Council. South Dublin Baseline Emissions Report (2016). Available at: https://www.codema.ie/images/uploads/docs/South_Dublin_Baseline_Report.pdf [Accessed 25/08/2022].

[40] Climate Change Advisory Council. Carbon Budgets (2021). Available at: https://www.climatecouncil.ie/carbonbudgets/ [Accessed on 22/08/2022].

speeds are projected to decrease in all seasons, with the largest decreases for summer months as shown in Figure 13-2.

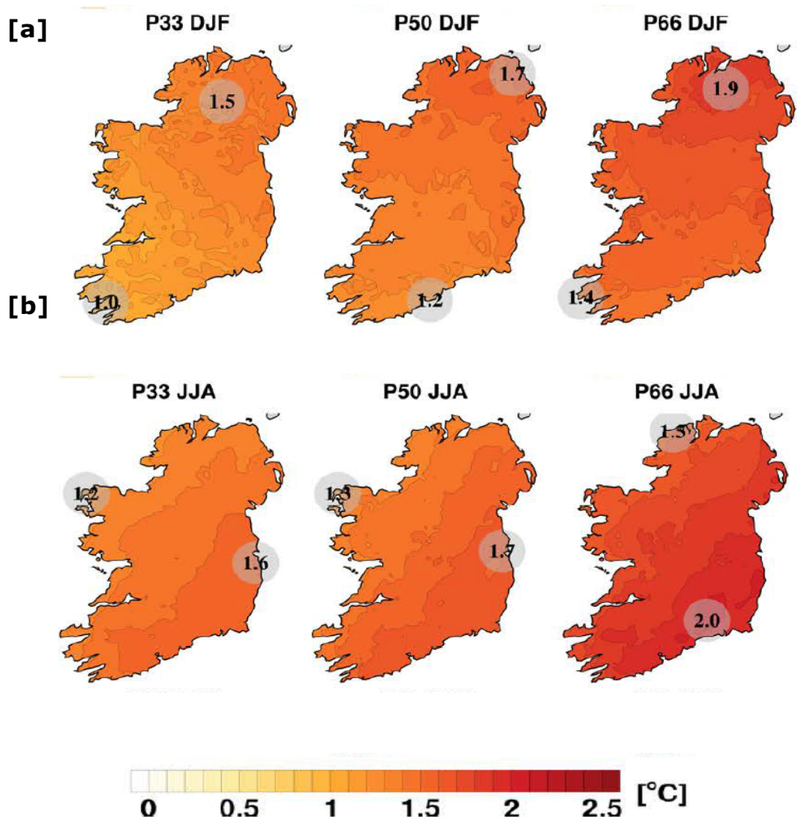


Figure 13-1 The 33rd, 50th and 66th percentiles of [a] winter and [b] summer temperature projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations*

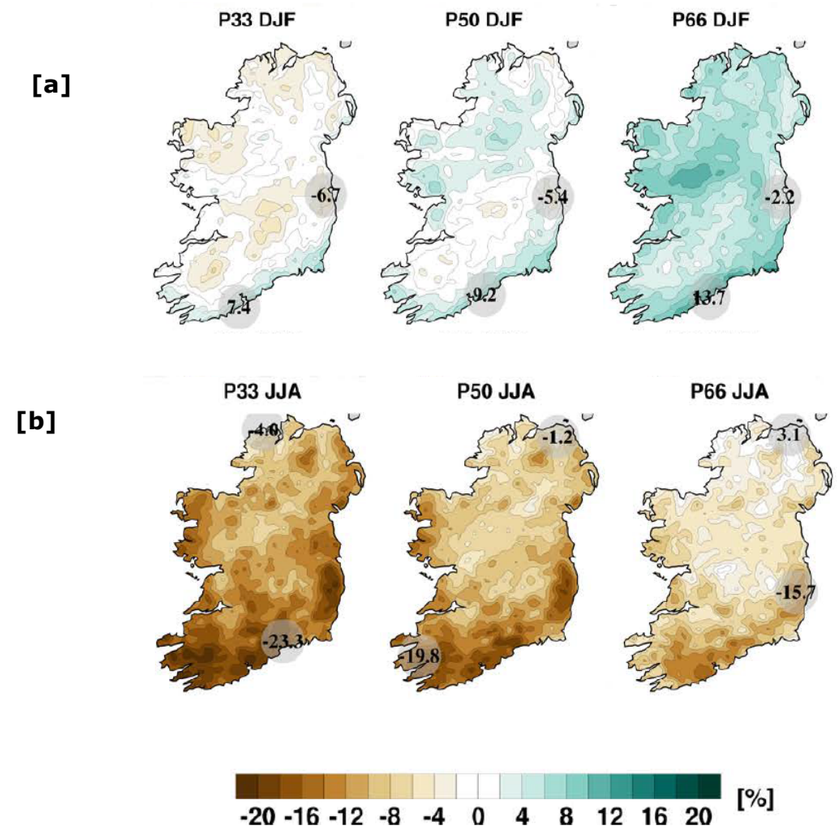
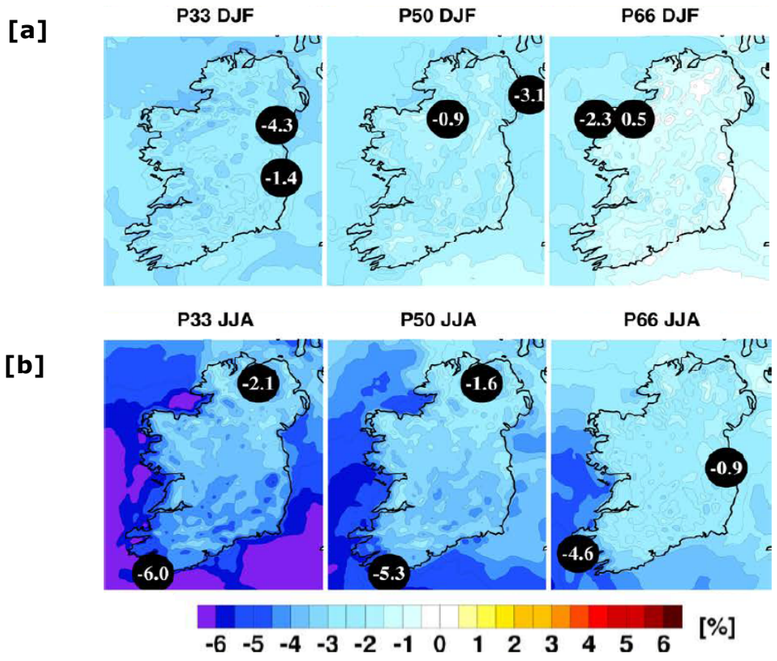


Figure 13- The 33rd, 50th and 66th percentiles of [a] winter and [b] summer wind speed projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations.*



The 33rd, 50th and 66th percentiles of [a] winter and [b] summer mean precipitation projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations*

GHG Emissions

13.90 In the absence of the proposed development (do-nothing), the GHG emissions from the site are anticipated to change compared to the existing baseline due to the operation of the July 2022 DUB-1 permitted development. The anticipated GHG emissions to be generated during the operation of the July 2022 DUB-1 permitted development for years between 2025-2084 are outlined in Table 13-9. Details of the methodology and scenarios associated with the July 2022 DUB-1 permitted development GHG emissions can be identified in the DUB-13 EIAR, Chapter 13: Climate Change.

Table 13-9: Estimated Operation ('use stage') GHG emissions for modelled opening year (2025) and total over the assumed 60-year operational period (2025-2084) for the July 2022 DUB-1 permitted development

Main stage of project lifecycle	Sub-stage of lifecycle	Emissions (tCO_2e)	
		2025 (modelled opening year)	Total (cumulative) over modelled 60-year operation (2025*-2084)
Operation ('use-stage')	Use of the proposed development by the end-user – Scenario 1	2,024,425	151,986,822
	Use of the proposed development by the end-user – Scenario 1 with emergency backup	2,028,556	152,227,825
	Use of the proposed development by the end-user – Scenario 1 with mitigation outlined in Table 13.12	2,024,421	151,983,905
	Use of the proposed development by the end-user – Scenario 2	105,339	6,323,046
	Use of the proposed development by the end-user – Scenario 2 with emergency backup	109,470	6,564,050
	Use of the proposed development by the end-user – Scenario 2 with mitigation outlined in Table 13.12	105,335	6,320,130
	Traffic associated with the proposed development	247	3,484.52

The opening modelled year was assessed as 2025 as this is the first year that DUB12 is operational, with electricity being consumed from EirGrid and with the MFGP running 24/7 on natural gas (Scenario 1), and electricity is being consumed from EirGrid with no MFGP in operation (Scenario 2).

*DUB11 is operational from Q3 2023 and the GHG emissions associated with its operation using HVO in 2023 and 2024 are captured in the above.

13.91 The EPA has produced GHG emission projections for two scenarios; 'With Existing Measures' and a 'With Additional Measures' which include implementation of Ireland's 2019 Climate Action Plan. Under the 'With Existing Measures' scenario, the projections indicate that Ireland would have total emissions of 57.96 $MtCO_2e$ by 2030. For the energy sector, emissions are project to increase by 1.4 % to 8.6 $MtCO_2e$ over the period 2020 to 2030.

13.92 Under the "With Additional Measures" scenario, which includes changing the source of electricity generation from coal and peat to wind power and diesel, and increasing use of electric vehicle engines, the projections indicate that Ireland would have a total emission of 47.87 $MtCO_2e$ by 203022. The energy sector emissions are projected to decrease by 24.8 % to 6.3 $MtCO_2e$ over the period 2020 to 2030.

Sensitive Receptors

CCR

13.93 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 13.10.

Table 13-10: Summary of Sensitive Receptors

Receptor	Sensitivity
Buildings and infrastructure receptors (including equipment, materials and building operations)	High
Human health receptors (e. g. construction workers, occupants and site users)	High
Environmental receptors (e. g. integrity of landscape features, habitats and species)	High

ICCI

13.94 The ICCI assessment is based on the receptors identified by each of the technical disciplines included within the EIAR.

Assessment of Effects

Demolition and Construction Effects

CCR

13.96 A summary of potential CCR impacts during the demolition and construction stage, as well as embedded and additional mitigation measures have been provided in Table 13-11.

GHG Emissions

13.95 GHG emissions associated with demolition and construction and operation of the proposed development would be released to the global atmosphere. Therefore, this is the receptor and is of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within this assessment.

13.97 The CCR assessment for the proposed development has not identified any significant effects for the demolition and construction, taking into consideration the embedded mitigation measures of the proposed development. All impacts are considered to be of low consequence of impact with possible probability/likelihood of impact; therefore, the effects are considered to range from **Temporary Imperceptible to Not Significant**, **Negative** in nature and **Not significant** in terms of EIA.

Table 13-11: Demolition and construction CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
Increased frequency and intensity of extreme weather events: Intense rainfall events	Demolition and construction	**Receptor:** Buildings and infrastructure Extreme rainfall events could result in the erosion of stockpiles and resultant silting of drainage assets. This could result in secondary impacts such as localised flooding.	As committed to in Chapter 5: Demolition and Construction Environmental Management, a detailed Construction Environmental Management Plan (CEMP) would be secured by means of an appropriately worded planning condition and would be prepared in advance of the construction works following the appointment of the key contractors. The detailed CEMP would include a Construction and Demolition Waste Management Plan (CDWMP) and would consider specific measures to minimise stockpiling on-site by avoiding and minimising the potential for contamination, for example by: • Ensuring deliveries would be 'just-in-time' to avoid storing large volumes of materials that could be affected; • Minimise emissions from stockpiles by covering, seeding, fencing, or damping down; • Material stockpiles and structures would be inspected before and after extreme weather events to ensure stability and incorporating measures; and • Covering, seeding, fencing, screening, or damping down of stockpiles would also occur; • Appropriate storage, handling, and management of construction materials with due regard to the potential for mobilisation into surface drainage. Furthermore, re-vegetating earthworks of exposed soil stockpiles would occur as soon as practicable; • Water pollution would be minimised by implementing adequate bunding for dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association (CRIA) provides guidance on the control and management of water pollution from construction sites[41]; and as stated in EIAR Chapter 5: Demolition and Construction Environmental Management, material would be stored in sheltered parts of the site to minimise interaction with rainfall and damage by the weather; and • As stated within the earthwork's specification, all work involving topsoil would not occur in heavy rain, or if areas of soil were exposed to 60mm of rainfall over the previous 60mm, unless permitted by the engineer. Stockpiles would also not exceed 1.5m in height and be on free draining ground.	**Likelihood level**: Unlikely **Consequence level:** Low as a result of partial disruption across elements of the site lasting less than a day. **Temporal Scale:** Temporary **Scale of Effect:** Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Construction	**Receptor:** Buildings and Infrastructure / Programme Extreme rainfall events and their secondary impacts could affect the ability to undertake certain construction activities leading to programme delays (e.g. pouring of concrete and asphalt) increasing project costs.	In line with best practice, vulnerable activities such as the construction of earthworks would take place in appropriate weather conditions (considering construction programme timescale constraints). This would reduce the likelihood of weather-related delays to these activities and would be undertaken in accordance with measures detailed in the CEMP. The contractor would be required to ensure that site activities, such as site preparation works, are postponed during rainfall events. As stated in the outline CEMP, materials would be stored in sheltered parts of the site to minimise interaction with rainfall and damage by the weather, while stockpiling would be limited when possible. Covering, seeding, fencing/ screening, or damping down of stockpiles would also occur.	**Likelihood level**: Unlikely **Consequence level:** Low as a result of partial disruption across elements of the site lasting less than a day. **Temporal Scale:** Temporary **Scale of Effect:** Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Construction	**Receptor:** Environment Extreme rainfall events could result in increased runoff of	As committed to in EIAR Chapter 5: Demolition and Construction Environmental Management, which anticipates the environmental issues and necessary management controls that would need be covered within the CEMP, good practice measures would be	**Likelihood level**: Unlikely	Additional Mitigation not required. Existing design and mitigation measures are appropriate to

[41] Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors – C532 CIRIA Report (Masters-Wouldiams et al, 2001)

14A WASTE

Introduction

14.1 This chapter of the EIAR reports on the likely significant waste effects to arise from the demolition and construction stage and the operation stage of the proposed development.

14.2 The chapter describes the waste policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely waste effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

14.3 There are no technical appendices supporting this chapter.

14.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - Waste Framework Directive (2008/98/EC)[1];
  - Landfill Directive (1999/31/EC), as amended in 2003 (2003/33/EC).
- National Legislation and Policy:
  - Waste Management Act 1996 (as amended)[2];
  - Waste Management (Licencing) Regulations 2004[3];
  - European Communities (Waste Directive) Regulations 2011[4];
  - National Climate Action Plan 2021[5];
  - Draft Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects (2021)[6] – which revised previous Guidelines set in 2006[7];
  - the Litter Pollution Act 1997 (revised in April 2022)[8] ; and
  - Environmental Protection Agency (EPA) National Waste Statistics Summary Report for 2018[9].
- Regional Policy:
  - Eastern Midlands Regional Waste Management Plans 2015-2021 (2017)[10];
  - Construction and Demolition (C&D) Waste: Soil and Stone Recovery/Disposal Capacity, Update Report (2020)[11];
- National guidance and Industry Standards:
  - Waste Action Plan for a Circular Economy 2020-2025 (2021)[12];
  - Guidance on Soil and Stone By-Products (2019)[13];
  - Materials and Waste in Environmental Impact Assessment (2020)[14]; and
  - A Resource Opportunity – Waste Management Policy in Ireland (2012)[15].

Assessment Scope

14.5 In considering the generation and management of waste, it is important to define when, under current legislation and understanding, a material is considered to be waste. The Waste Framework Directive (2008/98/EC) defines waste as *"…any substance or object which the holder discards, intends to discard or is required to discard"*.

14.6 More specifically, the Waste Action Plan for a Circular Economy (2021) describes C&D waste as waste from any building works, demolition, and development (including transport infrastructure).

14.7 The IEMA guidance relating to Materials and Waste in Environmental Impact Assessment[14] and the EPA Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects[6] was used in the assessment. Furthermore, professional judgement, experience and best practice methods have been drawn upon to assess the significance of the potential effects of the proposed development. The assessment has taken account of all applicable legislation, policy, and industry guidance.

14.8 The site is located within the jurisdiction of South Dublin County Council (SDCC) and the SDCC Development Plan 2016-2022[16] sets out a number of objectives and actions for the South Dublin area in line with the objectives of the Eastern Midlands Region (EMR) Waste Management Plan (WMP) 2015-2021[8]. The waste objectives with a particular relevance to the proposed development are as follows:

- IE5 Objective 1: To support the implementation of the EMR WMP 2015-2021 by adhering to overarching performance targets, policies, and policy actions.
- IE5 Objective 2: To support waste prevention through behavioural change activities to de-couple economic growth and resource use.
- IE5 Objective 3: To encourage the transition from a waste management economy to a green circular economy to enhance employment and increase the value recovery and recirculation of resources.
- IE5 Objective 8: To secure appropriate provision for the sustainable management of waste within developments, including the provision of facilities for the storage, separation, and collection of such waste.

14.9 The waste types and estimated quantities used in this assessment have been based on published data by the Environmental Protection Agency (EPA) in National Waste Statistics[17], data recorded from similar previous developments, and other available research sources.

[1] European Union, 2008. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance). Document 32008L0098.
[2] Government of Ireland, 1996. Waste Management Act 1996 (as amended). Updated to 27 August 2020.
[3] Government of Ireland, 2004. Waste Management (Licencing) Regulations, 2004.
[4] Government of Ireland, 2011. European Communities (Waste Directive) Regulations 2011.
[5] Government of Ireland, 2021. National Climate Action Plan.
[6] Government of Ireland, 2021. C&D Waste. Available at: https://www.gov.ie/en/publication/c305a-construction-and-demolition-cd-waste/ [Last Accessed 08/09/2022].
[7] Department of the Environment, Heritage and Local Government, 2006. Best Practice Guidelines of the Preparation of Waste Management Plans for C&S projects. Available at: https://www.leanbusinessireland.ie/includes/documents/BPGConstructionand%20demolition.pdf [Last Accessed 08/09/2022].
[8] Government of Ireland, 1997/2009. Litter Pollution Act 1997; Electoral (Amendment) (No. 2) Act 2009 – An Act To Regulate Expenditure By Political Parties And Candidates; To Amend The Local Elections (Disclosure Of Donations And Expenditure) Act 1999; To Amend The Litter Pollution Act 1997; And To Provide For Related Matters.
[9] Environmental Protection Agency (EPA), 2018. National Waste Statistics Summary Report for 2018. Available at: EPA_Nat_Waste_Stats_Report_Web.pdf [Last Accessed 08/09/2022]
[10] Eastern Midlands Region, 2017. Eastern Midlands Region Waste Management Plan 2015-2021. Available at: http://emwr.ie/emwr-plan/ [Last Accessed 08/09/2022].
[11] Government of Ireland, 2020. C&D Waste Soil and Stone Recovery/ Disposal Capacity Update Report. Available at: http://southernwasteregion.ie/sites/default/files/National%20C%20%20D%20Report%20Dec%202020%20for%20Publication.pdf [Last Accessed 08/09/2022].
[12] Government of Ireland, 2020. Waste Action Plan for a Circular Economy. Available at: https://www.gov.ie/en/publication/4221c-waste-action-plan-for-a-circular-economy/ [Last Accessed 08/09/2022].
[13] EPA, 2010. Guidance on Soil and Stone By-products. Available at: https://www.epa.ie/publications/licensing--permitting/waste/Guidance_on_Soil_and_Stone_By_Product.pdf [Last Accessed 08/09/2022].
[14] Institute of Environmental Management and Assessment (IEMA), 2020. Materials and Waste in Environmental Impact Assessment 2020. Available at: https://www.iema.net/resources/reading-room/2020/03/30/materials-and-waste-in-environmental-impact-assessment [Last Accessed 08/09/2022].
[15] Government of Ireland, 2012. A Resource Opportunity – Waste management policy in Ireland. Available at: https://www.gov.ie/en/publication/a9d98-a-resource-opportunity-waste-management-policy-in-ireland/ [Last Accessed 08/09/2022].
[16] South Dublin County Council, 2016. South Dublin County Council Development Plan 2016-2022. Available at: https://www.sdcc.ie/en/services/planning/development-plan/plan-2016-2022/ [Last Accessed 08/09/2022].
[17] Environmental Protection Agency (EPA), 2022. National Waste Statistics. Available at: https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/ [Last Accessed 08/09/2022].

Technical Scope

14.10 The assessment of the likely effects of the proposed development due to the generation and management of waste has considered the remaining landfill void capacity that would be depleted by waste produced during the demolition and construction stage and operation stage of the proposed development.

Spatial Scope

14.11 The study area for the waste assessment comprises the area of the Eastern Midlands Region of Ireland. This area has been used for baseline data investigation, and to locate potential sensitive receptors off-site, including surrounding landfill sites.

Temporal Scope

14.12 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (less than a year) in nature and from the operation stage which would be expected to be long term (15 to 60 years) to permanent in nature (i.e., >60 years).

Baseline Characterisation Method

Desk Study

14.13 In order to establish baseline waste conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- South Dublin County Council Development Plan 2016-2022[14];
- EMR WMP 2015-2021[10];
- Draft Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects[6];
- Waste Action Plan for a Circular Economy[12];
- C&D Waste Soil and Stone Recovery/Disposal Capacity Update Report 2020[11];
- Project Ireland 2040[18]; and
- National Development Plan 2018-2027[19].

Field Study

14.14 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions and conditions within the wider study areas.

Assessment Method

Methodology

Demolition and Construction Stage

14.15 The impacts of the proposed development, arising from the generation and management of waste, has been assessed. Due to the absence of EPA/Irish guidelines for waste assessments in EIA, the assessment has considered the methodology specified in Institute of Environmental Management and Assessment guidance documents[14]. An extensive document review to assist in identifying current and future requirements of waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports has also been undertaken.

14.16 To assess the potential effects arising from the generation of waste during the demolition and construction, and operation stages, a desk study was carried out which included:

- A review of applicable policy and legislation to create the legal framework for waste management in Ireland;
- Description of the typical waste materials that will be generated during the demolition and construction and operation stages; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

14.17A The waste estimates calculated for the demolition and construction stage of the proposed development have been calculated from a detailed review of the Dub 11/12 consented development adjacent. When conducting the review, the proposed development's Gross Floor Area (GFA) was used to normalise the data and create key performance indicators to estimate potential waste volumes for the proposed development. Additionally, the assessment has taken into consideration published data by the EPA in National Waste Reports. The excavations for foundations, including for the piled foundations for the bridge structure, have been considered.

14.18 Mitigation measures were also proposed to minimise the proposed development's environmental effects during the demolition and construction stage.

Operation Stage

14.19 The methodology for assessing likely operation stage effects is the same as that presented for the demolition and construction stage above.

Cumulative Stage

14.20 The combined effects of the proposed development and the cumulative development on a given receptor have been assessed for both stages of the proposed development.

14.21 This cumulative assessment has been considered qualitatively.

Assessment Criteria

14.22 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

14.23 The sensitivity of waste relates to availability of regional (and where appropriate, national) landfill void capacity in the absence of the proposed development. Landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste.

14.24 Information presented in Table 14-1 has been used to determine the sensitivity of landfill void capacity. For the purposes of EIA, 'negligible' and 'low' are classed as Low; 'medium' is classed as Medium and 'high' and 'very high' are classed as High.

Table 14-1: Receptor Sensitivity Criteria

Sensitivity	Criteria

[18] Government of Ireland, 2019. Project Ireland 2040 Documents and Information. Available at: https://www.gov.ie/en/collection/580a9d-project-2040-documents/ [Last Accessed 30/06/21].

[19] Government of Ireland, 2018. National Development Plan 2018-2027. Available at: https://www.gov.ie/en/policy-information/07e507-national-development-plan-2018-2027/?referrer=/en/national-development-plan-2018-2027/ [Last Accessed 30/06/21].

Table 14-1: Receptor Sensitivity Criteria	
Negligible	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to remain unchanged or is expected to increase through a committed change in capacity.
Low	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce minimally by <1 % as a result of wastes forecast.
Medium	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce noticeably by 1-5 % because of wastes forecast.
High	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce considerably by 6-10 % because of wastes forecast.
Very High	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce very considerably (by >10 %); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.

Impact Magnitude Criteria

14.25 The magnitude of impact has been classified as 'no change', 'low', 'medium', 'high' and 'major' in accordance with the criteria set out in Table 14-2. For the purposes of EIA, 'no change' and 'low' are classed as Low; 'medium' is classed as Medium and 'high' and 'major' are classed as High.

Table 14-2: Impact Magnitude Criteria	
Magnitude	**Criteria**
No Change	Zero waste generation and disposal from the development.
Low	Waste generated by the development will reduce regional landfill void capacity baseline by <1%
Medium	Waste generated by the development will reduce regional landfill void capacity by 1-5%.
High	Waste generated by the development will regional landfill void capacity by 6-10%.
Major	Waste generated by the development will reduce regional landfill void capacity by >10%.

Scale of Effect Criteria

14.26 Impacts have been assessed based on the value and sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 14-3.

Table 14-3: Scale of Effect Criteria				
		Magnitude		
		Low	**Medium**	**High**
Sensitivity	**Low**	Imperceptible to Not Significant	Not Significant to Slight	Slight to Moderate
	Medium	Not Significant to Slight	Slight to Moderate	Moderate to Significant
	High	Slight to Moderate	Moderate to Significant	Very Significant to Profound

14.27 Based on professional judgement and Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from moderate to profound are considered 'significant' in EIA terms.

Nature of Effect Criteria

14.28 The nature of the effect has been described as either negative, neutral, or positive as follows:

- Positive – An advantageous effect to a receptor;
- Neutral – An effect that on balance, is neither positive;
- Negative – A detrimental effect to a receptor.

Assumptions and Limitations

14.29 The assessment for waste receptors has been based on a review of the baseline information available at the time of assessment. Whilst the baseline data sources used in this assessment have been obtained from the most recently available information, it is still possible that conditions could have changed since their publication.

14.30 The quantities of materials to be used for the demolition and construction stage of the proposed development design, sources of materials and their mode of transport are yet to be finalised. Values have been estimated based on data obtained from a review of other similar data center applications in the surrounding area. It has been assumed that these data sets have been reported correctly.

14.31 It has been assumed that a Construction and Demolition Waste Management Plan (CDWMP) would be developed by the contractor. The CDWMP will ensure suitable management of construction, demolition, and excavation (CDE) waste, prevent (where practicable) and minimisation of waste arising and maximisation of waste re-use and recycling.

Baseline Conditions

Existing Baseline

14.32 For waste planning purposes, Ireland is divided into three regions: Connacht-Ulster; Southern; and Eastern Midlands[12]. SDCC lies within the Eastern Midlands Region (EMR)[10]. Therefore, reference to Waste management, generation, and capacity of landfills will refer to both the wider EMR in addition to the local authority SDCC. In terms of waste management, the local authority responsible for setting and administering waste management activities in the site and study areas is SDCC. Waste management activities within the area is governed by the requirements set out in the EMR WMP 2015-2021.

14.33 The EU Waste Framework Directive 2008/98/EC requires that a target of 70% recovery by weight of construction and demolition (C&D) waste generated be met by the year 2020. National Waste Statistics reported that Ireland achieved 84% material recovery C&D waste in 2019, surpassing the 2020 target. This shows an improvement on the previously reported rate of 71% in 2016 and 77% 2018.

14.34 In general, the largest element of C&D waste consisted of excavated soil and stone (making up approximately 85% of total C&D waste)[7]. The remainder included concrete, brick, tiles, metal, glass, wood, plastic, and metal[12]. Currently, the majority of C&D waste generated in Ireland is recovered or reused. Where recovery or reuse is not feasible, it is disposed of at suitably licensed facilities.

14.35 Within Ireland, the total mass of waste produced in the year 2018 was 14.1 million tonnes across all sectors[9]. For C&D waste, approximately 8.8 million tonnes were collected by authorised waste collectors for treatment in 2019. This was significantly greater than the 6.2 million tonnes reported in 2018 and 4.7 million tonnes reported in 2017, which corresponded with increases in construction activity nationally[9]. All C&D waste arises predominantly from demolition of existing structures, and from materials brought to site that were not used for their intended purposes, such as damaged items, cut offs and surplus materials.

14.36 According to the latest figures, most of the C&D waste collected in 2019 consisted of soil and stones (85%). The remainder was made up of concrete, bricks, tiles, and gypsum waste (7%) and mixed C&D waste (5%). Only 2.5% of C&D waste was collected separately as single material streams (wood, glass, plastic, or metal). Soil and stone waste are typically managed at Local Authority–permitted infill sites. Backfilling activities account for a significant portion of the recovery rate being achieved. The most recent figures available for C&D waste arising in Ireland, and that waste's disposal and recovery routes, are shown in Table 14.4. It should be noted that these figures are likely to have increased since then and will continue to do so in the coming years, due to the renewed growth in the economy.

Table 14-4: Collection and Management of C&D Waste Excluding Soil and Stone

Management	Recycling (tonnes)	Energy recovery (tonnes)	Backfilling (tonnes)	Disposal (tonnes)	Total (tonnes)
Metal waste	193,242	0	0	0	193,242
Segregated wood, glass, and plastic waste	13,999	19,177	2,317	14	35,507
Concrete, brick, tile, and gypsum waste	284,265	0	3,309,401	151,641	630,370
Waste bituminous mixtures	64,599	0	36,932	164	101,694
Mixed construction and demolition waste	10,407	857	48,825	20,826	80,915
Waste soils, waste stones, and dredging spoil	29,649	0	6,764,078	643,041	7,436,769
Waste treatment residues	39	14,262	25,671	227,115	267,086
Total	596,200	34,296	7,208,763	906,324	8,745,584

14.37 According to the C&D Waste Update Report (2020)[11] there are 106 authorised facilities in the EMR for soil and stone acceptance, including:

- Four active licenced soil recovery facilities;
- Six licenced soil recovery facilities due to start providing capacity;
- Four active inert landfills;
- 49 permitted facilities; and
- 43 registered facilities with a Certificate of Registration (CoR).

14.38 Overall, licensed Soil Recovery Facility (SRF) capacities in the EMR are concentrated in the local authority areas of Fingal, Meath, Kildare, and Wicklow. There are no licensed SRFs outside the Greater Dublin Area (GDA).

14.39 Waste licence facilities in the EMR are of the scale required by the markets[6]. EMR's current active and available annual licenced market capacity for SRF is 2.4 million tonnes (Mt). Six of the ten licenced sites have annual capacity of 300,000 tonnes or more and one facility is licenced to accept 1,500,000 tonnes of soil wastes each year. This capacity is concentrated in the Greater Dublin Area. Licensed capacity is authorised on an annual basis. The capacity for uncontaminated soil comprises of 2.4 million tonnes annual licenced capacity.

14.40 The permitted and registered facilities offer a much smaller capacity to the Region. The EMR remaining permitted lifetime capacity is 1.3 million tonnes (at end-2018). The registered remaining lifetime capacity in the region is much smaller by comparison with just over 188,000 tonnes available (at end-2018). While permitted and registered capacity is authorised on a lifetime capacity, meaning that these cannot be aggregated and are reported separately, and 1.52 million tonnes lifetime capacity provided by permitted and registered sites.

14.41 The geographical spread of these sites is reasonably good. The local authorities within Dublin County have low counts of permitted or registered facilities with no area having more than one of each. A number of local authorities (Laois, Louth, Offaly, and Westmeath) have low registered capacities and are reliant on permitted facilities.

14.42 There are three inert landfills in Ireland, plus the Tara Mines facility, which are all located in the EMR, providing predominantly disposal capacity. The four active inert landfill facilities have approximately 6.1 million tonnes of remaining lifetime capacity.

14.43 The Integrated Materials Solutions Limited Partnership (IMS) facility had 3.9 million tonnes remaining, with 2.1 million tonnes remaining at Walshestown, at the end of 2018.

14.44 In addition, there are a number of non-hazardous municipal landfill sites in the region which have an ongoing requirement for soil and stone material for daily cover, capping and other remediation activities at the sites. These facilities relevant to the proposed development are presented in Table 14-5.

14.45 The acceptance of non-hazardous waste and inert soils has reduced since 2016 as available void capacity has diminished. At the end of 2018, the remaining capacity at Drehid was 636,085 m^3 compared to 5,006,968 m^3 of available capacity when the site commenced activity. Conversely, Ballynagran increased the intake of non-hazardous soil waste for recovery from 163 tonnes in 2017, to 22,002 tonnes in 2018 in response to market demand.

Table 14-5: Licensed Capacity at Active Landfills

Landfill Facility Name	Waste for disposal (maximum tonnes per annum	Waste types for disposal (maximum tonnes per annum)	Waste types for recovery (maximum tonnes per annum)
Knockharley Landfill - Co. Meath	175,000	100,000 household 45,000 commercial 30,000 industrial	25,000 (C&D) 70,000 (inert waste)
Ballynagran Residual Landfill - Co. Wicklow	175,000	62,500 household 67,500 commercial 45,000 industrial	28,000 (C&D)
Drehid Waste Management Facility - Co. Kildare	120,000	120,000 non-hazardous municipal, commercial, and industrial wastes	No limit for inert waste were used in landfill engineering
Total	470,000	-	-

14.46 There are also a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes should they be required. Details of the facilities relevant to the proposed development are presented in Table 14-6.

Table 14-6: Licensed Waste Transfer Stations that could potentially accept C&D waste

Waste Transfer Station Name	Licensed Limitation from Acceptance of C&D Waste at Active Sites (tonnes per annum) at start of 2016
Starrus Eco Holdings Limited (now Greenstar) – Bray Depot	54,040

Table 14-6: Licensed Waste Transfer Stations that could potentially accept C&D waste	
Nurendale Ltd., trading as Panda Waste – Rathdrinagh	120,000
Greyhound Recycling and Recovery – Clondalkin	3,000
Thorntons Recycling Centre – Dunboyne	28,020
Nurendale Ltd., trading as Panda Waste – Finglas	40,000
Dean Waste Company Ltd. – Upper Sherriff Street	105,000
Labre Park Civic Amenity Site – Ballyfermot	6,000
Total	356,060

14.47 There is no dedicated 'hazardous waste to energy' or landfill treatment capacity in Ireland. Hazardous soil materials, depending on the nature of the contamination, are treated, and stabilised at specialised indigenous facilities. Treatment activities at some of these facilities can change the characterisation of soil wastes from hazardous to non-hazardous, whereby the soil can then be directed back to non-hazardous facilities. The lack of final treatment capacity for hazardous soils nationally creates a reliance on overseas facilities for final treatment.

14.48 There has been a significant increase in the treatment of contaminated soils in Ireland. This rise in treatment of hazardous soil waste domestically, is associated with a drop in the volumes exported; in 2018 Ireland exported almost 75,000 tonnes of hazardous soil, a drop of over 26,000 tonnes from 2017, as presented in Table 14-7.

Table 14-7: Hazardous Soil Treatment and Exportation in Ireland

Type	Waste (tonnes)				
	2014	2015	2016	2017	2018
Irish hazardous waste treatment facilities	1,630	5,938	682	608	18,733
Exported	5,701	14,329	79,591	101,440	74,912

Future Baseline

14.49 In the EIAR for the July 2022 DUB-1 permitted development it was estimated that the scheme would generate 44,472 tonnes of waste, with 42,616 tonnes reused, 1,970 tonnes recovered/recycled and 238 tonnes disposed.

14.50 Prediction of C&D waste was projected to increase to 8.2 million tonnes by 2025, and then increase again to 10 million tonnes by 2029. This figure is almost double that of the 2020 figure[11].

14.51 The generation of C&D waste, and the need for adequate management, is expected to grow over the medium- to long-term in line with the planned delivery of housing and infrastructure projects set out in Project Ireland 2040[18], which sets out Ireland's ambition and vision in terms of development over the next 20 years. The plan includes a number of major construction projects which presents huge potential in terms of preventing and recycling construction waste, as well as a challenge in terms of ensuring the generated waste is managed correctly.

14.52 If Ireland is to meet the targets as set out in the National Development Plan 2018-2027[19], it is vital that there is sufficient capacity for the recovery and/or disposal of the envisaged increased C&D waste. It is expected that due to the contraction in the economy following COVID-19, the envisaged C&D waste quantities may increase in 2022/2023.

14.53 In July 2020, there were three license applications for new waste facilities in the EMR. The combined capacity of un-commenced facilities is 1.5 million tonnes per annum. This capacity contains 73 % of the future capacity expected nationally (including new applications and un-commenced operations), which is expected to exceed 2.1 million tonnes.

Sensitive Receptors

14.54 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 14-8.

Table 14.8: Summary of Sensitive Receptors

Receptor	Sensitivity
Landfills (i.e. reduction in capacity from disposal of waste)	Medium

Assessment of Effects

Demolition and Construction Stage

Embedded Mitigation

14.55 Following the successful discharge of relevant pre-commencement planning conditions, and receipt of other required statutory permissions, on-site works would commence with enabling works (described in Chapter 5: Construction Description of this EIAR Volume and will be outlined in the CEMP).

14.56 Prior to commencement of construction works, a CDWMP would be prepared and agreed with the planning authority. This would be in accordance with the most up to date WMP for the EMR. The following mitigation measures would also be implemented at the demolition and construction stage:

- All excavations would be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. If any potentially contaminated material is encountered, it will be segregated from clean/inert material, tested, and classified as either non-hazardous or hazardous and further classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC[20], which establishes the criteria for the acceptance of waste at landfills. All excavated material would be used.
- Waste materials generated at the site compound would be stored in suitable receptacles in designated areas of the site compound.
- On-site segregation of waste materials would be carried out to increase opportunities for off-site reuse, recycling, and recovery, to ensure that the majority of construction materials are either recyclable or recoverable – it is anticipated that the following waste types, at a minimum, would be segregated: made ground, soils and stones and trees/shrubbery. In addition, the following wastes would be segregated at the site compound: organic (food) waste, packaging (paper/card/plastic), mixed dry recyclables and mixed non-recyclable waste.
- All waste contractors collecting waste from the site would hold a valid collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPO).
- Construction wastes would be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, recycling, recover and/or disposal. As stated in the baseline section, there are numerous licensed waste facilities in the local region that have sufficient capacity to accept both hazardous and non-hazardous waste materials and could manage C&D waste from the proposed development.
- All waste leaving site will be reused, recycled, or recovered where possible to avoid material designated for disposal.
- All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted, or licenced facilities.

[20] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

- All waste leaving the site would be recorded and copies of relevant documentation maintained.
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) would also be segregated and would be stored in appropriate receptacles (in suitably bunded areas, where required).
- A waste manager would be appointed by the main contractor to ensure effective management of waste during the excavation and construction works.
- All construction staff would be provided with training regarding the waste management procedures.
- The waste from deliveries into the two-bay truck loading bay would be compacted on-site.

14.57 These mitigation measures would ensure that the waste arising from the C&D phase of the development are dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and associated regulations including the Litter Pollution Act 1997 (revised in April 2022)[21] and the EMR WMP (2015-2021). It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved and will encourage sustainable consumption of resources.

Waste Generation Volumes

14.58 Waste arising from the site clearance, primary infrastructure and earthworks is expected to comprise of made ground/topsoil, rubble, bricks, concrete, tarmac from former hard standings, gravel, and clay material. It is important to note that the volume of waste generated from demolition would be more difficult to segregate than waste generated during construction, as many of the building materials will be bonded together or integrated.

14.59 As stated in the methodology, the estimated waste arisings from the proposed development, presented in Table 14-9, have been calculated from an extensive review of surrounding relevant data centers.

Table 14-9: Estimated Demolition Waste and End Destination

Waste Type	Estimated Quantities	Reuse		Recycle/ Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Glass	4	0	0	85	3	15	1
Concrete, bricks, Tiles, Ceramics	24	95	22	0	0	5	1
Plasterboard	2	0	0	85	2	15	0
Asphalts	38	0	0	95	36	5	2
Metals	7	0	0	95	7	5	0
Slate	4	0	0	85	3	15	1
Timber	6	0	0	90	5	10	1
Total	**84**	**-**	**22**	**-**	**56**	**-**	**5**

[NOTE: Values have been rounded to the nearest 1 tonne.]

14.60 Site preparation, excavations and levelling works required to facilitate construction of the foundations, access roads and the installation of services would generate approximately 6,000 m^3 of excavated material. It is currently proposed that all excavated material would be reused on-site.

14.61 The importation of approximately 12,500 m^3 of fill materials would be required for construction of foundations and other ground preparation works. If any soils/stones are imported onto the site from another construction site as a by-product, this would need to be carried out in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011.

[21] Government of Ireland, 1997/2009. Litter Pollution Act 1997; Electoral (Amendment) (No. 2) Act 2009 – An Act To Regulate Expenditure By Political Parties And Candidates; To Amend The Local Elections (Disclosure Of Donations And Expenditure) Act 1999; To Amend The Litter Pollution Act 1997; And To Provide For Related Matters.

14.62 As stated in the methodology, the estimated construction waste arisings from the proposed development, presented in Table 14-10, have been calculated from an extensive review of surrounding relevant data centers and normalised using the GFAs.

Table 14-10: Estimated Construction and Excavation Waste and End Destination

Waste Type	Estimated Quantities	Reuse		Recycle/ Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D Waste	258	0	0	90	233	10	26
Timber	219	0	0	90	197	10	22
Plasterboard	78	0	0	90	71	10	8
Metals	63	0	0	100	63	0	0
Concrete	47	100	47	0	0	0	0
Other (including cabling, ducting, conduits, packaging, and plastic	117	0	0	80	94	20	23
Topsoil	8,215	100	8,215	0	0	0	0
Excavated materials	5,943	100	5,943	0	0	0	0
Total	**14,941**	**-**	**14,205**	**-**	**657**	**-**	**79**

[NOTE: Values have been rounded to the nearest 1 tonne.]

Demolition and Construction Worker Waste Generation

14.63 During the demolition and construction period the introduction of a demolition and construction workforce on site would generate municipal waste. These wastes would generally be organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons) and mixed non-recyclables.

14.64 With consideration of the embedded mitigation measures outlined above, predicted impacts on landfill sites (medium sensitivity) are considered to be of low magnitude. It is expected that the municipal waste generated would be **Temporary**, **Not Significant to Slight** and **Negative** and **Not Significant in terms of EIA.**

Generation of Demolition and Construction Waste

14.65 Recycling of inert and non-hazardous waste on site and implementing the CDWMP would ensure that impacts of construction waste are minimised. In this assessment, it has been estimated that approximately 15,000 tonnes of C&D waste would be generated. There is currently 1,786,000 tonnes of capacity remaining in the waste management facilities and 470,000 tonnes of capacity remaining in landfill sites.

14.66 Therefore, the reduction in capacity of waste management facilities would be <0.05 % and the reduction in landfill capacity would be <0.05 %. In addition, it is expected that 99.5 % of the C&D waste would be diverted from landfill.

14.67 With consideration of the embedded mitigation measures outlined above, predicted impacts on landfill sites (medium sensitivity) are considered to be of low magnitude. It is expected that the waste generated would be **Permanent**, **Not Significant to Slight** and **Negative** and **Not Significant in terms of EIA.**

14.68 During enabling works, there is the potential for the generation of hazardous waste through land excavation. A ground investigation has been completed and no significant ground contamination issues have been identified, thus it is considered unlikely that there will be any hazardous wastes arising from excavation.

Operation Stage

Embedded Mitigation

14.69 The following mitigation measures would be implemented during the operation stage of the proposed development:

- On-site segregation of all waste materials into appropriate categories including (but not limited to): dry mixed recyclables, organic food/green waste, mixed non-recyclable waste, batteries (non-hazardous and hazardous), waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment and cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.).
- All waste materials would be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins would be clearly labelled with the approved waste type to ensure there is no cross contamination of waste materials.
- All waste collected from the development would be reused, recycled, or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available.
- A network of waste facilities would be used to ensure waste is managed efficiently. The waste hierarchy would be implemented, and waste recovery techniques would be employed if recycling is not possible.
- All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities.
- All waste leaving the site would be recorded and copies of relevant documentation maintained.
- Any waste classified as hazardous would be stored in a designated area (suitably bunded, where required) and would be removed off site by a licensed hazardous waste contractor(s).

14.70 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.

14.71 These mitigation measures would ensure the waste arising from the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and associated regulations including the Litter Pollution Act 1997 and the EMR WMP (2015-2021). It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved.

Waste Generation

14.72 Waste would be managed according to relevant national and regional legislation such as the waste framework directive. Waste collection vehicles would service the development regularly to ensure the resources are dedicated to ensuring efficient waste management practices.

14.73 Additionally, hazardous waste may be generated from batteries, contaminated chemical drums and other packaging. If the packaging contains residues of or if it is contaminated by dangerous substances, it may be classified as a hazardous waste (depending on the volume and concentration of contaminants). Volumes of potential hazardous wastes are considered likely to be negligible.

14.74 If the waste materials are not managed and stored correctly on-site, it is likely to lead to litter, health issues or pollution events at the site and/or on adjacent developments. As stated previously, the secondary effect of litter issues is the potential presence of vermin.

Operational Waste Stream Generation

14.75 The nature of the proposed development means that the generation of waste materials during the operation stage is unavoidable. However, it has not been possible to estimate the quantities of waste that would be generated by the proposed development due to the lack of data.

14.76 Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g., paper mills and glass recycling).

14.77 Overall, the impact on void space in landfill sites is considered to be **Permanent**, **Not Significant to Slight,** and **Negative** and **Not Significant** in terms of EIA.

Additional Mitigation

14.78 No additional mitigation measures are proposed in respect of waste.

Enhancement Measures

14.79 No enhancement measures are proposed in respect of waste.

Assessment of Residual Effects

Demolition and Construction Residual Effects

14.80 The residual effects are as previously report in the Assessment of Effects section, which are:

- Effect on void space in landfill sites: **Permanent**, **Not Significant to Slight,** and **Negative** (**Not Significant** in terms of EIA).

Operation Residual Effects

14.81 The residual effects are as previously report in the Assessment of Effects section, which are:

- Effect on void space in landfill sites: **Permanent**, **Not Significant to Slight,** and **Negative** (**Not Significant** in terms of EIA).

Summary of Residual Effects

14.82 Table 14-11 provides a summary of the outcomes of the waste assessment of the proposed development. **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 14-11: Summary of Residual Ground Conditions Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect**	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
Demolition and Construction								
Landfill Sites	Effect on void space	None required	Not significant to Slight	-	L	D	IR	P
Operation								

Table 14-11: Summary of Residual Ground Conditions Effects								
Landfill Sites	Effect on void space	None required	Not significant to slight	-	L	D	IR	P
Notes: * - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, IR = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = medium-term, Lt = Long-term, P = Permanent, R = Reversible. ** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.								

Cumulative Effects

Intra-Project Effects

14.83 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Intra Cumulative Effects.

Inter-Project Effects

14.84 There are numerous cumulative developments planned for in the surrounding area (as presented in Chapter 2: EIA Process and Methodology) that would have a cumulative impact by in-combination effects throughout the demolition and construction stage, and operation stage of the proposed development. However, it is not considered possible to reasonably undertake a quantitative cumulative assessment of the likely significant effects regarding waste for the reasons explained in the Assumptions and Limitations section of this chapter. Therefore, a qualitative assessment has been carried out.

14.85 It is reasonably considered that all the cumulative developments would be developed in line with the similar policy requirements as the proposed development; in particular with the requirements for maximising reuse and recycling of CDE waste through a CDWMP (or equivalent) and the meeting of targets for recycling and composting waste during operation. Therefore, results would be similar to that presented for residual effects; resulting in the following effects:

- Demolition and Construction Stage:
  - Effect on void space in landfill sites: **Permanent**, **Not Significant to Slight,** and **Negative** (**Not Significant** in EIA terms);
- Operation Stage:
  - Effect on void space in landfill sites: **Permanent**, **Not Significant to Slight,** and **Negative** (**Not Significant** in EIA terms).

Summary of Assessment

Background

14.86 This chapter has detailed the potential waste effects for the demolition and construction stage, and operation stage of the proposed development. The assessment has been undertaken considering the relevant national and local guidance and regulations.

14.87 The baseline assessment was undertaken using publicly available information and indicates that:

- The local authority responsible for setting and administrating waste management activities in the site area is SDCC.
- There are 106 authorised facilities in the EMR for soil and stone acceptance.
- Licensed SRF capacities in the EMR are concentrated in the local authority areas of Fingal, Meath, Kildare, and Wicklow.
- Waste licence facilities in the EMR are of the scale required by the current markets.
- The four active inert landfill facilities located in the EMR have approximately 6.1 million tonnes of remaining lifetime capacity to accept lightly contaminated soils.
- There are a number of non-hazardous municipal landfill sites in the region which have an ongoing requirement for soil and stone material for daily cover, capping and other remediation activities at the sites.
- There are a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes (should they be required).
- There is no dedicated 'hazardous waste to energy' or landfill treatment capacity in Ireland.

14.88 Overall, the results of the baseline assessment identified numerous waste management infrastructure facilities and landfill sites within the surrounding area. Many of the facilities/sites were indicated to have sufficient capacity to support future influxes of C&D and operational waste.

Demolition and Construction Effects

14.89 During the demolition and construction stage, waste would be produced from the demolition of the single storey dwelling on-site, and the construction of the data centers and accommodating facilities.

14.90 Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g., paper mills and glass recycling). According to the C&D Waste Update Report (2020)[11] there are 106 authorised facilities in the EMR for soil and stone acceptance, three landfill sites for C&D waste and a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes should they be required.

14.91 It is anticipated that the proposed development would generate approximately 15,000 tonnes of C&D waste in addition to operational waste. However, mitigation measures such as segregating of waste, using appropriate storage, and implementing a CDWMP (and CEMP) would reduce likely negative impacts and maximise the reuse and recycling and/or recovery of waste. Therefore, the reduction in landfill capacity would be < 0.05 %. In addition, it is expected that 99.5 % of the C&D waste and over 90 % of operational waste would be diverted from landfill.

14.92 Overall, it is considered, with embedded mitigation in place, that the demolition and construction stage activities would result in a **Negative**, **Direct**, and **Not Significant to Slight** effect (**Not Significant** in terms of EIA) on landfill sites.

Operational Effects

14.93 During the operation stage, waste would be managed in accordance with relevant national and regional legislation such as the Waste Framework Directive. Waste collection vehicles would service the development regularly to ensure the resources are dedicated to ensuring efficient waste management practices.

14.94 Additionally, hazardous waste may be generated from batteries, contaminated chemical drums and other packaging. If the packaging contains residues of or if it is contaminated by dangerous substances, it may be classified as a hazardous waste (depending on the volume and concentration of contaminants).

14.95 Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g., paper mills and glass recycling).

14.96 Overall, the effect on landfill sites is likely to be **Negative**, **Direct**, **Not Significant to Slight,** and **Not Significant** in terms of EIA.

Cumulative Effects

14.97 It is reasonably assumed that all the cumulative developments would be developed in line with the similar policy requirements as the proposed development, including the requirements for maximising reuse and recycling of CDE waste through a CDWMP (or equivalent) and the meeting of targets for recycling and composting waste during operation. Therefore, results would be similar to that of the proposed development, resulting in a cumulative effect that is **Negative**, **Direct**, **Not Significant to Slight,** and **Not Significant** in terms of EIA.

16 CUMULATIVE EFFECTS

Introduction

16.1 The Planning and Development Regulations require that the likely significant environmental effects of a development are considered, including cumulative effects which are defined in the EPA EIA Report Guidelines 2022 as *"the addition of minor or significant effects, including effects of other projects, to create larger, more significant effects".*

16.2 The relevant Institute of Environmental Management and Assessment (IEMA) Guidance[1] identifies two types of cumulative effects:

- Inter-project effects - incremental changes caused by other development schemes occurring together with the proposed development and the cumulative effects combining to worsen the effect of a particular impact; and
- Intra-project effects - those effects that occur as a result of impact interaction between different environmental topics within the same project. For example, a project might affect bird species as a result of direct loss of habitat and by noise and light disturbance. Each of these when considered in isolation may have a limited effect but taken together the sum is greater than the parts.

Inter-Project Cumulative Effects

16.3 A list of cumulative schemes for consideration in the inter-project cumulative effect assessment of the proposed development is detailed in EIAR Volume 1, Chapter 2: EIA Process and Methodology.

16.4 Inter-project effects have been addressed in each technical chapter of the EIAR (Chapters 6-15 of EIAR Volume 1 and EIAR Volume 2), as appropriate. To avoid significant repetition, information on the potential combined effects of the proposed development together with cumulative schemes is not presented within this chapter of the EIAR.

Intra-Project Cumulative Effects

16.5 The potential for intra-project cumulative effects is considered within this chapter.

Intra-Project Cumulative Effects

Assessment Approach

16.6 As indicated earlier, there is no established EIA methodology for assessing and quantifying the combined effects of individual effects on sensitive receptors. Accordingly, Ramboll has developed an approach which uses the defined residual effects of the proposed development to determine the potential for interactions between effects and consequently the potential for significant intra-project cumulative effects to arise. This is a tried, tested, and robust approach that has been implemented and accepted on a wide range of planning applications over many years.

16.7 The approach comprised the following steps:

- First, a review of the likely residual effects (and in particular the likely significant environmental effects) presented within the EIAR was undertaken;
- Second, the likely receptors or receptor groups were identified;
- Third, the individual effects which may impact a singular receptor or receptor group were listed in a matrix format;
- Fourth, the potential for individual effects to interact for a given receptor was identified; and
- Fifth, the scale of the combined intra-project cumulative effects was assessed.

16.8 To ensure a proportionate approach, no/non-standalone imperceptible and not significant effects have been disregarded. Where a range of effects has been predicted, the full range has been considered e.g., imperceptible/not-significant to slight, negative.

16.9 It is noted that intra-project cumulative effects are more likely to arise when the receptor or receptor group is of higher sensitivity to change, such as human receptors.

16.10 Within this EIAR, topics such as air quality, transport, noise and vibration and climate change are considered in their own right and also in the context of their associated human health effects; of which, these are then assessed against relevant receptor groups (which includes human health receptors and local residents etc.) as part of the population and human health assessment. Due to the nature of the population and human health assessment these are not considered within this intra-cumulative assessment, due to the need to ensure these effects are reported within their own right and are not double counted. As such, in the instance that human health effects result in an in-combination effect within the matrices presented in this section they are disregarded (as they are already considered from an intra- cumulative perspective in Chapter 6: Population and Human Health).

16.11 Where there is more than one effect likely to arise on a particular receptor or receptor group, the potential for effect interactions and the scale of the combined effect have been determined based on professional judgement and experience. The results of the assessment are presented within a matrix format in the Assessment Results section of this chapter.

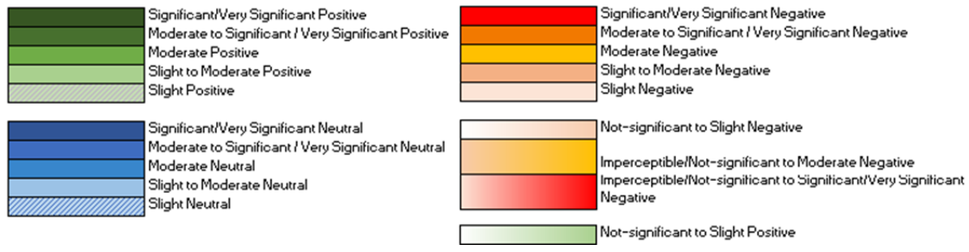
Assessment Results

16.12 Based on the methodology detailed above, Figure 16.1 and Figure 16.2 present the results of the potential for interactions of individual effects on receptors during the demolition and construction stage and once the proposed development is in operation, respectively.

[1] Institute of Environmental Management and Assessment. The State of Environmental Impact Assessment Practice in the UK. 2011

Likely Residual Effects		Receptors and Receptor Groups																
		Local Economy and New Workers	Existing Off-Site Residents	Existing Pedestrians	Existing Road Users	Existing Cyclists	Surface Water Receptors	Groundwater	Fluvial Flood Risk	Off-site Designated/ Protected Habitats	On-site Habitats and Species	Buildings and Infrastructure	Global Climate	Landfills	Existing Character Areas and Landscape Features	Site Landscape Features	Existing Views	Heritage Assets
Population and Human Health	Creation of Employment (Small Area Scale)																	
	Introduction of Resident Population (Small Area Scale)																	
	Air Quality Effects																	
	Noise Effects																	
	Transport Effects																	
Transport and Accessibility	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation																	
	Change in Driver Delay																	
	Change in Accidents and Safety																	
Noise and Vibration	Demolition and Construction noise																	
	Demolition and Construction Traffic Noise																	
	Demolition and Construction Vibration																	
Water Resource and Flood Risk	Direct impacts on surface water quality and hydrodynamic status as a result of construction works																	
	Disruption of Groundwater during Construction Excavations																	
	Loss of floodplain volume during construction																	
Climate Change	GHG Emissions																	
Waste	Effect on Void Space																	
Landscape and Visual	Removal of vegetation and dwelling with stripping of soil and change of topography to accommodate proposed development and landscaping																	
	Disturbance impacts on function and character value of the Baldonnel Stream																	
	Construction activity within urban fringe area of Newcastle Lowlands LCA that has been allocated for development																	
	Disturbance of linked green infrastructure affecting landscape context and setting																	
	Disturbance and impacts on character amenity and tranquillity																	
Potential for Effect Interaction and so Combined Cumulative Effect?		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Figure 16.1: Demolition and Construction Intra-Project Cumulative Effects



Likely Residual Effects		Receptors and Receptor Groups																
		Local Economy and New Workers	Existing and Future Off-Site Residents	Existing and Future Pedestrians	Existing and Future Road Users	Existing and Future Cyclists	Surface Water Flood Risk	Fluvial Flood Risk	Groundwater	Off-site Designated/ Protected Habitats	On-site Habitats and Species	Buildings and Infrastructure	Global Climate	Landfills	Existing Character Areas and Landscape Features	Site Landscape Features	Existing Views	Heritage Assets
Population and Human Health	Creation of Employment (Small Area Scale)																	
	Air Quality Effects																	
	Noise Effects																	
	Transport Effects																	
Transport and Accessibility	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation																	
	Change in Driver Delay																	
	Change in Accidents and Safety																	
Noise and Vibration	Plant noise under worst case operation conditions (Scenario 1)																	
	Plant noise under vest-case operation conditions (Scenario 2)																	
	Plant noise under emergency operation conditions (Scenario 3)																	
Water Resource and Flood Risk	Flood risk from the Baldonnel Stream																	
	Changes to flood risk as a result of changes to the surface water runoff regime of the site																	
Ecology	Ecological Enhancement of the Baldonnel Stream																	
Climate Change	GHG Emissions																	
Waste	Effect on Void Space																	
Landscape and Visual	Enhancement with new riverine planting and features including wetland meadow and pond																	
	Enhancement of linked green infrastructure features and increased commercial development within setting																	
	Increased commercial development within setting																	
	A small addition to the view, in context with surrounding character																	
	A notable change within the view in keeping with the character of the area.																	
Potential for Effect Interaction and so Combined Cumulative Effect?		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Figure 16.2: Operation Intra-Project Cumulative Effect

- Significant/Very Significant Positive
- Moderate to Significant / Very Significant Positive
- Moderate Positive
- Slight to Moderate Positive
- Slight Positive
- Significant/Very Significant Negative
- Moderate to Significant / Very Significant Negative
- Moderate Negative
- Slight to Moderate Negative
- Slight Negative
- Significant/Very Significant Neutral
- Moderate to Significant / Very Significant Neutral
- Moderate Neutral
- Slight to Moderate Neutral
- Slight Neutral
- Not-significant to Slight Negative
- Imperceptible/Not-significant to Moderate Negative
- Imperceptible/Not-significant to Significant/Very Significant Negative
- Not-significant to Slight Positive
- Slight to Moderate Positive

Demolition and Construction

16.13 As shown in Table 16.1, no effect interactions are likely to arise during the demolition and construction period.

Operation

16.14 As shown in Table 16.2, effect interactions are likely to arise during operation in relation to off-site human health effects, however as previously discussed, in-combination human-health effects have been disregarded due to the nature of the human health assessment (i.e., as these effects have already been considered from an intra-cumulative perspective in Chapter 6: Population and Human Health).

16.15 Therefore, no effect interactions are likely to arise during operation.

Conclusions

16.16 From the assessment of intra-project cumulative effects, no effects have been identified during demolition and construction or operation that have not already been discussed in Chapter 6: Population and Human Health.

17 RESIDUAL EFFECTS AND MITIGATION

Introduction

17.1 This chapter summarises the additional mitigation measures, the enhancement measures and the residual effects identified in the technical assessments of EIAR Volume 1 (Chapters 6-15) and EIAR Volume 2.

Additional Mitigation and Enhancement

17.2 As set out in Chapter 2: EIA Process and Methodology, the aim of an EIA is to develop measures to avoid, offset or reduce the significant negative environmental effects of a project and to enhance any beneficial effects.

17.3 Within each of the technical assessments, the need for additional mitigation measures has been considered in respect of likely significant negative effects as far as reasonably possible. In addition, opportunities for environmental enhancement have been explored where practicable. The proposed additional mitigation and enhancement measures are in addition to the embedded design and operational mitigation measures (as described in EIAR Chapter 4: Proposed Development Description) and standard embedded demolition and construction mitigation measures (as described in EIAR Chapter 5: Demolition and Construction Description), which have been considered within the technical assessments.

17.4 Table 17.1 presents a summary of the additional mitigation measures that have been identified over the course of the EIA of the proposed development categorised under the following stages:

- Demolition and Construction; and
- Operation.

17.5 It is noted that no enhancement measures have been identified within the individual technical assessments.

17.6 Reference should be made to individual technical assessment chapters for more detail.

Table 17.1: Summary of Proposed Additional Mitigation

Topic	Proposed Additional Mitigation
Demolition and Construction	
Population and Human Health	• None
Transport and Accessibility	• None
Air Quality	• None
Noise and Vibration	None
Water Resource and Flood Risk	• None
Ecology	• Pre-commencement badger survey. • All excavations should be securely covered, or a suitable means of escape provided at the end of each working day. • Pre-construction breeding bird survey (only if works are undertaken between March and August) • No demolition of buildings within the swallow summer breeding season April – October. Pre-demolition check of building for nesting birds.

Table 17.1: Summary of Proposed Additional Mitigation

Topic	Proposed Additional Mitigation
Ground Conditions	• None
Climate Change	• None
Waste	• None
Material Assets	• None
Landscape and Visual	• None
Cultural Heritage	• None
Operation	
Population and Human Health	• None
Transport and Accessibility	• None
Air Quality	• None
Noise and Vibration	• None
Water Resource and Flood Risk	• Site-Specific Flood Risk Mitigation Plan and associated maintenance regime
Ecology	• None
Ground Conditions	• None
Climate Change	• None
Waste	• None
Material Assets	• None
Landscape and Visual	• None
Cultural Heritage	• None

Residual Effects

17.7 This section summarises the likely residual environmental effects of the proposed development following the adoption and inclusion of the additional mitigation measures that are set out in Table 17.1.

17.8 Reference should be made to EIAR Chapters 6-15 in EIAR Volume 1 and Volume 2 for a detailed description of likely significant residual environmental effects.

Demolition and Construction Residual Effects

17.9 Table 17.2 summarises the residual effects which have been identified by the individual technical assessments as likely to arise from the demolition and construction of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

17.10 No significant positive or negative environmental effects have been identified.

•

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
Population and Human Health	Local Residents and Economy	Creation of Employment (Small area scale)	None required	Not-significant - Slight	+	L	D	R	T
	Local Residents and Economy	Creation of Employment (Electoral division and South Dublin County scale)	None required	Imperceptible	+	L	D/I	R	T
	Local Residents and Economy	Introduction of Resident Population (Small area scale)	None required	Not significant – Slight	-	L	D/I	IR	T
	Local residents	Air quality effects	None required	Not significant – Slight	-	L	D/I	IR	T
	Local residents	Noise effects	None required	Not Significant – Slight	-	L	D	IR	T
	Local residents	Transport effects	None required	Not Significant – Slight	-	L	D	IR	T
	Local residents	Amenity	None required	Imperceptible	-	L	D	R	T
Transport and Accessibility	Pedestrians	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation	None required	Slight	-	L	R	D	T
	Road users	Change in Driver Delay	None required	Slight	-	L	R	D	T
	Road users, pedestrians and cyclists	Change in Accidents and Safety	None required	Slight	-	L	R	D	T
Air Quality	Existing Off-site Human Health and Amenity	Dust Soiling and PM_{10} due to demolition and construction works	None required	Imperceptible	-	L	D	R	T
	Existing Off-site Human Health	Change in NO_2, PM_{10} and $PM_{2.5}$ levels due to vehicle emissions	None required	Imperceptible	-	L	D	R	T
Noise and Vibration	Local Residents (NSR 1)	Demolition and Construction Noise	None required	Not significant	-	L	D	IR	T
	Local Residents (NSR 2-5)	Demolition and Construction Noise	None required	Slight	-	L	D	IR	T
	Local Residents (NSR 1)	Demolition and Construction Traffic Noise	None required	Not significant	-	L	D	IR	T
	Local Residents (NSR 2-5)	Demolition and Construction Traffic Noise	None required	Slight	-	L	D	IR	T
	Local Residents (NSR 1)	Demolition and Construction Vibration	None required	Not significant	-	L	D	IR	T
	Local Residents (NSR 2-5)	Demolition and Construction Vibration	None required	Slight	-	L	D	IR	T
Water Resource	Surface Water Receptors	Potential contamination as a result of silt-laden runoff across the demolition and construction site	None Required	Imperceptible/Not Significant	-	L	D	R	T

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
and Flood Risk		and potential for contaminants to be introduced to surface water by construction activities through leakages/spillages							
	Surface Water Receptors	Direct impacts on surface water quality and hydrodynamic status as a result of construction works	None Required	Imperceptible/Not Significant	+	L	D	R	T
	Groundwater Supply	Disruption of Groundwater during Construction Excavations	None Required	Imperceptible	-	L	D	R	T
	Fluvial Flood Risk	Flood risk from the Baldonnel Stream	None Required	Imperceptible	+/-	U	D	R	T
	Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Construction	None Required	Imperceptible	+/-	U	D	R	T
Ecology	South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA	Pollution	None required	Imperceptible/Not Significant	-	L	I	IR	T
	Grand Canal pNHA and Liffey Valley pNHA	Pollution	None required	Imperceptible/Not Significant	-	L	D	IR	T
	Baldonnel stream	Pollution	None required	Imperceptible	-	L	D	IR	T
	Terrestrial habitats	Habitat loss	None required	Imperceptible	-	L	D	R/IR	T
	Terrestrial habitats	Pollution	None required	Imperceptible	-	L	I	R	T
	Bats	Commuting and foraging habitat loss	None required	Imperceptible	-	L	D	R	T
	Badger	Disturbance / destruction of setts	Pre-construction badger survey	Imperceptible	-	L	D	R	T
		Accidental trapping within excavations	All excavations should be securely covered, or a suitable means of escape provided at the end of each working day.						
	Birds	Disturbance / destruction of nest	Pre-construction breeding bird survey (Only if works are undertaken between March and August)	Imperceptible to Not-significant	-	L	D	IR	T

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
			No demolition of buildings within the swallow summer breeding season April – October. Pre-demolition check of building for nesting birds.						
		Habitat loss as a result of displacement by disturbance	None required						
Ground Conditions	Construction workers	Impact to human health from exposure to contaminated soils / dust / ground gases / water during enabling and construction works.	None required	Imperceptible	-	U	D	IR	T
	Adjacent site users	Impact to human health from exposure to contaminated dust during enabling and construction works.	None required	Imperceptible	-	U	I	IR	T
	Water environment (Baldonnel Stream)	Increased potential for leaching of contaminants from soils and mobilisation of contamination in surface water and groundwater during earthworks and foundation works. Also, contaminants introduced to surface water by construction activities through leakages/spillages.	None required	Imperceptible/not significant	-	U	D	IR	T
	Groundwater beneath the site (aquifers)		None required	Imperceptible/not significant	-	U	D	IR	T
	Agricultural Land	Loss of agricultural land	None required	Imperceptible	-	U	D	IR	P
Climate Change	**CCR**								
	Buildings and Infrastructure	Extreme rainfall events could result in the erosion of stockpiles and resultant silting of drainage assets.	None required	Imperceptible to Not significant	-	U	D	R	T
	Buildings and Infrastructure	Extreme rainfall events and their secondary impacts could affect the ability to undertake certain construction activities leading to programme delays (e.g. pouring of concrete and asphalt) increasing project costs.	None required	Imperceptible to Not significant	-	U	D	R	T
	Environment	Extreme rainfall events could result in increased runoff of concrete or cement products nearby watercourses.	None required	Imperceptible to Not significant	-	U	I	R	T
	Human Health	Heatwaves, higher temperatures and drought conditions could impact dust generated during construction activities.	None required	Imperceptible to Not Significant	-	U	D	R	T
	Human Health	Winds gusts could result in the damage of stockpiles. Secondary impacts could include site personnel welfare impacts.	None required	Imperceptible to Not Significant	-	U	D	R	T
	Human Health	Heatwaves, higher temperatures could impact on site construction personnel welfare, for example,	None required	Imperceptible to Not Significant	-	U	D	R	T

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
		causing heat stress and unsafe working conditions.							
	ICCI								
	Population and Human Health Sensitive Receptors	Potential interactions of climate change with the identified Population and Human Health effects	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Transport Sensitive Receptors	Potential interactions of climate change with the identified transport effects.	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Air Quality Sensitive Receptors	Exposure of sensitive receptors to dust from demolition and construction activities.	None required	Not Significant	-	U	D	R	Mt
	Air Quality Sensitive Receptors	Exposure of sensitive receptors to dust from demolition and construction activities.	None required	Not Significant	-	U	D	R	Mt
	Noise and Vibration Sensitive Receptors	Potential interactions of climate change with the identified Noise and Vibration effects.	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Water Resources and Flood Risk Sensitive Receptors	Exposure of sensitive receptors to water from demolition and construction activities.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Ecology Sensitive Receptors	Exposure of sensitive receptors to demolition and construction activities.	None required	Imperceptible to Not Significant	-	U	I	IR	Mt
	Ground Conditions Sensitive Receptors	Exposure of sensitive receptors (water) to demolition and construction activities	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Waste Sensitive Receptors	Potential interactions of climate change with the identified Waste effects	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Material Assets Sensitive Receptors	Exposure of sensitive receptors (surface water) to demolition and construction activities	None required	Not Significant	-	U	D	R	Mt
	Material Assets Sensitive Receptors	Exposure of sensitive receptors (water supply) to demolition and construction activities	None required	Imperceptible to Not Significant	-	U	I	R	Lt
	GHG Emissions								
	Global Climate	GHG Emissions	None required	Slight to Not Significant (not significant)	-	IR	D	L	LT
Waste	Landfill Sites	Effect on void space	None required	Not Significant to Slight	-	L	D	IR	P
Material Assets	Power and Electrical Supply	Increased demand on the surrounding network	None required	Imperceptible	+/-	L	D	IR	T
	Gas Supply				+/-	L	D	IR	T
	Foul Water Infrastructure				+/-	L	D	IR	T
	Water Supply				+/-	L	D	IR	T

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Telecommunications				+/-	L	D	IR	T
	Surface Water Infrastructure	Risks of contamination from increased run-off, machinery on site, concrete activities, and/or accidental spillages.			+/-	L	D	IR	T
Landscape and Visual	**Landscape**								
	Site	Removal of vegetation and dwelling with stripping of soil and change of topography to accommodate proposed development and landscaping	None required	Not significant / Slight	-	L	D	IR	T
	Baldonnel Stream	Disturbance impacts on function and character value.	None required	Not significant / Slight	-	L	D	IR	T
	Newcastle Lowlands LCA	Construction activity within urban fringe area of LCA that has been allocated for development	None required	Not significant / Slight	-	L	I	R	T
	The Grand Canal	Disturbance of linked green infrastructure affecting landscape context and setting	None required	Not significant / Slight	-	L	I	R	T
	NIAH Listed features	Disturbance and impacts on character amenity and tranquillity	None required	Not significant / Slight	-	L	I	R	T
	Road Corridors	Change to the townscape associated with the road corridors	None required	Imperceptible	-	L	D	R	T
	Visual								
	VP1-11	Disturbance and construction impacts affect the visual amenity for receptors (Low – Medium)	None required	Imperceptible	-	L	I	R	T
Cultural Heritage	On site archaeology	Knowledge gained by preservation by record	Programme of archaeological monitoring of topsoil stripping in the area immediately surrounding the possible prehistoric or early historic ditch and by preservation by record (excavation) of any features exposed prior to construction.	Imperceptible/Not Significant	+	L	D	IR	P
	Built heritage	None identified	None required	Imperceptible	+/-	U	D	R	T

Notes:
* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.
** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Operation Residual Effects

17.11 Table 17.3 summarises the residual effects which have been identified by the individual technical assessments as likely to arise upon completion and operation of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

17.12 The following significant positive environmental effects for the operation stage have been identified and are highlighted in green text in Table 17.3.

Landscape and Visual:

- Enhancement of the landscape of the Baldonnel Stream with new riverine planting and features including a wetland meadow and pond

17.13 No significant negative environmental effects have been identified.

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
Population and Human Health	Local Residents and Economy	Creation of Employment (Small area scale)	None required	Not-significant - Slight	+	L	D	IR	Lt - P
	Local Residents and Economy	Creation of Employment (Electoral division and South Dublin County scale)	None required	Imperceptible	+	L	D	IR	Lt - P
	Local residents	Air quality effects	None required	Not significant – Slight	-	L	D/I	IR	Lt - P
	Local residents	Noise effects	None required	Not Significant – Slight	-	L	D	IR	Lt - P
	Local residents	Transport effects	None required	Not Significant – Slight	-	L	D	IR	Lt - P
	Local residents	Amenity	None required	Imperceptible	-	L	D	IR	Lt - P
Transport and Accessibility	Pedestrians	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation	None required	Slight	-	L	R	D	Lt to P
	Road users	Change in Driver Delay	None required	Slight	-	L	R	D	Lt to P
	Road users, pedestrians and cyclists	Change in Accidents and Safety	None required	Slight	-	L	R	D	Lt to P
Air Quality	Existing Off-site Human Health	Change in NO_2, PM_{10} and $PM_{2.5}$ levels due to vehicle emissions	None required	Not significant	-	L	D	IR	Lt to P
	Existing Off-site Human Health	Change in NO_2 levels due to Phase 1 and Phase 2 emergency generators	None required	Imperceptible	-	L	D	IR	Lt to P
	Existing Off-site Human Health	Change in NO_2 levels due to Phase 1 and Phase 2 emergency generators	None required	Imperceptible	-	L	D	IR	Lt to P
Noise and Vibration	Local Residents (All NSRs)	Plant noise under worst case operation conditions (Scenario 1)	None required	Slight	-	L	D	IR	Lt to P
	Local Residents (All NSRs)	Plant noise under vest-case operation conditions (Scenario 2)	None required	Slight	-	L	D	IR	Lt to P
	Local Residents (All NSRs)	Plant noise under emergency operation conditions (Scenario 3)	None required	Slight	-	L	D	IR	Lt to P
Water Resource and Flood Risk	Fluvial Flood Risk	Flood risk from the Baldonnel Stream	Site-Specific Flood Risk Mitigation Plan and associated maintenance regime	Slight to Moderate	+	L	D	IR	LT

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Surface Water Flood Risk	Changes to flood risk as a result of changes to the surface water runoff regime of the site	None Required	Slight to Moderate	+	L	D	IR	LT
	Groundwater	Potential to alter local groundwater flow paths and levels	None Required	Imperceptible/Not Significant	-	L	D	IR	LT
	Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Operation	None Required	Imperceptible	+/-	L	D	IR	LT
Ecology	South Dublin Bay and River Tolka SPA	Pollution Ecological enhancement	None required	Imperceptible	+/-	L	I	IR	P
	Grand Canal pNHA and Liffey Valley pNHA	Pollution Ecological enhancement	None required	Imperceptible to Not-Significant	+/-	L	I	IR	P
	Baldonnel stream	Ecological enhancement	None required	Slight	+	L	D	R	P
	Terrestrial habitats	Ecological enhancement	None required	Imperceptible	+	L	D	R	P
	Bats	Disturbance through lighting	None required	Imperceptible	+	L	D	R	P
	Badger	Foraging habitat enhancement	None required	Imperceptible	+	L	D	R	P
	Birds	Foraging habitat enhancement	None required	Imperceptible	+	L	D	R	P
Ground Conditions	Adjacent site users	Impact to human health from exposure to residual contaminated soils / dust / ground gases / water.	None required	Imperceptible	-	U	I	IR	Lt to P
	Future site users		None required	Imperceptible	-	U	D	IR	Lt to P
	Water environment (Baldonnel Stream)	Contaminants released by operation activities through leakages/spillages.	None required	Imperceptible/Not significant	-	U	D	IR	Lt to P
	Groundwater beneath the site (aquifers)		None required	Imperceptible/Not significant	-	U	D	IR	Lt to P
Climate Change	**CCR**								
	Buildings and Infrastructure	Extreme rainfall events and increased frequency of intense rainfall events could result in the overwhelming of drainage assets.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure	Extreme rainfall events could lead to flooding of the underground foundations or services (electrical cables)	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure	Extreme rainfall events could lead to fluvial flooding, including of the Baldonnel stream high-lighted within the FRA; culvert has potential blockages	None required	Imperceptible to Not Significant	-	U	D	R	Lt

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Buildings and Infrastructure	Extreme rainfall events could lead to flooding of the drainage assets	None required	Imperceptible to Not Significant	-	U	I	R	Lt
	Human Health	Increased frequency of intense rainfall events could result in wet pavement surfaces leading to reduced skid resistance and unsafe conditions for site personnel.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Environment	Increased frequency and severity of extreme heat events (i.e., heat waves) could result in the landscape design being compromised (e.g., tree and shrubs die).	None required	Imperceptible to Not Significant	-	U	I	R	Lt
	Buildings and Infrastructure	Increased frequency and severity of extreme heat events could result in overheating of the electrical equipment (e.g. data servers).	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure	Transformers affected by urban heat islands and coincident air conditioning demand leading to overloading in summer months.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure	High temperatures and heatwaves could result in overheating and unsuitable conditions e.g., discomfort for occupants in ancillary buildings and office spaces	None required	Imperceptible to Not Significant	-	U	D	IR	Lt
	Buildings and Infrastructure	Heatwaves, higher temperatures could damage the building structure	None required	Imperceptible to Not Significant	-	U	D	IR	Lt
	Buildings and Infrastructure	Heatwaves, high temperatures and increased humidity could lead to lightning striking the data centre resulting in damage to infrastructure or loss of power.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Infrastructure and Human Health	Prolonged periods of drought could lead to vegetation drying, increasing risk of grassland fires near the Data centre. Secondary impacts include infrastructure damage and vegetation	None required	Imperceptible to Not Significant	-	U	I	IR	Lt
	Human Health	Prolonged periods of drought could affect water and potable water availability.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure and human health	Freeze-thaw could damage the proposed development, e.g. cracking, deformation, that reduces the proposed development's service life.	None required	Imperceptible to Not Significant	-	U	D	IR	Lt
	ICCI								
	Population and Human Health Sensitive Receptors	Potential interactions of climate change with the identified Population and Human Health effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Transport Sensitive Receptors	Potential interactions of climate change with the identified transport effects.	None required	Imperceptible to Not Significant	-	U	D	R	Lt

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Noise and Vibration Sensitive Receptors	Potential interactions of climate change with the identified Noise and Vibration effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Water Resources and Flood Risk Sensitive Receptors	Exposure of sensitive receptors to water from operational stage	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Ecology Sensitive Receptors	Potential interactions of climate change with the identified Ecological effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Ground Conditions Sensitive Receptors	Potential interactions of climate change with the identified Ground Conditions effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Waste Sensitive Receptors	Potential interactions of climate change with the identified Waste effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Material Assets Sensitive Receptors	Potential interactions of climate change with the identified Material effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	GHG Emissions								
	Global Climate	GHG Emissions	None required	Slight to Not Significant	-	IR	D	L	LT
Waste	Landfill Sites	Effect on void space	None required	Not significant to slight	-	L	D	IR	P
Material Assets	Power and Electrical Supply	Increased demand on the surrounding network	None required	Imperceptible	+/-	L	D	IR	P
	Gas Supply				+/-	L	D	IR	P
	Foul Water Infrastructure				+/-	L	D	IR	P
	Water Supply				+/-	L	D	IR	P
	Telecommunications				+/-	L	D	IR	P
	Surface Water Infrastructure	Risk of contamination to surrounding water environment.			+/-	L	D	IR	P
Landscape and Visual	**Landscape – Operation Year 5**								
	Site	Creation of new topography and habitat types with increased tree planting and connection with the Baldonnel stream landscape feature	None required	Imperceptible	+	L	D	IR	Lt to P
	Baldonnel Steam	Enhancement with new riverine planting and features including wetland meadow and pond	None required	Moderate	+	L	D	R	Lt to P
	Newcastle Lowlands LCA	Additional data centre development within a business park on the urban fringe with extensive boundary treatments that soften and assimilate the building into the landscape	None required	Imperceptible	-	L	ID	IR	Lt to P

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	The Grand Canal	Enhancement of linked green infrastructure features and increased commercial development within setting.	None required	Not Significant / Slight	-	L	ID	IR	Lt to P
	NIAH Listed features	Increased commercial development within setting.	None required	Not Significant / Slight	-	L	ID	IR	Lt to P
	Road Corridors	New commercial element within the transition from townscape to land-scape.	None required	Imperceptible	+	L	ID	IR	Lt to P
	Visual – Operation Year 5								
	VP: 03, 05, 10	Not visible	None required	Imperceptible	-	L	ID	IR	Lt to P
	VP04	A small addition to the view, in context with surrounding character	None required	Not Significant / Slight	-	L	ID	IR	Lt to P
	VP: 01; 02; 06; 08; 09, 11	A small addition to the view, in context with surrounding character	None required	Imperceptible	-	L	ID	IR	Lt to P
	VP: 07	A notable change within the view in keeping with the character of the area.	None required	Not Significant / Slight	-	L	ID	IR	Lt to P
Cultural Heritage	On site archaeology	None identified	None required	Imperceptible	+/-	U	D	IR	P
	Built heritage (TOR2-4)	Change to visual qualities of setting	None required	Imperceptible/ not significant	-	L	D	IR	P
	Built heritage (TOR8, 16, 17, 18-22)	None identified	None required	Imperceptible	+/-	U	D	IR	P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.