Planning & Development Act, 2000 - 2020,
European Communities (Environmental Impact Assessment) Regulations 1989 (as amended), Planning & Development Regulations, 2001 (as amended)

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

110kV transmission lines between permitted Coolderrig substation and the Grange Castle – Kilmahud Circuits, Grange Castle

April 2021

MARSTON
PLANNING CONSULTANCY

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1. INTRODUCTION

1.1 This Environmental Impact Assessment (EIA) Report has been prepared on behalf of Edgeconnex Ireland Ltd. (herein referred to as the 'applicant') to accompany a Strategic Infrastructure Development planning application to An Bord Pleanála (ABP). Planning permission is being sought for two underground single circuit 110kV transmission line from the permitted, and under construction, 110kV GIS Substation compound to the Grange Castle – Kilmahud Circuits c. 559m and 574m to the east within the townland of Grange, Dublin 22. These works are described in detail within Chapter 2 (Description of the Proposed Development) of this EIAR.

1.2 The permitted and under construction 110kV Gas Insulated Switchgear (GIS) Substation (known as Coolderrig Substation), 2 no. transformer bays, and Client Control Building were permitted under South Dublin County Council (SDCC) Reg. Ref. SD18A/0298 forms part of the wider Edgeconnex campus.

1.3 This development will hereafter be referred to as the 'Proposed Development'. EirGrid will be the transmission system operator (TSO). ESB Networks will be the transmission asset owner (TAO). (The company background and roles of the TSO and TAO are summarised in paragraph 1.22-1.23).

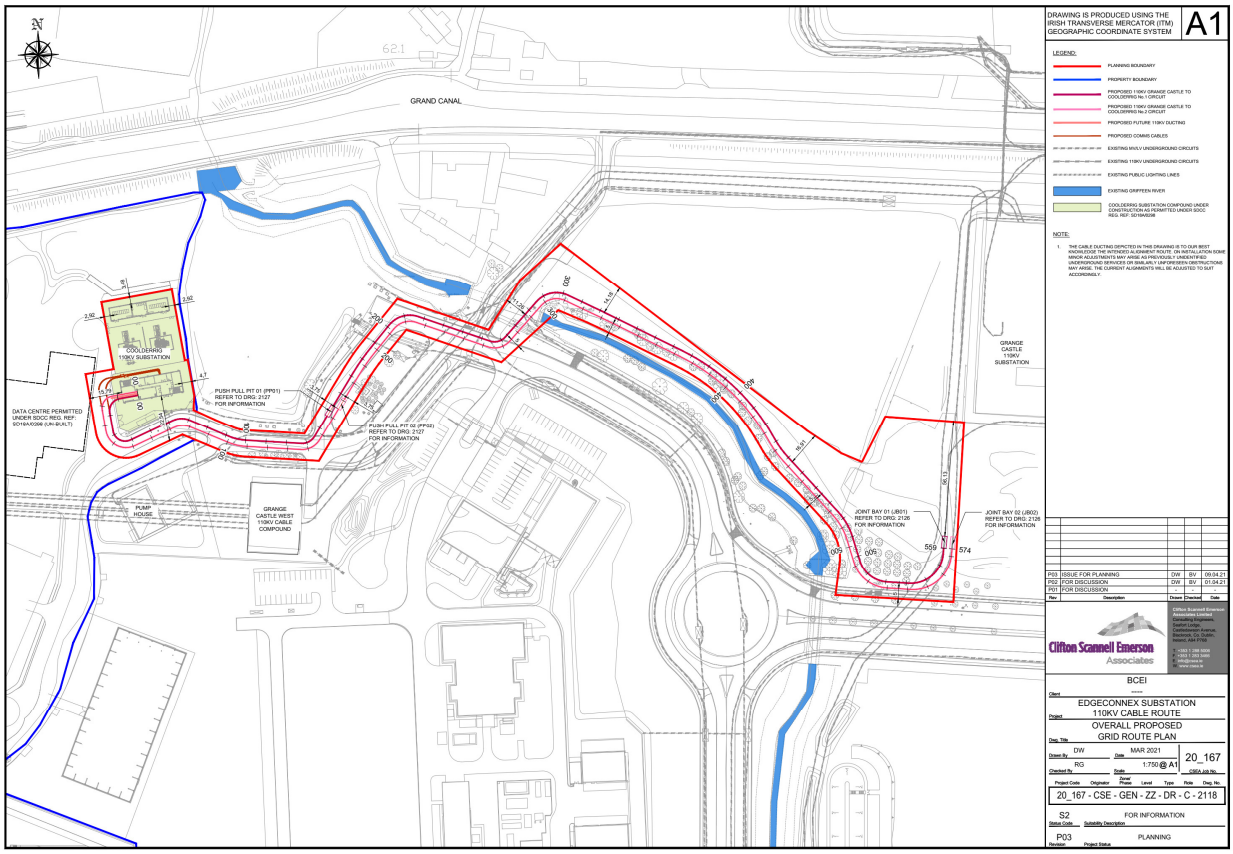

Figure 1.1 Proposed Development site boundary (red line), permitted substation, the proposed 110kV transmission lines (purple and pink lines) (Source: Clifton Scannell Emerson Associates, April 2021)

1.4 Figure 1.1 presents the route of the proposed underground 110kV transmission lines and the permitted and under construction GIS substation compound. The substation has been included within the application red line for completeness. A detailed description of the Proposed Development, and further drawings of the Proposed Development are provided in Chapter 2 (Description of the Proposed Development).

1.5 The Proposed Development is to be located on a site of c. 1.49hectares that consists of part of the Grange Castle Business Park campus and the Edgeconnex campus to the immediate west of the Park. The transmission route is bound by undeveloped lands within the Business Park to the north; and the Takeda complex and other internal Business Park infrastructure to the south. It is bound by the permitted Grange Back-up Power development that has yet to commence to the east; and the wider Edgeconnex complex that sits to the east of the R120 to the west. The transmission lines route passes

over a culverted stretch of the Griffeen River and is c. 80m from the Grand Canal to its north at its nearest point.

1.6 The Proposed Development is designed to provide a permanent power supply for the permitted development. The Grange Castle Business Park is owned by SDCC, and promoted in association with IDA Ireland, to attract overseas investment to the area. Located to the west of Clondalkin, Grange Castle has been the focus of significant international investment over the last several years.

1.7 It is strategically located being approximately 6km west of the M50 Orbital Motorway, and is close to the strategic road and mainline rail connections to the west and south of Ireland. The site is within 15 kilometres of the city centre and enjoys easy access to Dublin Airport and Dublin Port.

Legislative Requirements

1.8 The requirement for EIA for certain types and scales of development is set out in the EIA Directives (2011/92/EU and 2014/52/EU), European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (the bulk of which came into operation in September 2018), the European Communities (Environmental Impact Assessment) Regulations 1989-2006, Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001-2020. It should be noted that this EIA Report is prepared in accordance with the 2011 EIA Directive (2011/92/EU), as amended by the 2014 EIA Directive.

1.9 The EIA Directives list those projects for which an EIA is mandatory (Annex I) and those projects for which an EIA may be required (Annex II). With regard to Annex II projects, Member States can choose to apply thresholds or use case by case examination or a combination of both to assess where EIA is required. In Ireland, a combination of both has been applied.

1.10 The Proposed Development is not listed under Annex I EIA Directives. An EIA Report has been provided as the Proposed Development is required to provide the permanent power supply for the Permitted Development of the data centres granted under SDCC Reg. Ref. SD16A/0214; Reg. Ref. SD16A/0345; SD17A/0141; SD17A/0392; and SD18A/0298 that included an EIA Report to accompany each planning application.

1.11 The main objective of an EIA, as set out in Article 3(1) of the 2014 EIA Directive, is to identify, describe and assess the direct and indirect significant impacts of a project on population and human health, biodiversity, land, soils, water, air & climate (including noise), material assets, cultural heritage and the landscape and the interaction between the aforementioned factors. The EIA Report reports on the findings of the EIA process to date and informs the Planning Authority, statutory consultees, other interested parties and the public in general about the likely effects of the project on the environment.

Format of the EIA Report

1.12 This EIA Report has been prepared in accordance with the requirements of EIA Directives (2011/92/EU and 2014/52/EU). It is prepared in the Grouped Format Structure following the guideline structure set down in the Environmental Protection Agency (EPA) Draft "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports" (*2017).

1.13 The "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment" (August 2018) and the European Commission Guidance on the preparation of the Environmental Impact Assessment Report have been considered in the preparation of the EIA report.

1.14 This Environmental Impact Assessment Report (EIA Report) has been prepared in accordance with the requirements of the following:

- EU Directive /337/EEC; 2011/92/EU and 2014/52/EU;
- Planning and Development Act 2000 (as amended);
- Planning and Development Regulations 2001 (as amended);
- *Guidelines on the Information to be Contained in Environmental Impact Statements* 2002 (Environmental Protection Agency);
- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* 2003 (Environmental Protection Agency);

- *Revised Guidelines on the Information to be Contained in Environmental Impact Statements* Draft September 2017 (Environmental Protection Agency); and
- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* Draft September 2015 (Environmental Protection Agency).

1.15 Using the Grouped Format Structure, the EIA Report examines each environmental aspect in a separate chapter. Each chapter generally covers the following:

- Receiving Environment;
- Characteristics of the Proposed Development;
- Potential Impacts of the Proposed Development;
- Do-Nothing Scenario;
- Remedial and Mitigation Measures;
- Predicted Impacts of the Development; and
- Residual Impacts.

1.16 A Non-Technical Summary of the findings of the EIA Report is provided as a separate document.

1.17 A Schedule of Mitigation measures to be implemented as part of the Proposed Development is included in Appendix 2.3.

1.18 Cumulative impacts for each environmental topic are assessed within each Chapter of this EIA Report.

1.19 Interactions i.e. the interrelationship between each environmental aspect, are assessed as they occur in each chapter. The final chapter of the EIA Report, Chapter 16 shows where interactions have been identified and how they have been addressed.

Need for the Proposed Development

1.20 The need for the Proposed Development, designed to be made under this application, is to provide the necessary infrastructure to support the permanent power supply for the permitted development of the data centres granted under SDCC Reg. Ref. SD16A/0214; Reg. Ref. SD16A/0345; SD17A/0141; SD17A/0392; and SD18A/0298. All these applications were accompanied by a separate EIA report.

Company background

1.21 The Applicant seeks to provide data storage, management and dissemination services. To date, the Applicant has sought and gained permission for a number of data centre facilities on their complex that includes the permitted Coolderrig substation as well as on their new campus to the immediate west of the R120. The Applicant is committed to running its business in the most environmentally friendly way possible. Please refer to Chapter 2 (Characteristics of the Proposed Development) for additional details.

1.22 Eirgrid is the transmission system operator (TSO). Since 2006, Eirgrid has operated and developed the national high voltage electricity grid in Ireland. EirGrid is a state-owned company. EirGrid is independent from ESB. They operate the flow of power on the grid and plan for its future, while ESB Networks (the TAO) is responsible for carrying out maintenance, repairs and construction on the grid. The grid moves wholesale power around the country. Eirgrid brings energy from generation stations to heavy industry and high-tech users. They also supply the distribution network operated by ESB Networks that powers every electricity customer in the country.

1.23 ESB Networks are the transmission asset owner (TAO). ESB Networks is a subsidiary within ESB Group. ESB Networks finances, builds, and maintains the transmission system through which electricity flows from generation stations to bulk supply points near Ireland's cities and towns. It does this under a TAO licence granted by the Commission for Regulation of Utilities (CRU). ESB Networks performs its transmission related functions under the direction of Eirgrid. In summary EirGrid operates the transmission system (TSO) while ESB Networks carries out construction, maintenance, and repairs (TAO) under the direction of EirGrid. For this development, EirGrid will operate the permitted GIS substation, remotely from their control centres. However, ESB Networks will carry out all local operations on Eirgrid's behalf. Eirgird and ESB Networks are committed to running their businesses in the most environmentally friendly way possible.

Consultation

1.24 The Applicant and the project team have liaised with An Bord Pleanála (ABP) in advance of lodgment of the application for the Proposed Development that included a remote meeting held on the 11th January 2021 (Ref. PL06S.308655). Subsequent to that meeting documentation showing route options for the grid were forwarded to the Board on the 16th January 2021. Previously consultation meetings were held with South Dublin County Council as part of the application for the various data centre developments on the Edgeconnex site.

1.25 The EIA contributors/authors have incorporated advice and comments received from South Dublin County Council and ABP into the relevant chapters of this EIA Report.

Regulatory control

1.26 The proposed transmission of electricity is not an EPA regulated activity in terms of the Industrial Emissions Directive (Directive 2010/75/EU) (which replaced the IPPC directive). The TSO and TAO will ensure the relevant regulatory requirements relating to power activities are met.

Description of effects

1.27 The quality, magnitude and duration of potential effects are defined in accordance with the criteria provided in the EPA Draft *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (2017) as outlined in Table 1.1.

Table 1.1 Description of Effects as per EPA Guidelines (Draft, 2017)

Effect Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the env..
	Profound	An impact which obliterates sensitive characteristics
Duration of Effects	Momentary Effects	Effects lasting from seconds to minutes
	Brief Effects	Effects lasting less than a day
	Temporary Effects	Effects lasting less than a year
	Short-term Effects	Effects lasting one to seven years.
	Medium-term Effects	Effects lasting seven to fifteen years
	Long-term Effects	Effects lasting fifteen to sixty years
	Permanent Effects	Effects lasting over sixty years
	Reversible Effects	Effects that can be undone, for example through remediation or restoration
Probability of Effects	Likely Effects	The effects that can reasonably be expected to occur as a result of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
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	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	`Worst case' Effects	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents

Additional assessments required

1.28 This section addresses the additional approvals and assessments required under other EU Directives and legislation.

Appropriate Assessment Screening Report

1.29 A screening report has been completed by Scott Cawley, Consulting Ecologists for the Proposed

Development, as required under the Habitats and Birds Directive (92/43/EEC and 79/409/EEC) and is included as a stand-alone report. The AA (Appropriate Assessment) screening report document forms part of the SID application. The AA screening process has identified that seven European sites that are located within 15km or downstream of the Proposed Development site. The proposed development is hydrologically connected via the river network to European sites downstream in Dublin Bay (North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA).

1.30 Following an examination, analysis and evaluation of the best available information, and applying the precautionary principle, it can be concluded that the possibility of any significant effects on any European sites, whether arising from the project alone or in combination with other plans and projects, can be excluded. In reaching this conclusion, the nature of the project and its potential relationship with all European sites within the zone of influence, and their conservation objectives, have been fully considered. Therefore, it is the professional opinion of the authors of the AA Screening Report that the application for consent for the proposed development does not require an Appropriate Assessment or the preparation of a Natura Impact Statement (NIS).

Flood Risk Assessment

1.31 A Stage 1 Flood Risk Assessment has been undertaken for the site and forms a stand-alone report that forms part of this application.

Forecasting methods and difficulties in compiling the specified information

1.32 Forecasting methods and evidence used to identify and assess the significant effects on the environment for each environmental aspect are set out in each chapter. There were no significant difficulties in compiling the specified information for this EIA Report. Any issues encountered during the assessment of individual factors are noted within the relevant chapters.

Contributors to the EIA Report

1.33 The preparation and co-ordination of this EIA Report has been completed by Marston Planning Consultancy in conjunction with specialist subcontractors. Specialist inputs were provided by the following (Table 1.2):

Table 1.2 Roles and responsibilities in the EIA Report

Role		**Company**
EIA Project Management		Marston Planning Consultancy (MPC) – Anthony Marston
Engineering Design		Clifton Scannell Emerson Associates (CSEA)
EIA Chapter no.	**Chapter title**	**Company and consultant**
	Non-technical summary	MPC – input from each specialist
Chapter 1	Introduction	MPC – Anthony Marston
Chapter 2	Description of the Proposed Development	MPC – Anthony Marston
Chapter 3	Planning and Development context	MPC – Anthony Marston
Chapter 4	Consideration of Alternatives	MPC – Anthony Marston
Chapter 5	Population and Human Health	MPC – Anthony Marston
Chapter 6	Biodiversity	Scott Cawley – Alexis Fitzgerald
Chapter 7	Land, Soil, Geology and Hydrogeology	AWN Consulting – Marcello Allende
Chapter 8	Hydrology	AWN Consulting - Marcello Allende
Chapter 9	Noise and Vibration	AWN Consulting – Damian Kelly
Chapter 10	Air Quality and Climate	AWN Consulting – Dr. Edward Porter
Chapter 11	Landscape and Visual Impact	Kevin Fitzpatrick, Landscape Architecture – Kevin Fitzpatrick
Chapter 12	Traffic and transportation	Pinnacle Consulting – Ronan Kearns
Chapter 13	Cultural heritage	CRDS – Stephen Mandal
Chapter 14	Waste Management	AWN – Jonathan Gauntlett
Chapter 15	Material Assets	MPC – Anthony Marston
Chapter 16	Cumulative effects	MPC – input from each specialist
Chapter 17	Interactions	MPC – input from each specialist

Project Director / Selected Chapters - ***Anthony Marston, MSc (Environmental Planning).*** Anthony is a corporate member of both the Royal Town Planning Institute and the Irish Planning Institute. Anthony is the Principal of Marston Planning Consultancy with over 25 years' experience in EIA Management; and planning and development consultancy. He has project managed, co-ordinated, provided specialist input and contributed to numerous EIA Reports.

Biodiversity – *Alexis Fitzgerald. Alexis is a Consultant Ecologist with Scott Cawley.* Alexis holds an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin and obtained a distinction in his Masters in Biodiversity and Conservation from the same institution. He is an expert at vascular plant, charophyte and bryophyte identification and habitat surveying, developed over more than seven years of intensive study in university, professional ecological surveying and with natural history groups such as the Botanical Society of Britain and Ireland (BSBI) and the Dublin Naturalists' Field Club (DNFC). He also has extensive professional experience with vegetation and habitat classification and mapping (including EU Habitats Directive and Fossitt classification and statistical vegetation analysis), as well as rare, protected and invasive plant species surveying and monitoring. He has conducted multiple ecological surveys and assessments (Preliminary Ecological Appraisal, Ecological Impact Assessment, Appropriate Assessment, etc.) of linear infrastructure, residential, commercial and industrial projects. In a voluntary capacity, he is actively involved with such botanical and natural history groups as the BSBI and the DNFC, organising and leading field outings and indoor teaching seminars. He has also been the BSBI County Recorder for Co. Monaghan since 2015.

Land, Soils, Geology, Hydrogeology, and Hydrology- *Marcello Allende*. Marcelo Allende is an Environmental Consultant at AWN with over 15 years of experience in Environmental Consulting and water resources. Marcelo holds a degree in Water Resource Civil Engineering from the University of Chile. He has worked on a wide of range of projects including multi-aspect environmental investigations, groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, Due Diligence reporting, surface and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama.

Noise and Vibration - *Damian Kelly, Director and Principal Acoustic Consultant in AWN.* He holds a BSc from DCU and an MSc from Queens University Belfast. He has over 18 years' experience as an acoustic consultant. He is a member of the Institute of Acoustics. He has extensive knowledge in the field of noise modelling and prediction, having prepared the largest and most complex examples of road and industrial noise models currently in existence in Ireland. He was also co-author of the EPA document "Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities" (2012) and advised in relation to the noise limits applied to commercial developments by the various local authorities in the Dublin region.

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

Landscape and Visual Impact - *Kevin Fitzpatrick, BA(Hons) Land Arch, MLA, MILI.* Kevin is a corporate member of the Irish Landscape Institute. Kevin is the Principal of Kevin Fitzpatrick Landscape Architecture with over 15 years' experience in landscape and visual Impact assessment for inclusion in EIAR. He has provided visual assessment and specialist landscape analysis and design input to numerous EIA Reports.

Traffic and Transportation – *Ronan Kearns*. Ronan is an Associate Transportation Planner with a Masters in Civil Engineering with 17 years of experience in the traffic and transportation field. He has been involved in a variety of projects involving transport planning, Modelling, Traffic and Transport assessments, sustainable mobility planning, and engineering design.

Cultural heritage – *Dr. Stephen Mandal*. Dr Stephen Mandal MIAI PGeo EurGeol is co-founder (in 1997) and managing director of CRDS Ltd. Stephen holds an honours science degree in Geology and a PhD in Geoarchaeology on the petrology of the Irish stone axe from (TCD). He also holds Certificates in Safety and Health and Occupational First Aid (UCD). On completion of his PhD, Stephen spent two years as a post-doctoral research fellow in the Archaeology Department, UCD, during which time he also undertook a three-month research fellowship in Cineca, Bologna, Italy. Since 1991 Stephen has been petrologist for the Irish Stone Axe Project. He is professional member of the Institute of Archaeologists of Ireland, the Institute of Geologists of Ireland, and the European Federation of Professional Geologists. Between 2009 and 2014 Stephen Vice Chairperson of the Archaeology Committee of the Royal Irish Academy Committee.

Waste Chapter - ***Jonathan Gauntlett***. Jonathan is an Environmental Consultant in AWN Consulting with ongoing roles in impact assessment, licensing, environmental compliance and project management. Jonathan has over 9 years' experience in environmental compliance, environmental licensing, and urban planning. Recent projects include; SID and planning applications, IE Licence applications for biopharma and ICT facilities. Jonathan has a BSocSc (Environmental Planning) and BBA (Economics) from the Waikato University in New Zealand and has experience working in environmental consultancy, planning, and regulatory fields in Ireland, the UK and New Zealand.

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

Introduction

2.1 As described in Chapter 1 (Introduction), the Applicant is applying to ABP for planning permission for the provision of 2 no. underground single circuit 110kV transmission lines from the under construction and permitted 110kV Gas Insulated Switchgear (GIS) Substation (known as Coolderrig) within the Edgeconnex site; to the existing Grange Castle – Kilmahud Circuits with the Grange Castle Business Park and all associated and ancillary works (hereafter referred to as the 'Proposed Development'). The underground transmission lines cover a distance of c. 559m and 574m within the townland of Grange, Dublin 22. .

2.2 The permitted and under construction Coolderrig substation, 2 no. transformer bays, Client Control Building, associated compounds and site infrastructure are located within the Edgeconnex site to the immediate west of Grange Castle Business Park and were permitted under SDCC Reg. Ref. SD18A/0298.

2.3 This chapter presents a description of the Proposed Development as required by the relevant planning legislation, Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by the 2014 EIA Directive (2014/52/EU) (herein referred to as the EIA Directive), European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, the Draft EPA "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*" (2017) and the Draft EPA "Advice Notes for Preparing Environmental Impact Statements" (2015) (herein referred to as the Draft EPA Advice Notes for EIS 2015). Guidance outlined in the 'Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report'' published by the European Commission in 2017 was also considered in the preparation of this EIA Report.

Characteristics of the site

2.4 The Proposed Development is to be located on a site of c. 1.49ha. that consists of two parts. Firstly, the Coolderrig substation compound is located at the north-east corner within an under construction data centre campus of the applicant (Edgeconnex Ireland Ltd.). Their landholding and campus is bound by the Grand Canal and planting, including a road bridge (recently upgraded as part of the R120 scheme) to the north; the Takeda facility, sub-station, internal access roads and by undeveloped parts of the Grange Castle Business Park to the east; and a Microsoft data centre facility to the south. The campus is bounded by the R120 Newcastle Road and properties bounding this road to the west.

2.5 A number of permissions cover their campus. The data centres permitted under SDCC Reg. Ref. SD16A/0214 and SDCC Reg. Ref. SD16A/0345 have been built and are in operation at the southern end of the site. The data centre permitted under SDCC Reg. Ref. SD17A/0141 and amended under SDCC Reg. Ref. SD17A/0392 is partially built at the western edge of the campus.

2.6 The permission granted under SDCC Reg. Ref. SD16A/0345 as well as granting a data centre also permitted the existing temporary gas powered generation plant that sits to the immediate east of their campus on lands owned by Takeda. The temporary gas powered generation plant has been built and has been in operation for a number of years and provides power to the data centres so that they can operate. This permission received its Final Grant of permission on the 10th January 2017. Condition no. 3 of SDCC Reg. Ref. SD16A/0345 stated that the use of the temporary gas generation plant was permitted for a period of three years only. A further two years extension to this permission was granted under SDCC Reg. Ref. SD19A/0342 on the 4th February 2020. The Proposed Development will facilitate the decommissioning of this temporary gas powered generation plant.

2.7 A further permission was granted under SDCC Reg. Ref. SD18A/0298 for the full build out of their campus that included two further data centres and the substation that forms part of the Proposed Development site under this application. A full description of the planning history of the Edgeconnex campus is set out under Chapter 3 of this EIA Report.

2.8 The second part of the Proposed Development site consists of a linear route from the substation compound through the north-east corner of the Edgeconnex campus and under roads and lands within the Grange Castle Business Park.

2.9 The permitted and under construction 110kV GIS Substation Compound and short length of the transmission lines are located on land within the ownership of the Applicant. The majority of the transmission lines are on lands that are in the control or ownership of SDCC. Letters of consent are included within the planning application documentation for the Proposed Development.

110kV transmission line to the Grange Castle - Kilmahud Circuit

2.10 The route of the underground 110kV transmission lines to the Grange Castle – Kilmahud Circuits passes from the under construction substation compound within the Edgeconnex campus along the permitted internal access of their site for 70-80m. It then passes along under the internal road and bus terminus within the Grange Castle Business Park for c. 200m to a point just south of the Griffeen River. A Push Pull pit is proposed c. 150m along each transmission line to enable cabling to be pulled through the ducting given the length of the route from the joint bays at the Grange Castle – Kilmahud Circuits.

2.11 The route of the of the underground 110kV transmission lines will pass over the culverted Griffeen River before passing along an existing wayleave parallel and to the north of the open Griffeen River before each transmission line ties in with the Grange Castle – Kilmahud Circuits. The length of the 110kV cable routes is c. 559m and 574m. A proposed joint bay is to be installed at the connection to the Grange Castle - Kilmahud circuit.

2.12 The Proposed Development is not located directly adjacent to any areas of national or local environmental sensitivity/designation (Refer to Chapter 6 - Biodiversity for further details). The proposed Grand Canal NHA is located c. 85m to the north at its nearest point to the transmission lines. The need for the Proposed Development is described on page 3 of Chapter 1 of the EIA Report.

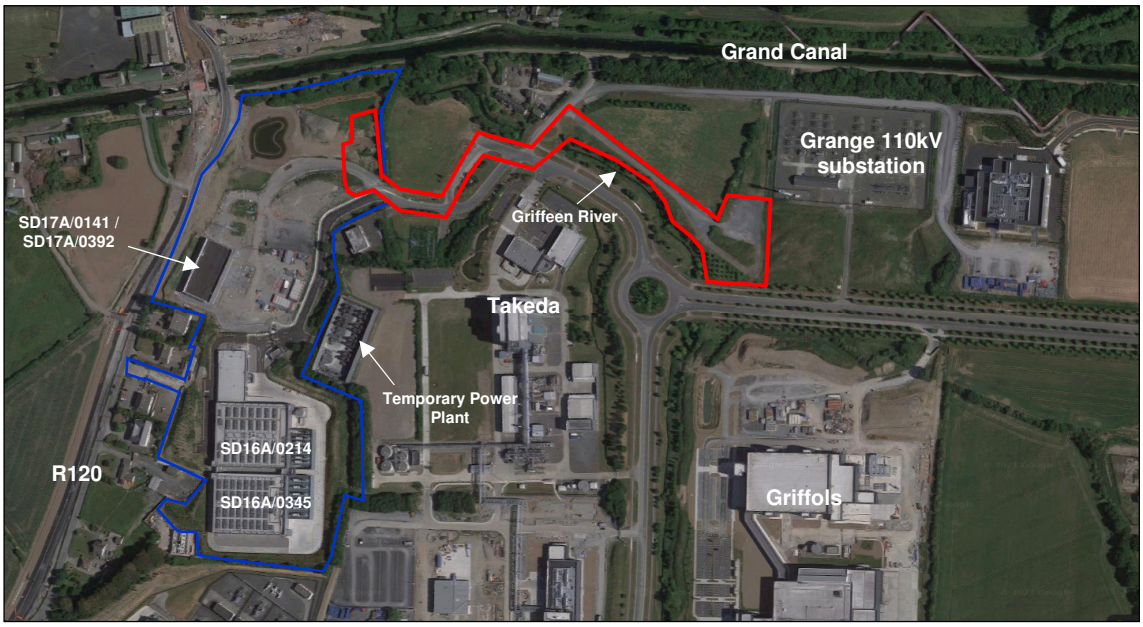

Figure 2.1 Proposed Development site outlined in red with the wider Edgeconnex campus site to east of the R120 outlined in blue in context of surrounding development and land uses (Source: Google Earth)

Permitted and under construction 110kV Substation

2.13 The Coolderrig 110kV GIS substation is located in the north-east part of the overall Edgeconnex campus. The substation received a Final Grant of permission on the 27th November 2018. The permission was subject to 25 conditions. The permitted substation includes a two storey GIS Substation building (with a gross floor area of 556sqm) (known as the Coolderrig Substation), associated underground services; 2 no. transformers and single storey MV switch room (180sqm)

within a 2.6m high fenced compound. The substation is due to be completed in the summer of 2021. A full description of the permitted development and the overall Edgeconnex campus is outlined in Chapter 3 of this EIAR.

Proposed Development description

2.14 The Proposed Development will consist of:

- The proposed development primarily comprises the provision of two no. 110kV transmission lines along with associated and ancillary works. The proposed transmission lines will connect the permitted and under construction Coolderrig 110kV Gas Insulated Switchgear (GIS) substation compound that was granted permission under SDCC Reg. Ref. SD18A/0298 with the existing Grange Castle – Kilmahud Circuits. The site of the proposed development has an area of c. 1.49 hectares.

- The two proposed underground single circuit 110kV transmission lines will connect the permitted Coolderrig 110kV GIS Substation, within the existing Edgeconnex landholding, to the existing Grange Castle - Kilmahud Circuits to the east. The proposed transmission lines cover a distance of approximately 559m and 574m within the townland of Grange, Dublin 22. The route of the transmission lines will pass along and under the internal road infrastructure within the Edgeconnex site and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Grange Castle – Kilmahud Circuits.

- The development includes the connections to the permitted Coolderrig substation as well as to the Grange Castle – Kilmahud Circuits, as well as changes to the landscaping within the Grange Castle Business Park and all associated construction and ancillary works.

- The permitted and under construction Coolderrig 110kV Gas Insulated Switchgear (GIS) substation includes a two storey GIS Substation building (with a gross floor area of 556sqm) (known as the Coolderrig Substation), associated underground services; 2 no. transformers and single storey MV switch room (180sqm) within a 2.6m high fenced compound, and all associated construction and ancillary works.

2.15 Figure 2.2 presents a site layout plan showing the route of the proposed 2 no. underground 110kV transmission lines, and the permitted 110kV GIS substation.

110kV transmission lines

2.16 The design of each underground 110kV transmission line will comprise a single 110kV circuit installed underground in high-density polyethylene (HDPE) ducting. The 110kV cables will be a standard XLPE (cross-linked polyethylene) copper cable. XLPE does not contain oil, therefore there is no risk of migration of oil into the ground in the event of a failure (such as a short circuit, a joint fail, a termination failure etc.). These types of failures would not have the potential to result in a perceptible environmental impact.

2.17 Site investigation works have been undertaken by Site Investigations Ltd. on the instruction of the Project Engineers, along the route, and is included in full within Chapter 7 of the Appendix document of this EIA Report. The findings of these investigations informed the route selection for the transmission lines.

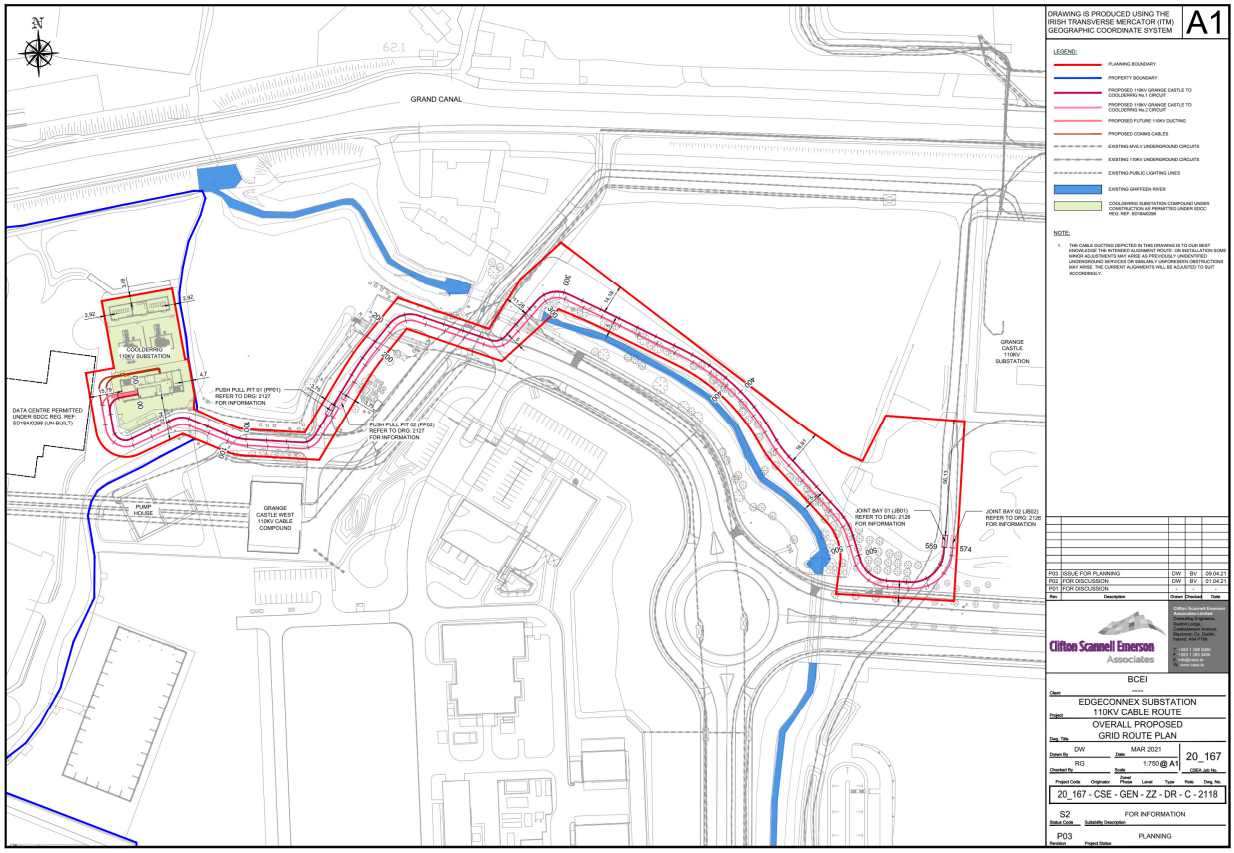

Figure 2.2 Proposed site layout plan of the Proposed Development site (red line) indicating proposed 110kV transmission lines (purple and pink lines) as well as the permitted development (shaded green) *(Source: Drawing no. 20_167-CSE-GEN-ZZ- DR-C-2118, CSEA Consulting Engineers)*

2.18 The installation of the HDPE ducting will require the excavation of one trench along each of the routes; each containing one 110kV circuit. The optimum depth of excavation of the trenches will typically be 1.25m below ground level but may increase at utility crossings. A wider shallow trench will be creates at surface (generally 0.3m depth to remove topsoil etc.. The typical width of each individual trench is 0.6m, however this may vary depending on ground conditions and the location of existing services. Five separate ducts will be installed in each trench. For the purposes of this assessment, reference to the 'transmission lines' refers to the transmission line to the Grange Castle - Kilmahud circuits. A typical cross section of the trench is illustrated in Figure 2.3.

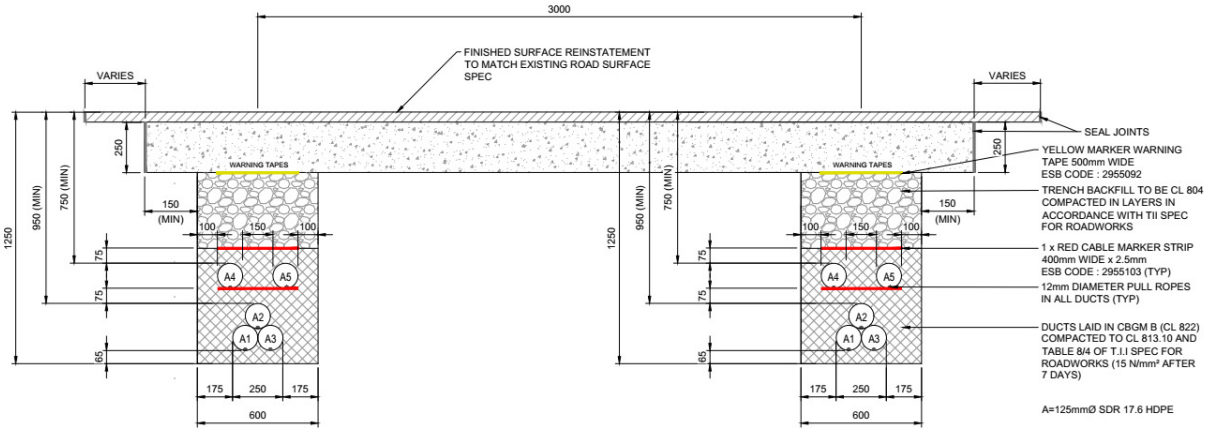

Figure 2.3 Typical cross-section of HV transmission line trench from the Grange Castle - Kilmahud Circuits to the permitted Coolderrig substation within the Edgeconnex campus (*Source: Drawing no. 20_167-CSE-GEN-ZZ-DR-C-2130, CSEA Consulting Engineers)*

2.19 The entire length of the transmission lines will be undertaken by excavator and hand digging, where required, in accordance with safe work procedures and HSA Code of Practice for Avoiding Danger from Underground Services. Trenches will be excavated with stable sloping, benching where required

and a suitable access and egress point. A suitable pump will be available on site and installed if groundwater is encountered to ensure trench stability and worker safety. Particular attention will be provided to the outlined requirements while working on the existing stream culvert crossing as well as in close proximity to the existing stream.

2.20 The ducting, bedding, surrounding fill material, warning marker boards and tape will be installed as per design in accordance with ESB specification while maintain safe clearance from existing utilities. Chambers and sandpits to be installed as per design in accordance with ESB specifications. Trenches will be backfilled with suitable material and surface finishes will be returned to original state.

2.21 The route of the transmission lines pass over the culverted Griffeen River within two trenches. This may require additional exploratory works to be carried out to assess existing utilities and/or culverted structure. There may be a requirement to excavate and hand dig below existing utilities at certain points to the required depth along the lines. This will involve reinstating backfill, and surrounding material to specified requirements to ensure underside of utilities are fully supported for load bearing purposes on completion.

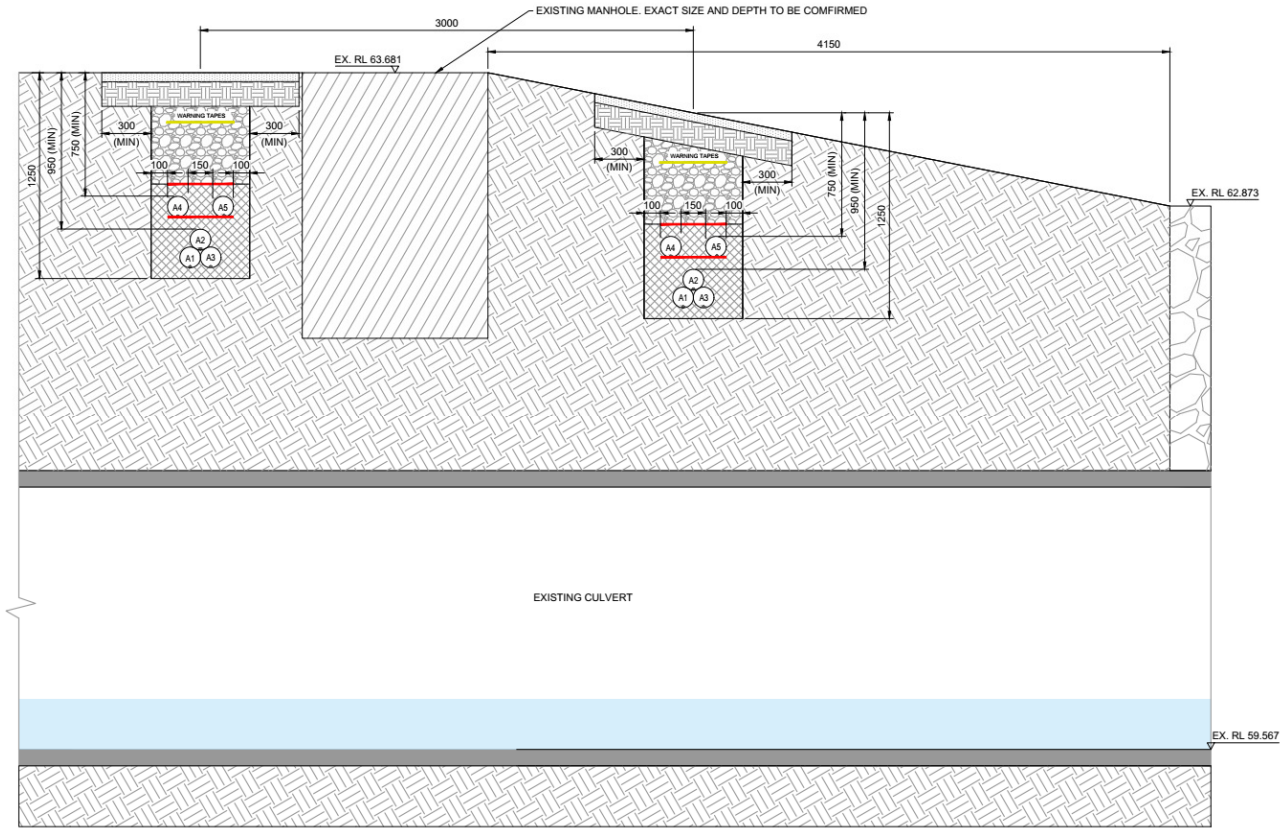

Figure 2.4 Cross-section of HV transmission lines trench crossing above the culverted Griffeen River (*Source: Drawing no. 20_167-CSE-GEN-ZZ-DR-C-2130, CSEA Consulting Engineers)*

2.22 The transmission lines pass along and parallel to the Griffeen River for c. 200m along its route and will require excavation along this part of the route (see Figure 2.5). This creates the potential for sediment and/or nutrient run-off, especially if soil is stored in an unconsolidated state for a period of time. Suspended solids or nutrients resulting from the decomposition of organic material could potentially enter the adjacent Griffeen River and other drainage features. It is considered unlikely that this would happen to a significant degree given the presence of dense riparian vegetation along the existing watercourse.

2.23 The methodology for the construction of this length of the route will include a range of other mitigation measures designed to further reduce impact on the river that includes that excavation and infilling will be carried out in small progressive stages. Any topsoil that is of use for landscaping will be stored on the site. Where this is required during the construction phase, it will be stored suitably far away from the Griffeen River and covered to avoid excessive sediment run-off or wind blow.

2.24 Whilst no significant run off of silt laden run off is anticipated, given the proposed construction methodology, the site will be regularly monitored by construction staff for signs of run-off such as silt in surrounding vegetation and measures will be put in place to prevent this where necessary. This may include the erection of a silt fence. A silt fence may be constructed by attaching a sheet of geotextile membrane to a stock fence and burying the bottom of it into the ground, thus allowing water to pass through but not the heavier fraction of the sediment.

2.25 Excavations will be carried out using a suitably sized excavator and always from the northern bank of the River. Any excavated soil that is not re-used will be disposed of to a Local Authority approved waste disposal facility. In all circumstances, excavation depths and volumes will be minimised and excavated material will be re-used where possible.

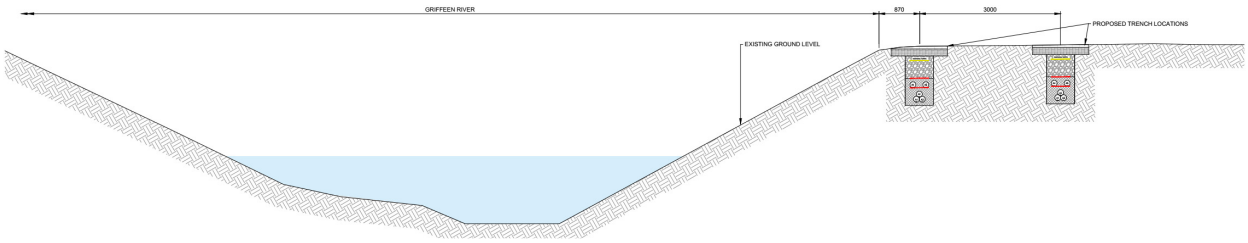

Figure 2.5 Typical cross-section of transmission lines to the north of the Griffeen River (Source: Drawing no. 20_167-CSE-GEN-ZZ-DR-C-2130, CSEA Consulting Engineers)

Joint bays and pulling pits

2.26 The proposed Development will link in to the Grange Castle – Kilmahud Circuits via the construction of two joint bays with associated communication chambers. The jointing bays will be c. 6m x 2.5m in plan and c. 2.5m to the underside of the base. These are located at the far eastern end of the Proposed Development site.

2.27 It is proposed to construct two no. push-pull chambers to the west of the crossing of the Griffeen River. The push-pull chambers will be c. 6m x 2.5m in plan and c. 2.5m to the underside of the base. These are required for the purpose of laying cables within the ducting given the length of the route.

Proposed Site Infrastructure and Secondary Facilities

Surface Water Drainage (Refer to Chapter 8 – Hydrology for further details)

2.28 In accordance with the requirements of South Dublin County Council and the Design Guidelines of the Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study any new development must adhere to the overall design requirements of these documents. The proposed drainage network of the Edgeconnex campus has been designed to convey the captured storm water on site and to direct it to the permitted attenuation pond to the north-west of the campus. This permitted attenuation pond is already constructed and has been modelled to ensure no physical clashes with other utilities, notably the proposed foul system.

2.29 The underground 110kV transmission lines from the proposed substation to the Grange Castle-Kilmahud Circuits and new joint and pull bays do not require any surface water drainage infrastructure.

2.30 Full details on surface water drainage design are provided within the *Engineering Planning Report*, prepared by CSEA Consulting Engineers which accompanies the planning submission for the Proposed Development. Chapter 8 Hydrology and Chapter 15 Material Assets address the potential impacts of the Proposed Development on storm water drainage.

Foul Drainage

2.29 The domestic effluent arising from the welfare facilities at the permitted GIS substation have been addressed under SDCC Reg. Ref. SD18A/0298. The wastewater contribution from the substation will be minimal and will be discharged via gravity into the on-site Grange Castle Business Park pumping station, from where it will be discharged via rising main / gravity into the local foul drainage network which ultimately discharges to Ringsend WWTP. No changes to this permitted foul drainage system

are proposed as part of the Proposed Development. The underground 110kV transmission lines from the under construction substation to the Grange Castle - Kilmahud Circuits and new joint bays do not require any foul drainage infrastructure.

2.30 A pre-connection enquiry (PCE) was therefore not required to be lodged with Irish Water.

2.33 Further detail in relation to wastewater emissions is presented in the CSEA Engineering Report, which accompanies this planning application and in Chapter 8 Hydrology and Chapter 15 Material Assets of this EIA Report. There are no process wastewater emissions to the foul drainage system.

Water Supply

2.34 The underground 110kV transmission lines from the permitted substation to the Grange Castle – Kilmahud Circuits and new joint bays do not require any water supply.

2.35 The permitted substation and wider data centre campus is provided with water via the Grange Castle Business Park mains supply (a 450mm water main) No changes to this supply and infrastructure is required to accommodate the Proposed Development.

2.36 Chapter 8 Hydrology and Chapter 15 Material Assets address the impacts on water supply. The average daily water demand for the permitted substation is likely to be below 1 PE.

Electricity

2.37 The permitted 110kV GIS substation, and proposed 110kV transmission lines are designed to support power demand for the permitted data centres and offices on the Edgeconnex campus. The permitted developments under SDCC Reg. Ref. SD16A/0214; Reg. Ref. SD16A/0345; SD17A/0141; SD17A/0392; and SD18A/0298 were subject to separate planning applications and EIA Reports and are located to the west /south-west of the permitted 110kV GIS (Coolderrig) substation. The Proposed Development will facilitate the decommissioning of the Power Plant granted under SDCC Reg. Ref. SD16A/0345 and subsequently extended for a further two years under SDCC Reg. Ref. SD19A/0342. A full description of the Permitted Developments is set out under Chapter 3 of this EIA Report.

Telecommunications

2.38 A fibre optic cable distribution network has been installed to serve the built data centres on the campus and these will be extended to the other permitted developments including the permitted substation.

Fire water system

2.39 A fire water ring main will be extended to the permitted substation to provide firefighting water to hydrants in the event of a fire. No fire water system is required for the proposed development.

Security and lighting

2.40 Other than during construction, the traffic accessing the permitted GIS substation will approach and access the site through the Grange Castle Business Park. A maximum speed limit of 20km/hour will be in place on the internal access road within the Edgeconnex campus.

2.41 Security will ensure that the procedure for accessing the facility is followed at all times. A record will be maintained of all personnel visiting the site (including deliveries etc.). All visitors to site will be monitored and supervised at all times, and if required suitable and appropriate procedures to deal with Covid-19 will be implemented. A 2.6m high security fence will be constructed around the perimeter of the permitted GIS substation and transformer compound.

2.42 CCTV cameras will be installed at strategic locations around the site to ensure all boundaries and approaches to the site are adequately monitored. An Intruder Detection System (IDS) combined with CCTV and security lighting will be utilised. The lighting design (both security and environmental lighting) has been assessed and optimised for the site, to ensure no obtrusive glare, light spillage or other light nuisance on neighbouring residential receptors or business users.

Table 2.1 Lighting mitigation design for bats

Bat Roosts	Foraging & Commuting
No direct illumination at exist points	Avoid lighting along river, lakes and canals
Position lights to avoid sensitive areas	Avoid lighting along important commuting routes
Use low pressure or high pressure sodium lights	Avoid the use of mercury or metal halide lamps
Avoid the use of mercury or metal halide lamps	Minimise light spills using shields masking and louvres
Restrict lights and the timing of such to avoid bat activity	Keep lighting columns as low as possible
Restrict lighting to ensure there are dark areas	Restrict lighting to ensure there are dark areas

2.43 Bat Conservation Ireland (www.batconservationireland.org) has produced a set of guidance notes for consideration in the design of bat sensitive lighting schemes. Further and more recent guidance has been provided by Bat Conservation Trust in the UK in relation to bats and artificial lighting. The main items to consider for both types of bat habitat are listed below.

2.44 The Permitted Development under SDCC Reg. Ref. SD18A/0298 was modelled at the time of its application, to ensure that it achieves the twin aims of having safe circulation routes whilst not having a long term impact on foraging, commuting and bat roosts. The lighting design within the campus and permitted substation ensure the illumination levels fall off to 0.5 lux within 2m of the roadways etc. (1 lux is accepted as being equivalent to a moon lit night). No additional lighting is proposed under this application. This is further detailed and assessed within Chapter 6 – Biodiversity.

Site roads and parking

2.45 The main construction and operational access to the Proposed and Permitted Developments will be from the access point into the site from Grange Castle Business Park. Other than during construction, the traffic accessing the permitted GIS substation will approach and access the site through this internal access road. Access arrangements and potential traffic safety impacts are considered in Chapter 12 Traffic and Transportation. Car parking is permitted to be provided adjacent to the permitted 110kV GIS substation. This is to allow for parking for full time staff as well as external staff, maintenance contractors and visitors attending the permitted substation and Proposed Development.

Existence of the Project

2.46 Under the current Draft EPA Guidelines on the information to be contained in EIA Reports, the description of the existence of the project is required to define all aspects of the proposed lifecycle of the Proposed Development under the following headings:

- Construction;
- Commissioning;
- Operation;
- Decommissioning; and
- Description of other related projects.

2.47 The following sections present a description of each of these aspects.

Description of Construction

2.48 The construction of the 110kV transmission lines will comprise three main stages, namely:

- Site preparation works and excavations;
- Cable installation, jointing and testing; and
- Reinstatement.

2.49 The construction of the new joint bays will be undertaken as part of the 110kV transmission line works to the Grange Castle - Kilmahud circuits will comprise three main stages, namely:

- Site preparation works and excavations;
- Construction of concrete bases for the electrical apparatus; and

- Fit Out Including M&E and commissioning.

Working Hours

2.50 It is anticipated that the construction of the 110kV transmission lines with their joint bays will be completed over a c. 2 month period during normal construction hours i.e. 7am to 7pm Monday to Friday with a half day working on Saturday (9am-1pm). Covid-19 restrictions may result in a prolonged construction schedule.

2.51 A portion of the 110kV transmission lines to the Grange Castle - Kilmahud Circuits is within the publicly accessible part of the Business Park. Construction of this portion of the route will be carried out between the hours of 10am and 4pm. During construction, staff will arrive on site at approximately 8am and take c. 1.5 to 2 hours to mobilise before commencing works. The works along and under the internal access road within the Business Park will be carried out along short lengths to minimise disruption. These works are likely to require closure of lanes for 1-2 weeks in both instances as works are undertaken. The works will be managed on a stop/go controlled basis for the length of these works. The works will mainly impact the access to the Edgeconnex campus but will also impact the bus turning area and access to the substation. Access to these areas will be maintained, or temporary measures will be put in place, for the duration of works.

2.52 The remainder of the route will be completed during normal construction hours i.e. 7am to 7pm Monday to Friday with a half day working on Saturday (9am-1pm). However, it is possible that the appointed contractors may wish to carry out certain operations outside these hours i.e. evening hours during long summer days etc. Such occurrences will be notified to the local authority, where required and generally kept to a minimum. Where they do occur, contractors will ensure they take place over as short a timeframe as possible and as such are unlikely to cause excessive disturbance.

Staffing

2.53 The following construction data has been used to estimate peak daily construction traffic (assumed to occur during civil works period for substation building):

- Average construction staff: 5-10; and
- Peak construction staff (peak staff levels during civil works): 12.

Construction schedule

- Application for Planning Permission – Q2 2021;
- Commence Site Construction works (subject to grant of planning permission) – Q1 2022; and
- Completion of Construction and Commissioning – Q2 2022.

Site preparation

2.54 Construction of the Proposed Development is due to commence, subject to grant of planning permission, in Q1 2022. Works in relation to the permitted substation is ongoing and is due for completion in Q2, 2021. The substation works and the Proposed Development will not occur at the same time. It is proposed that the same access and haul roads for vehicles will be utilised as for all development on the main site. A smaller off-site contractor's compound will be set-up to the west of the joint bays at the connection to the Grange Castle – Kilmahud Circuits. This hard standing area and hard standing access road from its north-west has been utilised as an access and compound area for previous projects within the Business Park.

2.55 The construction compound will facilitate office, portable sanitary facilities, equipment storage, parking etc. for contractors. It will be used for the short duration of the works. The site preparation required for the 110kV transmission lines and the new joint bays will require minimal site clearance. A combination of excavators, trucks and other soil shifting plant will commence the transmission line clearance and levelling aspects.

Building construction works

Levelling/Cut and Fill

2.56 It is proposed that some of the spoil generated will be reused under landscaped areas and/or in the formation level for roads and/or the construction compound. Any temporary storage of spoil required will be managed in accordance with a Construction and Environmental Management Plan (CEMP) to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc. (refer to Chapter 7 – Land, Soil and Hydrogeology and Chapter 14 – Waste Management of this EIA Report for further details).

2.57 Any excess spoil not suitable and/or required for reuse on site will be removed offsite for appropriate reuse, recovery and/or disposal as required (see Chapter 14 – Waste Management).

2.58 The Proposed Development will require the importation of a small amount of aggregate material. The fill material will be sourced from various locations within the Greater Dublin Area to facilitate construction of the Proposed Development. The impact of this has been assessed within Chapter 12 – Traffic and Transportation.

2.59 Contractors for the Proposed Development will be required to submit to the Planning Authority and adhere to a method statement (including the necessary risk assessments) indicating the extent of the areas likely to be affected and demonstrating that they will achieve the minimum disturbance necessary to achieve the required works. Any temporary storage of spoil will be managed, as set out under the finalised Construction Environmental Management Plan (CEMP) to be updated by the contractor from the draft CEMP submitted as part of this planning application pack. This will prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc. Please refer to Chapter 10 – Air quality and Climate of this EIA Report for further details).

Finishes

2.60 Reinstatement along the 110kV transmission lines will be as current, i.e. grassed in greenfield areas and hardstand along paved areas and roads.

Roads, services and landscaping

2.61 The internal road system will be completed as part of the Permitted Development under SDCC Reg. Ref. SD18A/0298. Landscaping will be undertaken in accordance with the landscape plan for the Edgeconnex campus, and as revised within the Business Park. A number of trees to the north of the Griffeen River are required to be removed to facilitate the works. These trees will be replaced on completion of the works (refer to Chapter 11 Landscape and Visual Impact of this EIA Report and the landscape drawings submitted by Austin Associates for further details).

Material sourcing, transportation and storage

Materials

2.62 Key materials will include piping, concrete, electrical cabling and process equipment and architectural finishes. A ‘Just in Time’ delivery system will operate to minimise storage of materials and waste management on site.

Sourcing

2.63 Where possible it is proposed to source general construction materials from the Dublin area to minimize transportation distances.

Storage

2.64 Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure area in the construction compound to prevent contamination. Liquid materials will be stored within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications – BS EN 1992-3:2006) to prevent spillage.

Transportation

2.65 Construction materials will be brought to site by road along the R134 and R136 as well as the internal business park access roads. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway.

Waste Management

2.66 Chapter 14 contains a detailed description of waste management (including quantities and types of waste) relating to construction and operation of the Proposed Development. A site-specific Construction and Demolition Waste Management Plan prepared by AWN Consulting Ltd. is included as Appendix 14.1 of this EIA Report. This C&D Waste Management Plan will be refined and updated by the appointed contractor in advance of the works to ensure best practice is followed in the management of waste from the Proposed Development.

Noise, Vibration and Dust Nuisance Prevention

2.67 With regard to construction activities, reference will be made to BS 5228 (i.e. BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014) *Code of practice for noise and vibration control on construction and open sites*, which offers detailed guidance on the control of noise and vibration from demolition and construction activities. Mitigation measures will be implemented during the construction of the Proposed Development, that will include:

- Limiting the hours during which site activities which are likely to create high levels of noise are permitted, e.g. soil levelling/excavations;
- Establishing channels of communication between the contractor/developer, local authority and residents;
- Appointing a site representative responsible for matters relating to noise and vibration; and
- Monitoring typical levels of noise during critical periods and at sensitive locations.

2.68 Furthermore, practicable noise control measures will be employed. These will include:

- Selection of plant with low inherent potential for generation of noise;
- Erection of acoustic barriers as necessary around items such as generators or high duty compressors; and
- Siting of noisy plant as far away from sensitive receptors as permitted by site constraints.

2.69 Noise and vibration control measures are discussed in detail in Chapter 9 - Noise and Vibration of this EIA Report.

2.70 The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of dust produced will be deposited close to the generated source.

2.71 In order to ensure that no dust nuisance occurs, a series of measures will be implemented during construction including:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only;
- If required, any area/road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 10km/hour, and on hard surfaced roads as site management dictates;
- In all conditions vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust;

- Wheel washing facilities will be provided for vehicles exiting the site to ensure that mud and other wastes are not tracked onto public roads;
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary; and
- At all times, these procedures will be strictly monitored and assessed. In the event of dust emissions occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

2.72 Dust nuisance control measures are discussed in further detail in Chapter 10 (Air Quality and Climate).

Water discharges

2.73 The Proposed Development will require site preparation and excavations, the installation of services and landscaping. Some removal of perched rainwater from the excavation may be required. Volumes will be quite low, and all pumped water will be subject to onsite settlement before release.

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

- Spillage or leakage of fuels (and oils) stored on site;
- Spillage or leakage of fuels (and oils) from construction machinery or site vehicles;
- Spillage of oil or fuel from refuelling machinery on site;
- The use of concrete and cement; and
- Storage of chemical on site.

2.75 See Chapter 8 - Hydrology for a full description of mitigation measures proposed to address all of the above.

Construction impacts

2.76 Each of the following EIA Report chapters (Chapters 3-16) includes an assessment of the potential impact of construction works on their individual environmental aspect and set out the relevant mitigation measures relating to that aspect. A Construction Environmental Management Plan (CEMP) will be put in place by contractors to minimise the impact of all aspects of the construction works on the local environment. The CEMP will include emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction. A Draft CEMP is submitted with the Proposed Development planning application documentation submitted by CSEA Consulting Engineers with the application package. The contractor will ensure that all workers and sub-contractors abide by the CEMP, which will be a live document to be updated throughout the construction process.

2.77 The primary potential effects from construction are temporary and will include:

- Potential effects in terms of nuisances relating to the air quality of the environs due to dust and other particulate matter generated from excavation works and effects on the noise environment due to plant and equipment involved in construction;
- Potential effects on the land, soils, geology & hydrogeology of the site during construction i.e. some loss of protection of the underlying aquifer to contaminants during site clearance, levelling and excavations etc.; and
- Potential effects on the local road network and its environs due to construction workers and other staff attending site during preparation, construction and commissioning phases.

2.78 Mitigation measures to address each of these potential short to medium term effects are presented in each individual chapter of this EIA Report and contained in the CEMP.

Description of commissioning

2.79 Once the construction of the Proposed Development is completed, ESB Networks will be mobilised to complete the commissioning. It will be carried out over a period of months. Commissioning works primarily involve a suitably qualified individual connecting the relevant cables to a switchgear within

the substations. Following this, energisation can take place. As there is no requirement for chemicals usage and minimal access to the route by personnel there is no likely environmental effect as a result of commissioning.

Operation of the Proposed Development

2.80 As stated in Chapter 1, EirGrid will be the transmission system operator (TSO) and ESB Networks will be the transmission asset owner (TAO). EirGrid will operate transmission stations, including the permitted and under construction new GIS substation, remotely from their control centres. However, ESB Networks will carry out all local operations on Eirgrid's behalf. ESB Networks will undertake local operational activities from the substation with only interim inspections along the underground transmission lines.

2.81 The estimated staff required are outlined in the following paragraphs.

Underground 110kV Transmission Lines

2.82 Once constructed, the underground transmission lines will not require any staff to operate it. Instead, two ESB Networks maintenance staff will carry out a routine inspection of the asset one year after completion and once every three years thereafter.

Joint Bays

2.83 Once constructed, these joint bays will not require any staff to operate them. Instead, ESB Networks maintenance staff will inspect these bays as part of their existing overall maintenance operations at the permitted substation. Therefore, no additional staff (above existing requirements) will be required to maintain the joint bays and thus, there will be no additional trips generated by this element of the Proposed Development.

2.84 Traffic relating to staff movements have been assessed as part of the traffic and transportation chapter of this EIA Report (Chapter 12).

Permitted 110kV GIS substation

2.85 The 110kV GIS substation will become operational as a result of the proposal and does not require any full-time staff to operate it. However, maintenance of the substation will be required by ESB Networks, including a routine weekly inspection, and a more comprehensive inspection once per year. The weekly inspection of the GIS substation will take a maximum of 8 hours on a single day and will be conducted by up to 2 staff.

2.86 In addition to the weekly inspections, more comprehensive maintenance works will take place annually on each cubicle. This will require up to 4 staff to conduct testing at the substation over a maximum period of 15 days (120 hours). It is expected that the proposed 3 new transformers (to be located south of the 110kV GIS substation) will also be inspected during this time.

Decommissioning of the Proposed Development

2.87 The lifespan of the Proposed Development is not defined but it is anticipated that it will be maintained, and periodic upgrading undertaken over a long lifetime to meet future demand and upgrade in technology. If the permitted GIS substation is no longer required over the long-term, then full decommissioning in accordance with prevailing best practice will be undertaken. Retirement of any cables will involve decoupling the cable from the switchgear. An excavation pit of approximately 10sqm will then be established. The cable to be retired will be identified within this excavation pit and spiked (to ensure that decoupling from the switchgear has been successful and the cable is not live). The cable will then be cut and capped to protect the exposed cable. The excavated pit can be reinstated using the excavated material with no import of fill required for this part of the Proposed Development. The retired cable can remain in situ in the ground, with the potential for it to be returned to operation should it be required in the future.

2.88 The decommissioning and/or removal of cable is ultimately a matter for the ESB/EirGrid in their function as TSO/TAO and does not form part of the Proposed Development.

Description of other developments

2.89 A list of the other developments in the vicinity of the Proposed Development is provided in Chapter 3 (Planning and Development Context) of this EIA Report.

Sustainability energy efficiency and resource use

2.90 Eirgrid and ESB Networks are committed to running their businesses in the most environmentally friendly way possible. ESB Networks is a subsidiary within ESB Group. The ESB Group has identified energy efficiency as a strategic priority within its Brighter Future strategy. ESB Group is a commercial semi-state-owned company (95% state-owned) and is committed to supporting and being exemplar in the delivery of Ireland's 2020 public sector targets. These targets, outlined in the fourth National Energy Efficiency Action Plan (2017 – 2020) (NEEAP), include an energy efficiency target of 33% for the public sector.

Health & safety

Design and Construction Health and Safety

2.91 The Proposed Development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007-2016 (S.I. 299 of 2007, S.I. 445 of 2012, S.I. 36 of 2016) as amended and associated regulations.

2.92 The Proposed Development has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience based on a number of similar developments.

General operational health and safety

2.93 ESB Networks has an Environmental Safety and Health Management System that will be established at the Proposed Development.

Potential impacts of the Proposed Development

2.94 The Proposed Development is to be located on EE (Enterprise and Employment) zoned lands with the objective "*To provide for enterprise and employment related uses"* under the South Dublin County Development Plan 2016-2022 and located adjacent to a permitted substation and an extensive data centre campus as well as other zoned lands that form Grange Castle Business Park. The development, when operational, will generate limited additional traffic, air, noise and water emissions and waste generation from activities.

2.95 During construction, there is the potential for temporary nuisance impacts from traffic, dust, noise and construction waste, if not carefully managed. All contractors will be required to adhere to the CEMP to ensure each of these potential impacts are minimised.

2.96 Each chapter of this EIA Report assesses the potential impact of the construction and operation of the Proposed Development on the receiving environment. Please refer to each specialist chapter respectively.

Major accidents / disasters

2.97 The 2014 EIA Directive and associated EPA Draft EIA Report Guidelines 2017 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 in the EIA Report. The site has been assessed in relation to the following external natural disasters; landslides, seismic activity and volcanic activity

and sea level rise/flooding as outlined below. The potential for major accidents to occur at the Proposed Development has also been considered with reference to Seveso/COMAH.

Landslides, Seismic Activity and Volcanic Activity

2.98 There is a negligible risk of landslides occurring at the site and in the immediate vicinity due to the topography and soil profile of the site and surrounding areas. There is no history of seismic activity in the vicinity of the site. There are no active volcanoes in Ireland so there is no risk of volcanic activity. Further detail is provided in Chapter 7 - Land, Soils, Geology & Hydrogeology.

Flooding/Sea Level Rise

2.99 The potential risk of flooding on the site was also assessed. A Stage 1 Flood Risk Assessment was carried out and it was concluded that the development is not at risk of flooding. The assessment indicates that the Proposed Development would not adversely impact on the flood risk for other neighbouring properties. Further detail is provided in Chapter 8 - Hydrology and the accompanying Stage 1 Flood Risk Assessment that forms a stand-alone document as part of the planning application and undertaken by Pinnacle Consulting Engineers. Given the inland location of the site, it is not at risk from sea level rise.

Seveso/COMAH

2.100 The Proposed Development will not be a Seveso/COMAH facility. No substance will be stored on site that forms the proposal that is controlled under Seveso/COMAH.

Minor accidents/leaks

2.101 There is a potential impact on the receiving environment as a result of minor accidents/leaks of fuel/oils during the construction and operational phases. However, the implementation of the CEMP and mitigation measures set out in Chapters 7 and 8 will ensure the risk of a minor accident/leak is low and that the residual effect on the environment is imperceptible.

Related development and cumulative effects

2.102 The Proposed Development is designed to provide permanent power to the data centre campus permitted and built under SDCC Reg. Ref. SD16A/0214 and Reg. Ref. SD16A/0345. It will also allow the completion of the data centre permitted under SDCC Reg. Ref. SD17A/0141 / SD17A/0392; and the construction of the data centres permitted under SDCC Reg. Ref. SD18A/0298. The Proposed Development will also allow the decommissioning of the temporary Power Plant that was originally permitted under SDCC Reg. Ref. SD16A/0345 and was subsequently extended under SDCC Reg. Ref. SD19A/0342.

2.103 A brief description of these permitted developments and their current status is provided in paragraphs 2.5 - 2.7 of this Chapter and in more detail in Chapter 3 – Planning and Development Context. These separate planning applications were also subject to EIA Reports. The Proposed Development has the potential to be constructed at the same time as the permitted data centres granted under SDCC Reg. Ref. SD18A/0298.

2.104 The cumulative impact of the Proposed Development with the permitted developments during the construction phase; and the entire permitted developments during the operational phase have been considered in each chapter of this EIA Report. Works that do not form part of the Proposed Development that will be undertaken by a statutory undertaker have also been cumulatively assessed under this EIA Report.

2.105 A list of the other developments considered to be relevant is provided in Chapter 3 (Planning and Development Context). The cumulative impact assessment is provided in each chapter of this EIA Report. The implementation of all mitigation measures set out under this EIA Report and under the EIA Report for the Permitted Development for each environmental aspect, will ensure that there will be no cumulative impacts arising.

3. PLANNING AND DEVELOPMENT CONTEXT

3.1 The Proposed Development is within the functional area of South Dublin County Council (SDCC). The following section details compliance of the Proposed Development, as described in Chapter 2, with regard to national policies and objectives as well as local planning policy under the South Dublin County Development Plan 2016-2022.

3.2 The Applicant is applying to ABP for planning permission for the Proposed Development. The project is designed to support the power demand for the permitted data centres as permitted and built under SDCC Reg. Ref. SD16A/0214 and Reg. Ref. SD16A/0345. It will also allow the completion and operation of the data centre permitted under SDCC Reg. Ref. SD17A/0141 / SD17A/0392; and the construction and operation of the data centres permitted under SDCC Reg. Ref. SD18A/0298. The Proposed Development will also allow the decommissioning of the temporary Power Plant that was originally permitted under SDCC Reg. Ref. SD16A/0345 and was subsequently extended under SDCC Reg. Ref. SD19A/0342. The permitted and under construction 110kV GIS substation compound is located within the north-east part of the overall landholding of the Applicant.

Strategic Infrastructure Development

3.3 Section 182A of the Planning & Development Act 2000 (as amended), provides that applications for approval of "*development comprising or for the purposes of electricity transmission*" shall be made directly to ABP. Section 182A, sub-section 9, also provides that "*transmission*" is to be construed in accordance with section 2(1) of the Electricity Regulation Act 1999 but shall also be construed as meaning the transport of electricity by means of:

(a) a high voltage line where the voltage would be 110 kilovolts or more, or
(b) an interconnector, whether ownership of the interconnector will be vested in the undertaker or not.

3.4 Section 2(1) of the Electricity Regulation Act 1999 defines "*transmission*", in relation to electricity, as:

*"the transport of electricity by means of a transmission system, that is to say, a system which consists, wholly or mainly, of high voltage lines and electric plant and which is used for conveying electricity from a generating station to a substation, from one generating station to another, from one substation to another or to or from any interconnector or to final customers but shall not include any such lines which the [*Electricity Supply*] Board may, from time to time, with the approval of the Commission* [for Energy Regulation]*, specify as being part of the distribution system but shall include any interconnector owned by the [*Electricity Supply*] Board."*

3.5 It should be noted that the Commission for Energy Regulation is now known as the Commission for the Regulation of Utilities (CRU). The Board's *Strategic Infrastructure Development Electricity Transmission Guidelines* provide that "*certain private sector Proposed Developments may constitute electricity transmission under section 182A where such proposals will ultimately form a node on or part of the transmission network. This might include for example substations and related connection infrastructure to the national grid associated with large commercial or industrial development*."

3.6 The Pre-application Consultation with ABP that included a meeting on the 11th January 2021 led to the Board ruling on the 4th February 2021 that the Proposed Development meets the relevant criteria and constitutes Strategic Infrastructure Development (SID) under Section 182A of the Planning and Development Act 2000 (as amended) (ABP Reg. Ref.: ABP-308655-20).

National Planning Framework

3.7 The National Planning Framework (NPF) was published in February 2018 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.

3.8 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 (including datacentres) 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."

3.9 The Proposed Development comprises a substation and associated ancillary development designed to support ICT and surrounding future development. A full description of the Proposed Development is available in Chapter 2 Description of the Proposed Development.

3.10 The Proposed Development comprises the provision of a permanent power supply for the permitted data centre campus, in a location which is well suited and serviced to accommodate such a use. The NPF also states under National Strategic Outcome 5, A Strong Economy Supported by Enterprise, Innovation and Skills :

"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 facilitys. 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."

3.11 The NPF is favourably disposed to the location of Power Generation Facilities and ICT infrastructure in Ireland, and the Proposed Development, which comprises of such infrastructure, is therefore considered to be wholly in accordance with this key body of national planning policy.

Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly

3.12 The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midlands Regional Assembly (EMRA) 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."*

3.13 The site is therefore considered to be an appropriate location for the development of data centres and its supporting infrastructure under this Strategy.

South Dublin County Development Plan 2016-2022

3.14 The South Dublin County Development Plan (The Plan) is the statutory planning document that covers the entire South Dublin administrative area. The Plan was adopted in June 2016. The Proposed Development is to be located within an area zoned EE (Enterprise and Employment) under the County Development Plan with the stated aim:

"*To provide for enterprise and employment related uses."*

3.15 The Proposed Development is required to provide permanent power for the permitted data centres as permitted and built under SDCC Reg. Ref. SD16A/0214 and Reg. Ref. SD16A/0345. It will also allow the completion and operation of the data centre permitted under SDCC Reg. Ref. SD17A/0141 / SD17A/0392; and the construction and operation of the data centres permitted under SDCC Reg. Ref. SD18A/0298. The Proposed Development will also allow the decommissioning of the temporary

Power Plant that was originally permitted under SDCC Reg. Ref. SD16A/0345 and was subsequently extended under SDCC Reg. Ref. SD19A/0342.

3.16 The County Development Plan (s. 10.2.9) supports the provision of transmission and energy infrastructure with the appropriate service providers such as ESB Networks and Eirgrid that facilitates the economic development and expansion of the County. Energy (E) Policy 11 of the County Development Plan specifically states that "*It is the policy of the Council to ensure that the provision of energy facilities is undertaken in association with the appropriate service providers and operators, including ESB Networks, Eirgrid and Gas Networks Ireland. The Council will facilitate the sustainable expansion of existing and future network requirements, in order to ensure satisfactory levels of supply and to minimise constraints for development*". The service providers and operators have been fully consulted in formulising this SID application.

3.17 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 northwards from City West to Grange and Grange Castle.

3.18 It is the policy of the Council to support sustainable enterprise and employment growth in South Dublin and in the Greater Dublin Area, whilst maintaining environmental quality. A number of objectives relate to EE zoned lands that include ET3 Objective 2 that states:

"To prioritise high tech manufacturing, research and development and associated uses in the established Business and Technology Cluster to the west of the County (Grange Castle and Citywest areas) to maximise the value of higher order infrastructure and services that are required to support large scale strategic investment."

3.19 Policy ET3 Objective 5 requires that "*all business parks and industrial areas are designed to the highest architectural and landscaping standards and that natural site features, such as watercourses, trees and hedgerows are retained and enhanced as an integral part of the scheme*". The wider permitted development and proposal retains and enhances natural site features by the use of the highest architectural and landscaping design standards.

3.20 Policy ET3 Specific Local Objective 1 supports the conducting of a review of the zoning of lands south of the Grand Canal and west and north of the R120, with a view to preparing a long term plan for the expansion of the Grange Castle Economic and Enterprise Zone, to accommodate strategic investment in the future, while also seeking to provide public open space along the Canal, including a natural heritage area in the vicinity of the historic canal quarries at Gollierstown. This rezoning has formed Variation no. 1 of the County Development Plan and does not relate to these lands.

3.21 The nature of the permitted development on the Edgeconnex campus was informed by a site analysis of environmental issues and individual environmental reports were prepared and submitted with the application for development under SDCC Reg. Ref. SD16A/0214; SD16A/0345; SD17A/0141 / SD17A/0392 and SD18A/0298.

3.22 This has included noise and air quality objectives. The enhancement and creation of new bio-diversity corridors to fully integrate the Permitted and Proposed Development into the surrounding environment to ensure that direct and cumulative effects on biodiversity are addressed in the overall design. Suitable attenuation and sustainable drainage systems have also informed the design of the permitted campus development. This mitigation of design of the permitted development also increases native tree planting within the Edgeconnex campus from its current position. The permitted development within the Edgeconnex campus incorporates SUDS fully in accordance with policies of the Plan.

3.23 In conclusion it is considered that the Proposed Development is in accordance with the policies and objectives of local, regional and national land use planning policy.

Sustainable Development

3.24 Irelands Framework for Sustainable Development 'Our Sustainable Future' (launched 2012 with subsequent progress report in 2015), by the Department of the Environment, Community and Local

Government. It provides a framework to ensure that development is undertaken in a sustainable manner.

3.25 'Our Sustainable Future' aims to ensure that development is carried out sustainably and in an environmentally sound manner which includes optimisation of natural resources, minimisation of waste, safe and sparing use of chemicals and the application of clean technology.

3.26 All of these aspects will be integral considerations in the construction and operation of the Proposed Development on a day to day basis and are addressed within this EIA Report where appropriate.

Consultation

3.27 The Applicant and the project team have liaised with An Bord Pleanála (ABP) in advance of lodgement of the Proposed Development on the 11th January 2021. Previously consultation meetings were held with South Dublin County Council as part of the applications for the various permitted developments in which the permitted and under construction GIS substation development was shown as part of future infrastructure. EIA contributors/authors have incorporated advice and comments received into the relevant chapters of this EIA Report.

Relevant planning history

Edgeconnex campus

Reg. Ref. SD16A/0176

3.28 A planning application was lodged with South Dublin County Council for enabling works on the southern part of the site to the east of the R120 to carry out the required demolition, earthworks and site preparation works to facilitate the Proposed Development. This application was made prior to the making of application under Reg. Ref. SD16A/0214 in order to facilitate the clearing of the site for future development.

Reg. Ref. SD16A/0214

3.29 A decision to grant planning permission for phase 1 of the development of this Edgeconnex data centre campus to the east of the R120 was made on the 11th August 2016. The proposed data centre and associated elements has a gross floor area of 5,839sqm amounting to a site coverage of 9% over the entire site of 6.5hectares. The buildings consist of the following primary components:

- 1 no. single storey data halls with roof plant and stand-by generators to be located to its east to be built primarily on the northern part of the southern extent of the overall site;
- Single storey goods receiving area and storage, and single storey office to be located to the north of the data hall; and
- ESB sub-station in the position of the currently under construction substation.

3.30 The overall height of the development is dictated by the parapet screen to the roof plant of the data hall that is circa 10.5m above finished ground level. The other building elements will be lower. External plant consisting of 6 no. standby generators will be located to the east of the data hall. The standby generators will be screened from view. Mechanical units will be located on the roof and will also be screened from view and treated similar to adjacent developments. The generator flues will extend circa. 15m above ground level above each generator.

Reg. Ref. SD16A/0345

3.31 Permission was granted on the 10th January 2017 to extend the data centre facility by the construction of a new data centre of 4,176sqm to the immediate south of the data hall of 4,435sqm and single storey office of 1,341sqm permitted under Reg. Ref. SD16A/0214. The permitted extension of the data centre and associate elements include the following primary components:

- 1 no. single storey data halls with roof plant and 5 no. stand-by generators to be located to its east to be built to the immediate south of the data hall and generators permitted under Reg, Ref. SD16A/0214;
- Temporary gas generation plant within walled yard measuring 2,811sqm and containing 12 no. 1.875 MVA sized container units to be located within the Takeda lands to the east of the site (it is this element that is the subject of this amendment application); and
- New two storey ESB substation (507sqm) with associated transformer yard and building (157.5sqm) to replace gas generation plant on upgrade of electricity connections in the area.

3.32 The temporary gas generator plant permitted consisted of an open walled yard of 2,811sqm that will contain 12 no. 1.875 MVA sized container units. All these are gas fired engines that result in lower emissions than the comparable diesel fired alternative. The temporary plant will operate on a continual basis until such time as the load demand can be accommodated on the electrical utility grid, which will be facilitate by the current application. The plant will be decommissioned if permission is granted and once the grid connection is fully operational.

Reg. Ref. SD17A/0027

3.33 Permission was granted on the 4th April 2017 for the potential future relocation of the temporary gas generator plant permitted under Reg. Ref. SD16A/0345 on lands owned by Takeda, to lands within the applicant's control. This permission has not been implemented and was extended again under Reg. Ref. SD20A/0031.

Reg. Ref. SD17A/0141

3.34 Permission was granted on the 14th August 2017 for a new stand-alone single storey data centre of 1,515sqm to the immediate north of the data centre, and its extension, permitted under Reg. Ref. SD16A/0214 and SD16A/0345. The attenuation pond was permitted to be enlarged under this permission.

Reg. Ref. SD17A/0392 / ABP Ref. ABP-300752-18

3.35 Permission was granted by the Board on the 26th July 2018 for a 125sqm extension and other modifications to the permission granted under SD17A/0141. The decision upheld the decision of the Planning Authority following a single third party appeal.

Reg. Ref. SD18A/0298

3.36 Permission was granted on the 27th November 2018 for development of 2 no. new single storey data centres and associated office areas, and plant, with a gross floor area of 5,823sqm. The first data centre of 1,857sqm was located to the immediate east of the data centre that was permitted and subsequently extended under Reg. Ref. SD17A/0141 / SD17A/0392. The second data centre (3,005sqm) will be located to the north of the extended data centre granted under Reg. Ref. SD17A/0141 and SD17A/0392 and to the south of the permitted attenuation pond. This permission once implemented will result in the site to the east of the R120 being fully developed.

3.37 The permission also facilitated the redesign of the ESB substation and associated transformer yard and client control building. This substation is currently being constructed and is due to be completed during the summer of 2021.

Reg. Ref. SD19A/0342

3.38 This permission extended the duration of the permission for the temporary gas powered generation plant to the east of the Edgeconnex campus for a further two year period from the 4th February 2020. No works were associated with the permission.

Proposed Edgeconnex site to the west of the R120

Reg. Ref. SD19A/0004

3.39 A planning application was lodged with South Dublin County Council for enabling works on the southern part of the Proposed Development site to carry out the required earthworks and site preparation works to facilitate the development proposed under this application. This application was granted permission in 2019. No works have commenced in relation to this permission.

Reg. Ref. SD19A/0042 / ABP Ref. PL06S.305948

3.40 Permission was granted by An Bord Pleanála on the 5th October 2020, which upheld the decision of the Planning Authority for the phased development of 4 single storey data halls within two data centre buildings all with associated plant at roof level, 32 standby generators, office and service areas, service road infrastructure, car parking, ESB substation/transformer yard, An EIAR was submitted with the application for the development that had an overall gross floor area of 17,685sqm. The development also included a temporary gas-powered generation plant within a walled yard containing 19 no. generator units (15 + 4 arrangement) with associated flues (each 17m high) to be located to the west of the proposed data halls.

3.41 Following a request for Further Information, the number of generators within the Power Plant was reduced to only 8 operating with two back up units and limited to a lifespan of two years.

3.42 The decision of the Board was subject to 19 conditions. Condition no. 16 relating to noise outlined that operational noise shall not exceed 45dB(A) Leq 1 hour between 2000 and 0800, and 55dB(A) Leq 1 hour at all other times. The condition in full stated:

> *"The operational noise level shall not exceed 55 dB(A) Leq 1 hour (corrected for any tonal or impulsive component) at the nearest noise sensitive locations, including dwellings, between 0800 and 2000 hours, Monday to Friday inclusive, and shall not exceed 45 dB(A) Leq 1 hour at any other time. All sound measurement shall be carried out in accordance with ISO 1996-1:2016 "Acoustics - Description, measurement and assessment of environmental noise - Part 1: Basic quantities and assessment procedures". Procedures for the purpose of determining compliance with this limit shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development."*

3.43 This permission has not commenced on site.

Reg. Ref. SD21A/0042

3.44 An application was lodged with the Planning Authority on the 24th February 2021 for a further extension to the applicants data centre campus to the west of the R120. The development will consist of the construction of two no. single storey data centres with associated office and service areas; and three no. gas powered generation plant buildings with an overall gross floor area of 24,624sqm that will comprise of the following:

- Demolition of abandoned single storey dwelling, remaining agricultural shed and derelict former farm building;
- Construction of 2 no. single storey data centres (12,797sqm), both with associated plant at roof level; with 24 no. standby diesel generators with associated flues (each 25m high) that will be attached to a single storey goods receiving area / store and single storey office area (2,404sqm) located to the west of the data centres as well as associated water tower and sprinkler tank and other services;
- amendments to the internal access road and omission of access to loading bay permitted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948 that include the relocation of permitted, and new, internal security gates; and new internal access roads to serve the Proposed Development that will provide access to 39 no. new car parking spaces (including 4 no. electric and 2 no. disabled spaces) and sheltered bicycle parking to serve the new data centres;
- The development will also include the phased development of 3 no. two storey gas powered generation plants (9,286sqm) within three individual buildings and ancillary development to provide power to facilitate the development of the overall site to be located within the south-west part of the overall site. Gas Plant 1 (3,045sqm) will contain 20 no. generator units (18+2) with associated flues

(each 25m high) will facilitate, once operational the decommissioning of the temporary Gas Powered Generation Plant within its open compound as granted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948. Gas Plant 2 (3,045sqm) will contain 20 no. generator units (18+2) with associated flues (each 25m high); and Gas Plant 3 (3,196sqm) will contain 21 no. generator units (19+2) with associated flues (each 25m high). These Plants will be built to provide power to each data centre, if and, when required. The Gas Plants will be required as back-up power generation once the permanent power connection via the permitted substation is achieved;
- New attenuation pond to the north of the site;
- Green walls are proposed to the southern elevation of each Power plant, as well as to the northern elevation of the generator compound of the data centres, and enclosing the water tower/pump room compound; and a new hedgerow is proposed linking the east and west of the site; and
- Proposed Above Ground Gas Installation compound to contain single storey kiosk (93sqm) and boiler room (44sqm).

3.45 The development will also include ancillary site works, connections to existing infrastructural services as well as fencing and signage. The development will include minor modifications to the permitted landscaping to the west of the site as granted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948. The site will remain enclosed by landscaping to all boundaries. The development will be accessed off the western side of the R120 via the permitted access granted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948.

3.46 It is proposed to provide permanent power supply to the site via the permitted GIS substation located centrally within the site and as granted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948. Its HV connection to a suitable point of connection is yet to be defined by Eirgrid and will be applied for, if deemed to be a SID form of development, under a separate Strategic Infrastructure Development (SID) application accompanied by an EIA Report.

3.47 The interim power supply to the western campus, which is not affected by the current proposal, is required to be provided by the proposed Power Plants that form part of this application, and will be developed in a phased basis, to provide permanent power for the data centre granted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948; and the rest of the western data centre campus.

3.48 Due to the Flexible Demand offer from Eirgrid for the western campus site; the Power Plants will be required to provide additional reliability of power, and will act as a back-up source of power when the connection to the national grid is unavailable. This is likely to be for relatively short periods but longer than could be sustained by the standby generators associated with all data centres on site. The Planning Authority are due to make a determination on this application by the 20th April 2021.

Conclusions

3.49 The Proposed Development, described in Chapter 2 of this EIA Report is fully in accordance with local, regional and national land use planning policy. The Proposed Development will be situated on suitably zoned lands within this site identified and subject to applications that it will facilitate and within the Grange Castle Business Park.

3.50 The content of this EIA Report identifies potential environmental risks and how they will be addressed and mitigated in the design, during construction and during the operational phases of development. Details of the various environmental topics are identified and discussed in the following chapters of the EIA Report.

3.51 In conclusion, it can be stated that the Proposed Development complies fully with the stated requirements of SDCC and will deliver a key piece of supporting infrastructure, which is of significant importance to the Applicant.

4. ALTERNATIVES

4.1 EIA legislation and the prevailing Guidelines as set out in Chapter 1 of this EIA Report and best practice require that Environmental Impact Assessment Reports (EIA Reports) consider 'reasonable alternatives', for example in terms of project design, technology, location, size and scale; that have been studied, which are relevant to the Proposed Development and its specific characteristics; and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects'. This section will address:

- Do Nothing Alternative;
- Alternative project locations;
- Alternative designs/layouts;
- Alternative processes;
- Alternative technologies; and
- Alternative mitigation measures.

4.2 This chapter describes the alternatives that were considered for the Proposed Development, where applicable, under each of the headings presented in Section 4.1 and the reasons for the selection of the chosen options, including a comparison of environmental effects of the alternative options where relevant.

Do-nothing alternative

4.3 In the event that the Proposed Development does not proceed, the permitted data centres as granted under SDCC Reg. Ref. SD17A/0141 / SD17A/0392; and under SDCC Reg. Ref. SD18A/0298 would not be completed or built. The data centres built and in operation under SDCC Reg. Ref. SD16A/0214 and Reg. Ref. SD16A/0345 would be left without a permanent power supply. This would require either a further extension of the permission for the temporary gas powered generation plant originally permitted under SDCC Reg. Ref. SD16A/0345 and extended under Reg. Ref. SD19A/0342 to be further extended or they would be forced to cease operation.

4.4 The permanent power supply is designed to provide the full power requirement of the various permitted developments. Without the permanent power supply that the Proposed Development will provide, the rest of the Edgeconnex campus will remain undeveloped with the potential that the currently operating data centres may not be able to operate after the 4th February 2022.

4.5 The land on which the Proposed Development would be located, would remain undeveloped outside of the campus; and the road and existing planning to the north of the Griffeen River would remain and would reach maturity. The undeveloped land with the Edgeconnex campus would likely recolonise as scrub following the completion of the currently under construction substation.

4.6 There are no environmental effects associated with the do-nothing scenario. The Do-Nothing scenario has been considered in each chapter of the EIA Report.

Alternative project locations

110kV Transmission Line Routes

4.7 The assessment of the alternative routes for the 110kV transmission lines considered various route options for the 110kV transmission line to the Grange Castle-Kilmahud Circuits. These included various routes and connection points relating to the Grange Castle-Kilmahud Circuits Once the connection point was established by Eirgrid, the number of alternative routes was limited primarily by the need to cross the Griffeen River as well as navigating the existing utilities in the area. There was also a need to avoid crossing the land to the west of the Grange substation and north of the Griffeen River outside of designated SDCC wayleaves.

4.8 Site investigation works have been undertaken by Site Investigations Ltd. on the instruction of the Project Engineers, along the route, and is included in full within Chapter 7 of the Appendix document of this EIA Report. The findings of these investigations informed the route selection for the transmission lines.

4.9 The alternatives considered were limited to different arrangements of linking from the permitted substation to the connection point. The aim of the alternative routes were to minimise, where possible the length of construction works, and if possible to remain within the alignment of existing wayleaves, where possible. The alternatives differed significantly in terms of length due to the need to stay close to or within wayleaves along the eastern part of the route. The routes considered can be summarised as follows:

Option 1 – this route (purple) forms a very similar alignment to the preferred route that forms this SID application.
Option 2 – this route (orange) crossed along the southern side of the access road to the Edgeconnex campus and to the east of the bus terminus before crossing the Griffeen River in a similar location to the preferred route prior to extending around the northern part of the land to the immediate west of the Grange Castle 110kV substation. It was notable that the route had to sit outside the wayleave to the north of these lands and thus reduced the capacity to develop these lands as well as being the longest route that would generate by far the longer construction period.
Option 3 – this route (green) option matched that of Option 1 until the Griffeen River, where rather than crossing at this point, it was proposed to pass under the internal access road within the Business Park down to the roundabout and to traverse the Griffeen where the river is culverted under the internal access road. The level of other utilities and infrastructure along this route, and the location of the crossing point of the Griffeen River so close to the joints bays, made the route unfeasible.
Option 4 – this route option (blue) matched a very similar route to that of second part of Option 3 but matched more closely the alignment of Option 2 along the south side of the internal access road closer to the substation.
Option 5 – this route option (red) matches the start and end of the preferred route but passed to the east of the bus terminus. This created conflicts with the existing 110kV lines passing through this area to the Grange Castle West 110kV cable compound.

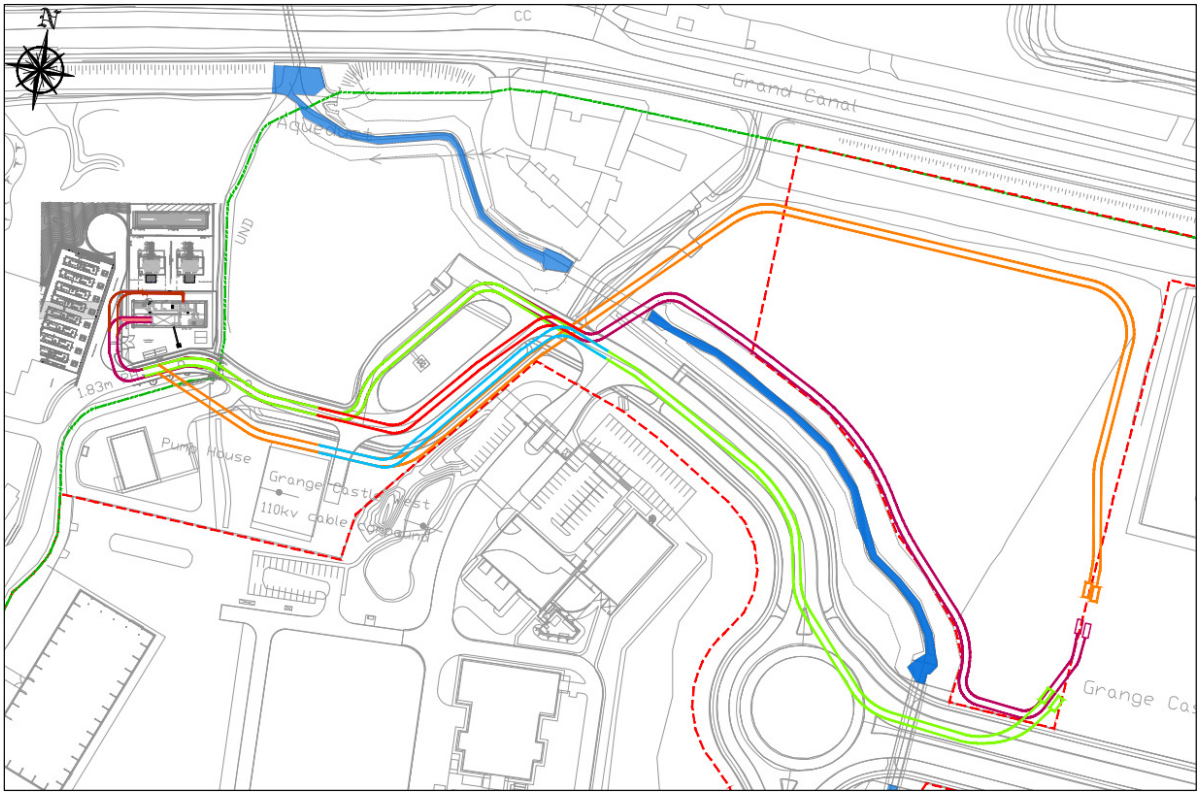

Figure 4.1 Alternative Grid Connection Routes from the Grange Castle – Kilmacud Circuits to the permitted Coolderrig Substation (Source: Clifton Scannell Emerson Associates March 2021)

4.10 A preliminary appraisal of the environmental impact, road closures, water crossings, road impacts, impact on residential properties and businesses; impacts on wayleaves and easements was undertaken as part of the route selection process and this indicated a lack of any other alternative routes.

4.11 Construction dust related impacts to nearby sensitive receptors are the primary impacts associated with the route options. Once constructed there will be no emissions to atmosphere from the cable routes and therefore there will be no impact to air quality or climate. There are few nearby sensitive receptors that have the potential to be impacted by any of the cable route options.

4.12 A further appraisal of the environmental impacts of route options was undertaken as part of the route selection process by CSEA Consulting Engineers. In terms of the operational phase for route options, environmental impact, road closures, water crossings, road impacts, impact on residential properties and businesses; impacts on wayleaves and easements; were considered to have a ***long-term***, ***neutral*** and ***imperceptible*** impact on the environment. For the construction phase, the duration of impacts for all route options would be ***temporary*** as the works for the transmission line will have a duration of less than a year. However, the construction phase for Option 2 would be significantly longer than the preferred route.

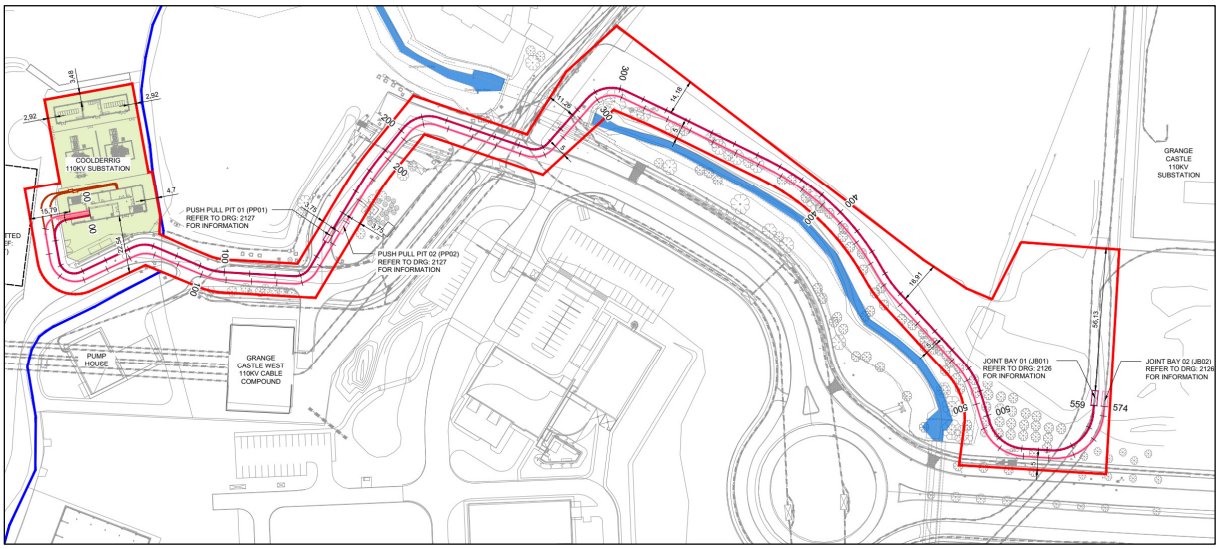

Figure 4.2 Preferred Grid Connection Route (pink and purple lines), from the Grange Castle-Kilmacud Circuits to the permitted Coolderrig Substation in context of application boundary (red line) (Source: CSEA, April 2021)

4.13 There are no significant environmental impacts predicted for the construction phase for the chosen route as set out in the subsequent Chapters 5-16 of this EIA Report. Based on the high-level assessment of the alternative routes, it is considered that the construction phase would not result in any significant environmental impacts.

GIS Substation

4.14 The location of the proposed GIS substation compound was identified as part of the Permitted Development as granted under SDCC Planning Reg. Ref. SD18A/0298. As the substation does not form part of the Proposed Development under this SID application no alternative layouts were considered. The fully permitted layout of the Edgeconnex site is indicated below.

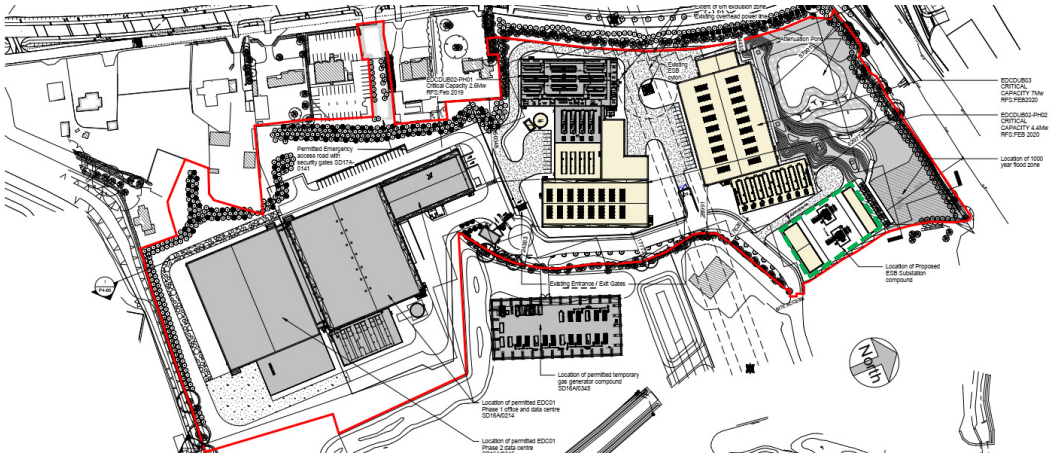

Figure 4.3 Permitted layout of Edgeconnex campus – permitted substation outlined in green

Alternative design / layout

4.15 Alternative design options for the 110kV transmission cables did not consider the provision of overhead lines. By their very nature, overhead lines require corridors to run along and alignments that must be clear of all other development. In the case of both a significantly wide corridor would be required. This would effectively sterilise the land in this corridor.

4.16 Two no. single circuit 110kV underground transmission lines were chosen above the overhead alternative as it enables more power to be transferred over a particular distance and requires less land to do so – minimising ecological and visual impacts of the Proposed Development and reducing installation costs.

Alternative processes and technologies

4.17 This section typically examines the project processes in relation to likely emissions to air and water, likely generation of waste and likely effect on traffic to determine the process that is least likely to impact on these parameters. The underground 110kV transmission lines will become an integral part of the national high voltage electricity grid which is currently operated by ESB Networks.

4.18 The underground cable installations must meet ESB Network's strict specifications to ensure it will be seamlessly absorbed into the national grid infrastructure and can provide a reliable power generation, and if required a reliable power supply. From a "*process design*" point of view, therefore, the flexibility to select alternative processes for integrating into the current national grid is not available to the Applicant.

4.19 As appropriate, alternative processes are considered on an ongoing basis by both EirGrid and ESB Networks as a part of each of their operations based on many factors including technical feasibility, environmental impact, efficiency, security, reliability and cost. Therefore, from a "*process design*" point of view, the flexibility to select alternative processes for integrating into the current national grid is not available to the Applicant. There are no reasonable alternatives available.

Alternative mitigation

4.20 For each aspect of the environment, each specialist has considered the existing environment, likely impacts of the Proposed Development and reviewed feasible mitigation measures to identify the most suitable measures appropriate to the environmental setting of the Proposed Development. In making a decision on the most suitable mitigation measure the specialist has considered relevant guidance and legislation. In each case, a comparison of environmental effects was made, and the specialist has reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development).

4.21 Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects. The selected mitigation measures are set out in each of the EIA Report Chapters 5-16 and are summarised in Chapter 2 - Appendix 2.3.

Conclusions on Alternatives

4.22 The selected route for the 110kV transmission lines is deemed to be the most suitable for the Proposed Development from an engineering and environmental perspective as they offer the shortest construction phase and thus a shorter duration of any potential environmental impacts that might arise.

4.23 During construction the proposed 110kV routes (similar to the alternative route assessed i.e. Option 1) will have a ***temporary***, ***neutral*** and ***imperceptible*** *to* ***not significant*** environmental effect. It is noted that the proposed route and the alternative routes considered were considered to have a ***neutral, imperceptible, long-term*** environmental effect during the operational phase.

4.24 The design of the new joint and pull-pit bays have been selected with due regard to minimising the environmental and visual impact once in situ. The selection of the design has been constrained to the standard specifications required by ESB Networks for connection to the national grid. In conclusion, it

is considered that the Proposed Development and design is the most suitable choice to provide the support required to meet the power requirements of the Permitted Development.

5. POPULATION AND HUMAN HEALTH

5.1 This chapter of the EIA Report considers and assesses the *"existence, activities and health of people"* with respect to *"topics which are manifested in the environment such as employment and housing areas, amenities, extended infrastructure or resource utilisation and associated emissions"* as set out under the EPA Draft EIA Report Guidelines 2017.

5.2 In addition, this chapter assesses more broadly the impact of the Proposed Development on the land use of the area, recent trends in population, employment and economic performance, and the community. The assessment also considers the mitigation measures necessary to reduce, and if possible remedy, significant adverse effects on these elements of the environment.

5.3 Population and human health comprise one of the most important elements of the *"environment"*. Any potential impact on the status of the population or human health by the Proposed Development must therefore be assessed. The principal concern is to ensure that human beings experience no significant unacceptable diminution in aspects of *"quality of life"* as a consequence of the construction and operation of the Proposed Development. Relevant components in this section of the EIA Report, include land use, population, employment, and amenity aspects.

5.4 Natural hazards are considered in Chapter 2 and Chapter 6 - Biodiversity. Issues examined in this chapter include:

- Demography;
- Population;
- Employment;
- Social Infrastructure;
- Landscape, Amenity and Tourism;
- Natural Resources;
- Air Quality;
- Noise & Vibration;
- Material Assets;
- Traffic; and
- Health and Safety.

5.5 In addition to the impacts on population and human health dealt with under this chapter, the impacts on human beings are also considered in Chapter 9 – Noise and Vibration; Chapter 10 – Air Quality and Climate; and Chapter 11 – Landscape and Visual. The impacts on property are considered in Chapter 15 - Material Assets. Where these topics are dealt with in further detail elsewhere in this EIA Report, the relevant chapters have been cross referenced in this Chapter. The cumulative effect is addressed in Chapter 16 of this EIA Report. Interactions are addressed in Chapter 17 of this EIA Report.

Methodology

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

"1. The environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:
(a) population and human health;
(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
(c) land, soil, water, air and climate;
(d) material assets, cultural heritage and the landscape;
(e) the interaction between the factors referred to in points (a) to (d).

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

5.7 A 2017 publication by the European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report, considered that:

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

5.8 This chapter will follow these EC guidelines, and will examine the health effects relevant to the Proposed Development as they relate to a relevant, defined study area. The effects of the Proposed Development on the population and human health are analysed in compliance with the requirements of the EPA Draft EIA Report Guidelines 2017.

5.9 A desktop survey of the SDCC area as well as an analysis of the local area and its facilities was undertaken. The desktop analysis included a review of background studies and reports; maps and aerial photography of the area; and review of demographic characteristics of the area as ascertained from Census of Population data and other statistics released by the Central Statistics Office (CSO). The quality, magnitude and duration of potential effects are defined in accordance with the criteria provided in the EPA Draft *EIA Report Guidelines* 2017) as outlined in Table 1.1 of Chapter 1 of this EIA Report.

Assessment of Significance and Sensitivity

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

Receiving environment

5.11 The Proposed Development is to be located on a site of c. 4.6 hectares that will primarily be located within a site that is located to the north-east of the Edgeconnex campus to the east of the R120 and to the south of the Grand Canal; and on land within the Grange Castle Business Park. The Proposed Development and surrounding area are described in further detail in Chapter 2 (Description of the Proposed Development). There is a single residential property along the route that is located c. 26m from the application boundary and c. 33m from the nearest transmission line to the immediate north of the point where the transmission lines cross over the Griffeen River. The same house is c. 32m to the north of the application boundary to the north of the bus terminus, within the Grange townland. The next nearest residential properties are located to the north of the canal and c. 107m from the nearest part of the transmission lines.

5.12 The Proposed Development is located at its nearest point c. 80m south of the Grand Canal pNHA (Refer to Chapter 6 - Biodiversity for further details). The need for the Proposed Development is described in Chapter 1 of the EIA Report.

Study Area

5.13 The study area selected for the assessment of the impact on human health as a result of the Proposed Development was defined as the Electoral Divisions (ED) of Clondalkin-Dunawley which extends from a point to the north of Clondalkin and is bounded at its western end by the R120; by the Grand Canal to the north, and the R134 and part of the Old Nangor Road to the south. The ED is made up by the Grange Castle Business Park to its west and the north-western fringes of Clondalkin to the east.

Existing Baseline conditions

Population and Demographics

5.14 The Proposed Development site is located within the Clondalkin – Dunawley Electoral Division (ED). The Clondalkin – Dunawley Electoral Division had a population of 11,323 at the time of the 2016 Census and 10,877 at the time of the 2011 Census (Central Statistics Office (CSO). This represents a 3.9% increase in population between 2011 and 2016 i.e. a population increase of 446.

5.15 Electoral Divisions are broken down into smaller areas in 2011 and 2016 to provide a more detailed understanding of local population trends for this immediate area. The Proposed Development site of the transmission lines is located within Small Area 267049001 (as per the 2016 Census), it had a population of 282 at the time of the 2016 Census. This population is entirely to the east of the R136 some 1.4kms to the south-east of the proposed joint bays into the Grange Castle – Kilmahud Circuits. The change in boundaries between the 2011 Census and the 2016 Census means that a direct comparison between the data (including populations/households etc.) is not possible. This is acknowledge by the specific wording of the CSO website which states "*as the small area boundaries can change between censes direct comparisons are not always possible*".

5.16 The total housing stock recorded in 2016 for the Small Area was 114. Notwithstanding the fact that a direct comparison between the population and housing trends within the Small Area is not possible (as referenced above). Overall the population in the immediate vicinity of the subject site is primarily one-off housing. It is reasonable to deduce that over the last 20 years the focus of the local area has been on employment and enterprise and the increasing policy focus on housing being located on serviced and residentially zoned land within urban areas. A less detailed assessment of population has been undertaken in accordance with the Draft Guidelines (2017).

5.17 The population of the administrative area of South Dublin increased by 12.9% between 2006 and 2016, which is significantly higher in comparison to the population of the Clondalkin - Dunawley ED (within which the subject site is located). This County based population broadly reflects population growth that was experienced in Leinster and the State. The Small Area data has not been referenced below as the Small Area boundaries relating to the subject site were altered between the 2011 and 2016 Census. The small population increase within the ED is reflective of the lack of undeveloped residentially zoned land at the time of the 2006 Census, and the primarily Enterprise and Employment zoning across the entirety of the western half of the ED area.

Table 5.1 Population levels in the study area in 2006, 2011 and 2016

	2006	2011	2016	% change 2006 - 2016
Clondalkin - Dunawley ED	10,873	10,877	11,323	+4.1%
South Dublin CC	246,935	265,205	278,767	+12.9%
Leinster	2,295,123	2,504,814	2,634,403	+14.8%
State	4,239,848	4,588,252	4,761,865	+12.3%

5.18 Some parts of the West Dublin area underwent very high levels of population growth during the early 2000s, although this happened primarily outside of the immediate environs of the application site and ED. This growth, which is in excess of the County, Regional and State levels, is evident in new suburban areas to the north and south that were constructed around the western fringes of Dublin during this period.

Employment

5.19 The economic conditions in Ireland that stemmed from 2008 resulted in higher unemployment levels over the following six years although this has subsequently decreased, up until the recent Coronavirus pandemic. The number of persons on the Live Register of unemployment fell in the State from 428,876 in February 2013 to 186,702 in February 2021(including seasonal adjustments this increased to 188,500).

5.20 This figure does not include those persons on the range of support measures/payments which were put in place in response to the Coronavirus pandemic. The Coronavirus pandemic has resulted in a significant and sudden increase in unemployment. The long term implications on employment across

the State and in Dublin at the time of making the application are unclear. The number on the Pandemic Unemployment Payment (PUP) at the time of making the application was 468,847.

Table 5.2 At work by industry type 2011 and 2016 (source: CSO, 2006, 2011 and 2016)

	Year	Clondalkin-Dunawley ED	Clondalkin Local Electoral Area
Agriculture	2011	5	78
	2016	4	65
Construction	2011	162	1,034
	2016	244	1,283
Manufacturing	2011	405	2,343
	2016	429	2,280
Commerce	2011	1,051	6,144
	2016	1,117	6,065
Transport	2011	423	2,383
	2016	442	2,434
Public administration	2011	25	1,316
	2016	195	1,184
Professional services	2011	799	4,552
	2016	950	4,778
Other	2011	738	3,949
	2016	1,008	5,064
Total at work	**2011**	**3,808**	**21,799**
	2016	**4,389**	**23,153**

5.21 The number of persons on the Live Register of unemployment fell in Dublin from 102,591 in February 2013, and has continued to decrease to 44,218 in February 2020 and has increased to 47,772 in February 2021. This figure does not include those persons on the range of support measures/payments which were put in place in response to the Coronavirus pandemic.

5.22 The changes in persons in work, labour force and unemployed within the wider study area as outlined in Table 5.2 is indicative of the change in the economic circumstance that has been experienced across the State since 2008, up until the Coronavirus pandemic, and the significant improvements over the last seven years. It is notable however that the increase in unemployment was significantly more marked within the wider local area, although this may have been rectified in the five years since the most recent Census although the Coronavirus pandemic may have significantly altered this.

5.23 In relation to employment type the CSO Clondalkin - Dunawley ED figures for 2011 and 2016 indicate that employment increased almost across the board during the Census periods 2006 to 2016. These increases were particularly marked within public administration and professional services. This trend is likely to have continued since the last Census of 2016, based on the continuing decrease in the number of people on the Live Register up until March 2020, but is likely to have increased subsequently as a result of the pandemic (as per the recent February 2021 Live Register and PUP figures referenced above)

Social infrastructure

Residential dwellings

5.24 Residential development is primarily located to the north, south-west and north-west of the site (see Figure 5.1). There is one existing dwelling to the immediate north of the Proposed Development site (Grange) and its associated buildings (c. 30m from the Proposed Development boundary). Further dwellings are located to the north of the canal at the southern end of Hayden's Lane (c. 100m from the Proposed Development boundary).

5.25 There are a number of residential dwellings bounding the main Edgeconnex campus site to the south-west along the R120. Some of these are in quasi-residential use. These properties form a ribbon development of six houses along the eastern side of the R120. The nearest occupied residential property along the R120 to the south-west is located c. 200m from the Proposed Development site. A single dwelling is located to the north-west to the south side of the Grand Canal adjacent to the new bridge over the canal. This dwelling is located c. 150m from the western boundary of the Proposed Development site boundary. A Travellers site and further residential dwellings are located to the north-

east of the site along the Kishoge laneway. The nearest of these properties is c. 470m from the nearest point of the Proposed Development boundary. Residential properties and other sensitive receptors within c.1km area of the Proposed Development are shown in Figure 5.1 below.

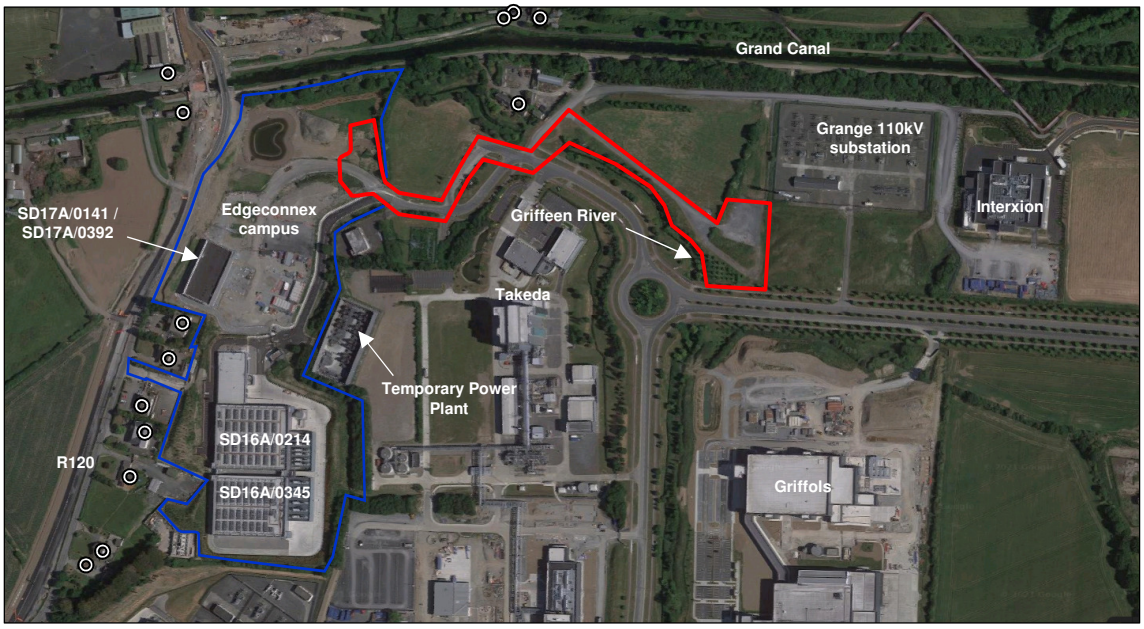

Figure 5.1 Existing land use in vicinity and outside of the subject site (Nearest existing residential properties outlined by white ring)

5.26 The western fringes of Clondalkin lie some 1km to the east of the eastern boundary of the Proposed Development site. The nearest residential property to the south is located some 1.5kms away along the Baldonnel Road.

Schools

5.27 The population in the surrounding areas of Clondalkin, Newcastle, Lucan, Tallaght and Rathcoole is serviced by junior and secondary schools. The nearest schools are located in Adamstown some 800m to the north-west, and 1.5kms to the south-east and to the east of the R136 in Clondalkin. Childcare facilities are similarly distributed with the nearest crèche being located some 900m to the north-west in Adamstown.

Health and security

5.28 The nearest hospital to the facility is located some 6.2kms away at the Adelaide and Meath Hospital incorporating the National Children's Hospital, Tallaght, Dublin 24. The Peamount Healthcare facility sits some 2.4kms to the south-west of the proposed development. The nearest Garda station are 3.5kms away in Clondalkin and 5.3kms away in Rathcoole with the nearest fire station being 4.8kms away at Belgard Road, Tallaght, Dublin 24.

Landscape, amenity and tourism

5.29 The Proposed Development will be located on the periphery of a largely built up urban area where industrial activities are the main land use. Tourism is not a major industry in the immediate environs of the site. The wider area does contain a small number of hotels and other tourist accommodation (B&B's etc.). This generally increase towards the east in the direction of Dublin city and its many tourist sites. The Grand Canal and greenway are located to the immediate north of the site that offers a high degree amenity to locals and visitors.

5.30 In terms of landscape amenity, SDCC recognise that the landscape, natural heritage and amenities of South Dublin have an important role to play in contributing to a high quality of life for residents and a positive experience for visitors. The primary area of landscape amenity is the Grand Canal. This is both recognised by SDCC and Waterways Ireland and other organisations in that it provides a key amenity link between the city centre and the suburbs and beyond. The impact on this tourism and

amenity resource has been considered as part of the assessment under this chapter. Further discussion of impact on landscape amenity is presented in Chapter 11 - Landscape and Visual.

5.31 The Lucan Sarfields GAA Club lies to the north-west; and the Lucan pitch and putt to the north-east of the R120 canal bridge over the Grand Canal. The Newcastle Golf Centre lies some 1.6kms to the south-west from the permitted substation part of the site. This includes both a driving range and par 3 course. The Grange Castle Golf Club lies to the east of the Google data centre off the New Nangor Road (R134) and some 1.8kms from the eastern boundary of the application site.

Natural resources

5.32 Natural resources and land uses in the hinterland of the Proposed Development have also been considered as they may have implications for the development of the lands. Historical Ordnance Survey (OS) maps indicate that the land to the east and south has been in industrial/commercial use for 20-30 years. Much of the agricultural resource in the surrounding area has already been lost over recent decades or is zoned to facilitate employment and related development in the future. There are no quarries within a 2km radius of any part of the Proposed Development site. The closest geological heritage site is the Belgard Quarry, which is located 3.8kms to the south-east of the site.

Land use

5.33 Land use outside of the developing employment zones to the wider west, south and east, is primarily in agricultural use despite its EE zoning. The area in which the Proposed Development site is located lies within the functional area of South Dublin County Council. Under the Councils Development Plan, a variety of land use objectives are established for the area including specific location objectives for Grange Castle Business Park. Policy ET3 Objective supports the development of high tech development within the Grange Castle Business Park that the subject site is primarily located within.

5.34 Economic clusters and corridors are geographic concentrations of competing, complementary or interdependent firms and industries that may do business with each other and/or have common needs for talent, technology and infrastructure and rely on the services of other cluster firms in the operation of their business. The areas of Grange Castle and City West (existing established industrial areas) and surrounding areas are cited under section 4.3.3 of the County Development Plan as two particularly important areas for the creation of a cluster of high end economic development based around Foreign Direct Investment manufacturing and support industries. The positive characteristics of these areas is the availability of large plot sizes, infrastructure and heavily landscape corporate park models.

5.35 Grange Castle Business Park and its surrounding lands is already home to several industrial facilities and comprises a number of different land uses (See Figure 5.1). The Grange Castle Business Park contain a range of data centres as well as pharmaceutical industries. The nearest facility to the main development site, apart from the appplicants own campus, is the Takeda pharmaceutical development to the immediate south of the Proposed Development site; and the Grange substation to the immediate north-east of the eastern end of the Proposed Development site.

5.57 The Proposed Development is situated on suitably EE zoned lands in an identified industrial area in south-west Dublin. Furthermore, the location will minimise the potential environmental impacts through careful design, master planning and mitigation measures as described in various chapters of this EIA Report. Various other objectives of the County Development Plan as outlined throughout this EIA Report (see Chapter 11 – Landscape and Visual Impact) relate to the protection of amenity and townland boundaries.

5.58 Specific details of potential impacts in relation to these resources are dealt with in the relevant chapters within this EIA Report. In conclusion it can be stated that the Proposed Development complies fully with the stated requirements of SDCC and will be a strategic asset in the continued economic development and growth of the Dublin area.

Characteristics of the Proposed Development

5.59 The Proposed Development is described in detail within Chapter 2 of the EIA Report. The Proposed Development will include the provision of two no. underground 110kV transmission lines that will

connect the permitted and under construction Coolderrig substation with the Grange Castle – Kilmahud Circuits, Grange Castle Business Park, Dublin 22.

Potential impacts of the Proposed Development

5.60 The impact of construction, commissioning, operation and decommissioning of the Proposed Development are considered below.

Potential Impacts on Human Beings

5.61 There will be a short-term, imperceptible, positive effect on local business with the limited presence of a very small number of construction workers of 5-10 using local facilities during the construction phase of the transmission line installation. However, the main potential impacts on human beings associated with the Proposed Development will be in relation to air quality, noise and visual effects during the construction stage. The potential impacts are assessed within the corresponding chapters of this EIA Report and are summarised below.

Potential Impacts on Human Health from Air Quality

5.62 As outlined in Chapter 10 Air Quality and Climate, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are the protection of human health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Chapter 10, Table 10.1). The standards for human health have designed to avoid harmful effects to health.

Construction phase

5.63 As detailed in Chapter 10 Air Quality & Climate, there is a potential impact on human beings due to dust generation as a result of construction activities. There is an overall negligible risk of temporary human health impact as a result of the proposed construction activities. When the dust mitigation measures and best practice measures are implemented it will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the Proposed Development is likely to be ***temporary*** and ***imperceptible*** with respect to human health.

Operational phase

5.64 During operation, the cables will be buried underground and therefore there will be no emissions to atmosphere. There is the potential for maintenance vehicles accessing the substation site to result in emissions of NO_2, PM_{10}/$PM_{2.5}$ and CO_2. However, due to the infrequent nature of such maintenance the potential impact on human health due to air quality during the Operational Phase is considered to be ***long-term, imperceptible*** and ***neutra****l.*

Potential Impacts on Human Health from Noise & Vibration

5.65 Noise and Vibration impacts associated with the development have been fully considered within Chapter 9 of this EIA Report. Commentary on the impact assessment and related noise levels are summarised below with respect to potential environmental health impacts.

Construction phase

5.66 As detailed in Chapter 9 Noise and Vibration, potential noise emissions associated with the construction phase of the development can be generated by construction plant and activities. These are expected to be less than the prevailing ambient noise level at the nearest sensitive locations. As a result, the existing noise environment is not expected to change significantly because of the temporary construction phase. In addition, due to the distance between the site and the nearest sensitive locations, vibration impacts generated during construction are expected to be negligible. Therefore, the noise and vibration impact of the construction phase of the Proposed Development is likely to be ***temporary*** and ***not significant*** with respect to human health because of the short-term construction phase.

Operational phase

5.67 The potential cumulative impact from noise and vibration with the Permitted Development is considered within Chapter 9 – Noise and Vibration Chapter of the EIA Report.

Potential Impacts on Local Amenities and Tourism

5.68 There will be no potential impact on the local parks or the larger amenity areas such as along the Grand Canal. It is not anticipated that the Proposed Development will have any potential impact on local tourism or shopping amenities. The Proposed Development will not create any wastewater discharge which could have a potential impact on local amenities or the local population. Should any discharge of construction water (collected stormwater) be required during the construction phase, discharge will be to the storm water/foul sewer drainage system or collected and removed, following appropriate treatment for sediment removal. Further information regarding surface water management can be found in Chapter 8 - Hydrology.

5.69 The underground nature of transmission lines, together with the low sensitivity receiving environment and the existing land use and land use zoning, is such that residual landscape and visual impacts are considered to be ***imperceptible*** and ***neutral***. Further discussion is presented in Chapter 11 - Landscape and Visual Impact.

Potential Impacts from Additional Traffic

5.70 The potential impact as a result of additional traffic on human health during construction and operation relates to potential congestion, noise and pollution. An assessment of the additional traffic movements and short-term diversions associated with the Proposed Development during the construction phase is presented in Chapter 12 - Traffic and Transportation.

5.71 The potential impact of the development on human beings and in particular road users will be ***temporary, negative*** and ***not significant*** for the construction phase and ***long-term, neutral*** and ***imperceptible*** for the operational phase. Any significant construction works will take place outside of main commuter hours and solely within the Business Park. There is no potential impact during the operation phase.

Unplanned Events / Potential Impacts on Health and Safety

5.72 The Proposed Development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (S.I. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. 299 of 2007) as amended and associated regulations. The transmission lines have been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience based on a number of similar existing facilities operated by the ESB Networks.

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

5.74 During the operational phase of the development, ESB Networks will implement an Environmental Safety and Health (EH&S) Management System and associated procedures. Full training in the EH&S Management System and relevant procedures will be provided to all employees.

5.75 The 2014 EIA Directive, 2018 EIA Regulations and associated EPA Draft EIA Report Guidelines 2017 require that the vulnerability of the project to major accidents and/or natural disasters (such as earthquakes, landslides, flooding, sea level rise etc.), as well as unplanned events, is considered in the EIA Report. The site has been assessed in relation to the following external natural disasters; landslides, seismic activity, volcanic activity and sea level rise/flooding as outlined below. The potential for major accidents to occur at the facility has also been considered with reference to Seveso/Control of Major Accident Hazards (COMAH) Regulations. There is a negligible risk of landslides occurring at the site and in the immediate vicinity due to the topography and soil profile of the site and surrounding

areas. There is no history of seismic activity in the vicinity of the site. There are no active volcanoes in Ireland so there is no risk of volcanic activity.

5.76 The potential risk of flooding on the site was also assessed. A Stage 1 Flood Risk Assessment was carried out and it was concluded that the Proposed Development is not at risk of flooding (Refer to Chapter 8). Furthermore, the permitted development design attenuation etc. will ensure there is no potential impact on flood risk for other neighbouring properties, nor is the site at risk from sea level rise.

5.77 The Proposed Development will not be a Seveso/COMAH facility. The only substance stored on site controlled under Seveso/COMAH will be diesel for the generators within the permitted substation and the amounts proposed do not exceed the relevant thresholds of the Seveso Directive. There is a potential impact on the receiving environment as a result of minor accidents/leaks of fuel/oils during the construction and operational phases. However, the implementation of the mitigation measures set out in Chapter 7 - Land, Soils, Geology and Hydrogeology; and Chapter 8 - Hydrology of the EIA Report will ensure the risk of a minor/accident is low and that the residual effect on the environment is imperceptible.

Remedial and mitigation measures

5.78 Mitigation measures proposed to minimise the potential effects on human health in terms of air quality and climate and noise and vibration during construction are discussed in the relevant sections of Chapters 9 and 10, respectively. Chapter 12 Traffic and Transportation addresses mitigation measures proposed to reduce the effect of additional traffic.

Residual impacts

5.79 The residual impacts on the local population during the construction phase are considered to be *temporary*, *neutral* and *imperceptible* due to the expected temporary employment of a small number of construction workers directly employed to work on the construction of the transmission line and in turn creating a small amount of indirect additional business from using local businesses during the construction phase. The operation of the Proposed Development will provide an ability to provide permanent power to the various data centres within the Edgeconnex campus. This will facilitate the decommissioning of the temporary gas powered power plant. This will have a positive impact on the noise environment.

5.80 It is expected that the Proposed Development will have a *slight, positive* and *long-term* effect on the immediate hinterland through facilitating the provision of adequate electricity supply to the data centre campus that could potentially facilitate future employment opportunities on site.

5.81 A health and safety management plan will be in place to ensure the health and safety of all site personnel during construction. The experience of ESB Networks and the implementation of an EH&S Management System and relevant procedures will minimise any health and safety risks during operation of the development. The cumulative impact is addressed within each chapter of this EIA Report. Interactions are addressed in Chapter 16 of this EIA Report.

Cumulative impacts

5.82 The permitted substation will be completed prior to work commencing on the proposed development. There is however, the potential for the construction phase of the Proposed Development to occur at the same time as other permitted development within the Edgeconnex campus and within the wider Grange Castle Business Park.

5.83 The proposal will create additional employment in the area with 5-10 construction workers associated with the Proposed Development. The construction of the permitted data centres on the Edgeconnex campus is projected to generate 60-120 construction jobs.

5.84 The cumulative effect of all these construction activities on local businesses during the construction phase of the Proposed Development will be ***temporary, imperceptible, positive effect***.

5.85 The potential impact of the construction of the Proposed Development on population and human health in terms of air quality and climate; as well as noise and vibration are discussed in the relevant sections of the population and human health chapter (Chapter 5 as well as the relevant Chapters 9 and 10) of this EIA Report. There is potential for an increase in dust generation; and construction noise from machinery due to the cumulative impact of all of the permitted and committed developments with the Proposed Development. The cumulative impact of the Proposed Development on population and human health in terms of air quality and climate; as well as noise and vibration will be ***negative, temporary*** and ***not significant***.

5.86 The potential impact of the construction of the Proposed Development on population and human health in terms of Traffic & Transportation is set out in Chapter 12 of this EIA Report. The potential impact as a result of additional traffic on human health during construction relates to added congestion, noise and pollution. The ongoing nature of cumulative development will mean that there will be ***temporary***, ***neutral*** and ***not significant*** effect on population and human health due to traffic during the construction phase of the Proposed Development.

5.87 A number of the Permitted Developments listed in Chapter 3 refer to projects within the Grange Castle Business Park, which due to their greater distance from the nearest residential properties to the Proposed Development site will have an imperceptible effect on the local population. The predicted cumulative impact associated with the construction phases of these projects with the Proposed Development will be ***temporary*** and ***not significant***.

5.88 Once in full operation, the permitted developments within the Edgeconnex campus will coincide with that of the operational phase of the Proposed Development and permitted substation. The EIA Report submitted with the permitted developments within the Edgeconnex campus indicated that it would employ 40 people, once in operation, and sustain employment for a further 20 already employed within the already operational data centres.

5.89 The cumulative effect of the permitted and committed developments with the Proposed Development will be a long-term, imperceptible, positive effect on local businesses.

5.90 The Proposed Development will be in Operation at the same time as the construction of the permitted development on the Edgeconnex campus. This will generate the potential for noise impacts associated with the construction phase of the data centre campus to occur at the same time as the operation of the permitted substation and Proposed Development. Due to the larger scale nature of the permitted development compared to the Proposed Development the cumulative impact as a result of such a scenario would be broadly the same as projected under the construction phase with a ***neutral, temporary*** and not ***significant impact***.

5.91 The assessment under Chapter 9 (Noise and Vibration) of this EIA Report undertook a cumulative modelling exercise that took into consideration the noise generated by the Proposed Development and permitted development on the Edgeconnex campus. The cumulative impact of the Proposed Development with other committed or permitted developments will be ***long-term*** and ***not significant***.

5.92 There are no significant effects associated with the operation of the Proposed Development on population and human health in terms of air quality and climate. Therefore, the cumulative impact with the construction phases of the permitted development, and the underground cable installations will be ***temporary*** and ***not significant***. The cumulative impact with the operational phases of the Permitted Development, and the underground cable installations will be ***long-term*** and ***not significant***.

5.93 As described in Chapter 12 Traffic & Transportation, considering local planned and Permitted Developments, there will be a ***long-term, neutral*** and ***imperceptible*** cumulative effect due to the low trip generation during the operational phase of the Proposed Development with other planned and permitted development that also have low levels of operational traffic generation..

6. BIODIVERSITY

6.1 This Biodiversity Chapter for the Environmental Impact Assessment Report (EIA Report) was authored by Alexis FitzGerald of Scott Cawley Ltd.

6.2 This Chapter provides an assessment of the potential ecological effects of the proposed development, which is located east of the existing Edgeconnex Data Centre site in the townland of Grange in west Co. Dublin (refer to Figure 6.6 Proposed development site in the context of the surrounding environment for the location of the proposed development site). The proposed development consists of an underground substation grid connection development, with associated drainage. A detailed description of the proposed development is included in Chapter 2 of the EIA Report.

6.3 The subject lands are located west of Dublin city, just south of the Grand Canal which flows eastwards just north of the northern margin of the site. The lands are mostly comprised of areas of managed and unmanaged grassland, treelines, ornamental shrubs and also large areas of hardstanding. Hardstanding areas within the proposed development site comprise of an existing development area within the EdgeConnex Data Centre site in the west of the proposed development site, as well as extensive paved areas and roads. There is one waterbody, the Griffeen River, which flows through and directly adjacent to almost the entire length of the proposed development site. The adjacent lands and wider environs are largely urban in nature consisting of industrial and commercial areas to the south and east. The areas to the north and west are largely agricultural in nature.

6.4 The proposed development will be built on the existing managed grassland and hardstanding and will cross over the Griffeen River in the west of the site. The location of the proposed development site in relation to the surrounding environment is presented below in Figure 6.6 Proposed development site in the context of the surrounding environment

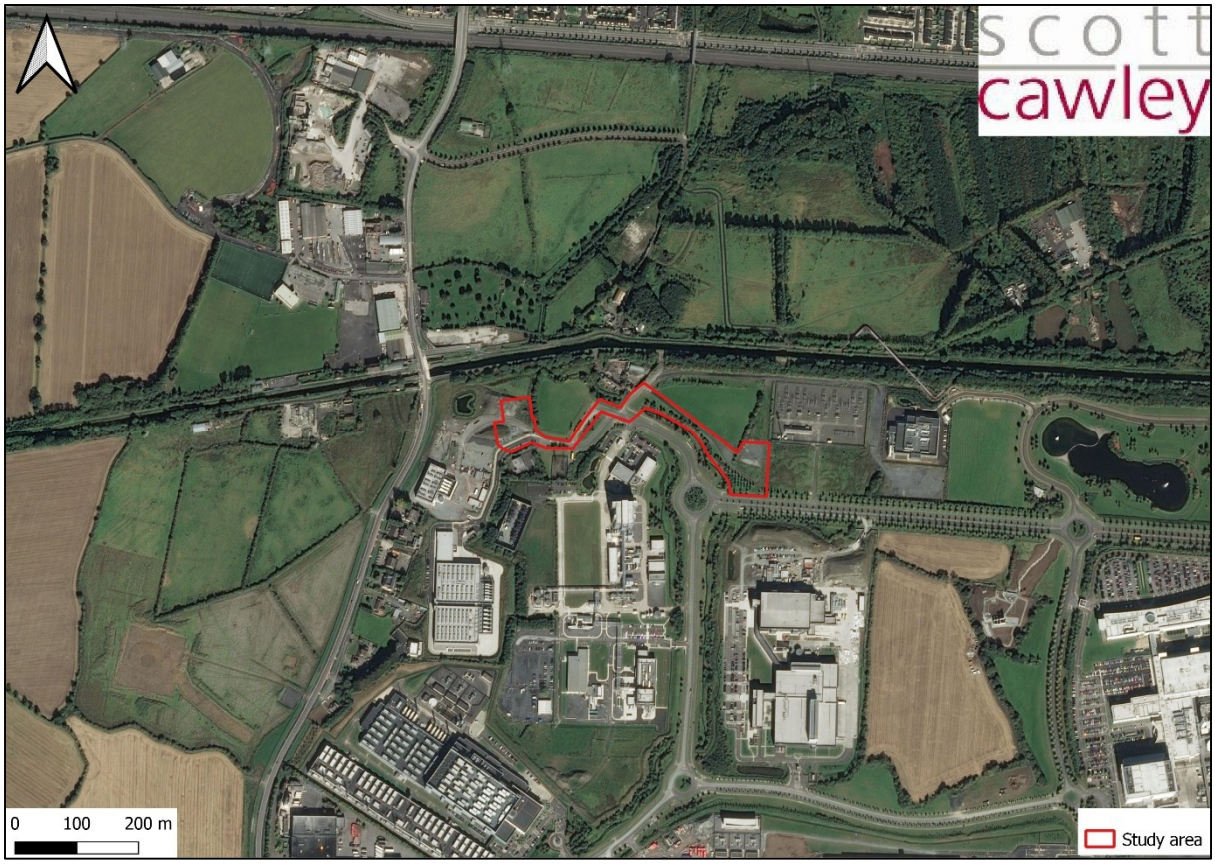

Figure 6.6 Proposed development site in the context of the surrounding environment

Aims

6.5 The purpose of this chapter is to:

- Establish and evaluate the baseline ecological environment, as relevant to the proposed development

- Identify, describe, and assess all potentially significant ecological effects associated with the proposed development
- Set out the mitigation measures required to address any potentially significant ecological effects and ensure compliance with relevant nature conservation legislation
- Provide an assessment of the significance of any residual ecological effects
- Identify any appropriate compensation, enhancement, or post-construction monitoring requirements

6.6 A separate stand-alone Appropriate Assessment (AA) screening report (Scott Cawley Ltd., 2021) has been prepared and is being submitted as part of the planning application documentation. The AA Screening report contains information relevant to the competent authority's assessment of potential impacts that may arise from the proposed development on any European site.

Planning, Policy and Legislation

6.7 The collation of ecological baseline data and the preparation of this assessment has had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this biodiversity chapter.

6.8 The following international legislation is relevant to the proposed development:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter, referred to as the 'Habitats Directive'. The Habitats Directive is the legislation under which the Natura 2000 network[1] was established and special areas of conservation (SACs) are designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.
- Directive 2009/147/EEC; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which special protection areas are designated for the protection of endangered species of wild birds listed in Annex I of that directive.
- Directive 2000/60/EC; hereafter, referred to as the 'Water Framework Directive' (hereafter, referred to as the 'WFD'). The Water Framework Directive is a piece of legislation adopted with the aim of attaining good status in all water bodies (rivers, lakes, groundwater and transitional (estuarine) and coastal waters) that are of lesser status at present and retaining good status or better where such status exists at present, throughout the EU. As part of this aim, the legislation requires the establishment of two primary monitoring programmes for water bodies: the Surveillance Monitoring (SM) and the Operational Monitoring (OM) networks for surface waters and groundwater.
- The following national legislation is relevant to the proposed development:
- Wildlife Acts 1976 to 2019; hereafter collectively referred to as the 'Wildlife Acts'. The Wildlife Acts are the principal pieces of legislation at national level for the protection of wildlife and for the control of activities that may harm wildlife. All bird species, 22 other animal species or groups of species, and 86 species of flora are protected under this legislation.
- Planning and Development Acts 2000 to 2021; hereafter collectively referred to as the 'Planning and Development Acts'. This piece of legislation is the basis for Irish planning. Under the legislation, development plans (usually implemented at local authority level) must include mandatory objectives for the conservation of natural heritage and for the conservation of European Sites. It also sets out the requirements in relation to environmental assessment with respect to planning matters, including transposition of the Habitats and Birds Directive into Irish law.
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 to 2015; hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the regulations).

[1] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.
In Ireland these sites are designed as European sites - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

- Flora (Protection) Order, 2015. This lists species of plant protected under Section 21 of the Wildlife Acts.

6.9 The following plans and policies are relevant to the proposed development:

- All-Ireland Pollinator Plan 2015-2020 (National Biodiversity Data Centre, 2015)
- South Dublin County Development Plan 2016-2022 (South Dublin County Council, 2016)
- National Biodiversity Action Plan 2017-2021 (Department of Culture Heritage and the Gaeltacht, 2017)
- Draft Biodiversity Action Plan for South Dublin County 2020-2026 (South Dublin County Council, 2020). This lists South Dublin County's objectives and actions in relation to biodiversity within the county boundary and how they align with those listed in National Biodiversity Action Plan 2017-2021 (National Parks and Wildlife Service (NPWS), 2017).

Assessment Methodology

6.10 This Biodiversity chapter for the EIA Report was authored by Alexis FitzGerald, who also carried out the field surveys, was reviewed by Niamh Burke and approved by Aebhin Cawley of Scott Cawley Ltd.

6.11 Alexis holds an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin and obtained a distinction in his Masters in Biodiversity and Conservation from the same institution. He is an expert at vascular plant, charophyte and bryophyte identification and habitat surveying, developed over more than seven years of intensive study in university, professional ecological surveying and with natural history groups such as the Botanical Society of Britain and Ireland (BSBI) and the Dublin Naturalists' Field Club (DNFC). He also has extensive professional experience with vegetation and habitat classification and mapping (including EU Habitats Directive and Fossitt classification and statistical vegetation analysis), as well as rare, protected and invasive plant species surveying and monitoring. His role as a Consultant Ecologist has focussed on the production of ecological surveys and assessments (including Preliminary Ecological Appraisal, Ecological Impact Assessment, Appropriate Assessment, Environmental Impact Assessment Biodiversity Chapter reporting, etc.) of linear infrastructure, residential, commercial and industrial projects. Alexis has a specialist interest in botany but is also competent in a range of fauna surveys (*e.g.* mammals including badgers, bats and otters). In a voluntary capacity, he is actively involved with such botanical and natural history groups as the BSBI and the DNFC, organising and leading field outings and indoor teaching seminars. He has also been the BSBI County Recorder for Co. Monaghan since 2015.

6.12 Niamh is Director of Coiscéim Ecology. She holds a BSc in Natural Sciences with Environmental Science and a PhD in salmonid ecology. She is a Chartered Environmentalist (CEnv) with the Society for the Environment (Soc Env) and a Full Member of the CIEEM. Niamh is a senior scientist with academic research and consulting experience in terrestrial ecology, aquatic ecology and fluvial geomorphology. She is an experienced project manager with a full working knowledge of EIA, the planning process and relevant environmental legislation, both national and European. With a specialism in aquatic habitats, she also has experience of terrestrial species' surveys and mitigation approaches. In her extensive consultancy roles she has acted as reviewer for all ecological reporting, ensuring consistency of standards and approach.

6.13 Aebhin is Managing Director with Scott Cawley. She holds an honours degree in Zoology from Trinity College, Dublin and a postgraduate diploma in Physical Planning at Trinity. She is a Chartered Environmentalist (CEnv) with the Society for the Environment (Soc Env) and a Full Member of the CIEEM. Aebhin Cawley is an experienced ecological consultant with extensive experience in public and private sector projects including renewable energy, ports and other major infrastructural developments. Aebhín has been undertaking Ecological Impact and Appropriate Assessment work in Ireland since 2002 and has been influential in determining the direction in which EcIA and AA work is evolving in Ireland. She has delivered lectures and training to a range of organisations and professional institutes and regularly provides training to local authorities and other public sector organisations.

Scope of the Assessment

6.14 The study area is defined by the Zone of Influence (ZoI) of the proposed development with respect to the ecological receptors that could potentially be affected. The ZoI, or distance over which potentially significant effects may occur, will differ across the Key Ecological Receptors (KERs), depending on the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken has established the habitats and species present within, and in the vicinity of, the proposed development site. The ZoI and study area was then informed and defined by the sensitivities of each of the KERs present, in conjunction with the nature and potential impacts associated with the proposed development.

6.15 The ZoI of habitat loss impacts is confined to within the proposed development boundary. The ZoI of potential impacts on surface water quality in the receiving environment extends downstream to freshwater, estuarine and coastal ecosystems associated with waterbodies that are hydrologically connected to the proposed development via the Griffeen River, which is located within and directly adjacent to the proposed development boundary.

6.16 The ZoI of air quality effects related to dust deposition is likely to be located within and/or adjacent to the proposed development site boundary. The ZoI of general construction activities (*i.e.* risk of spreading/introducing non-native invasive species, dust deposition and disturbance due to increased noise, vibration, human presence and lighting) is not likely to extend more than several hundred metres from the proposed development.

Desk Study

6.17 A desk study was undertaken on the 25 February 2021, to collect any available information on the local ecological environment. The following resources assisted in the production of this report, in addition to those listed in the Reference section of this report:

- Data on European sites, Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs) as held by the National Parks and Wildlife Service (NPWS) from https://www.npws.ie/protected-sites and https://www.npws.ie/maps-and-data – refer to Appendix 6.1 and Figure 6.8 and Figure 6.9 for descriptions and locations of protected sites in the vicinity of the proposed development.
- Records of rare and protected species, as held by the National Biodiversity Data Centre www.biodiversityireland.ie within c.2km of the proposed development site, or the NPWS within the same grid square (O03) in which the proposed development site is located in – refer to Appendix 6.2 for all desk study flora and fauna records
- Spatial information relevant to the planning process including land zoning and planning applications from Department of Housing Planning, Community and Local Government web map portal. Available from https://myplan.ie/
- Ordnance Survey Ireland mapping and aerial photography from www.osi.ie;
- Data on waterbodies, available for download from the Environmental Protection Agency (EPA) web map service. Available from https://gis.epa.ie/EPAMaps/
- Information on soils, geology and hydrogeology in the area available from the Geological Survey Ireland (GSI) online Spatial Resources service. Available from https://www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx;
- Information on local biodiversity policies and objectives within the South Dublin County Development Plan 2016-2022 (South Dublin County Council, 2016);
- Information on the location, nature and design of the proposed development supplied by the applicant's design team; and,
- Information on the conservation status of birds in Ireland from Birds of Conservation Concern in Ireland[2].
- Environmental Impact Assessment Report for adjacent Edgeconnex development site, the Biodiversity Chapter of which was completed by Scott Cawley (2018) – this site is located directly west of (and partly within) the current proposed development.
- Appropriate Assessment Screening Report for a Proposed Development at Grange Castle Business Park, Nangor Road, Dublin 22 (Scott Cawley, 2015) – this site is located directly east of the current proposed development.

[2] Colhoun, K., and Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014-2019. Irish Birds 9: 523-544 (2013).

- Environmental Impact Assessment Report for a proposed road development at Clonburris, the Biodiversity Chapter of which was completed by Scott Cawley (2020) – this site is located directly north of the current proposed development (north of the Grand Canal).

Consultation

6.18 Consultation letters were submitted by email to the Development Applications Unit of the Department of Culture, Heritage and the Gaeltacht on the 9 February 2021 (DAU Ref: G Pre 0042/2021). The letters included an outline description of the proposed development and a request for any comments on the proposal. No response from the authority was received by Scott Cawley Ltd. prior to submission of the planning application for the proposed development.

6.19 Inland Fisheries Ireland was contacted on the 9 February 2021 to request additional data on species which may use the Griffeen River and for any comments they may have on the proposal. Inland Fisheries Ireland responded on the 17 February 2021 by forwarding on fisheries reports and data for the Griffeen River, the Camac River and the connecting river network. The correspondence did not include any comments on the development proposal.

Field Survey Methodology

6.20 Surveys for habitats, protected, rare and invasive flora, terrestrial mammals (including bats) and amphibians and reptiles, as well as ground-level assessments of trees and structures with respect to their suitability for roosting bats, as well as nesting birds, were undertaken on the 10 February 2021 by Alexis FitzGerald B.A. (Hons) M.Sc. of Scott Cawley Ltd.

Habitats and Flora Survey

6.21 A habitat survey was undertaken at the proposed development site following the methodology described in *Best Practice Guidance for Habitat Survey and Mapping*[3]. All habitat types were classified using the *Guide to Habitats in Ireland*[4], recording the indicator species and abundance using the DAFOR scale[5] and recording any species of conservation interest. Vascular and bryophyte plant nomenclature generally follow that of the National Vegetation Database[6], having regard to more recent taxonomic changes to species names after the *New Flora of the British Isles*[7] and the British Bryological Society's *Mosses and Liverworts of Britain and Ireland: A Field Guide*[8].

Fauna Surveys

Terrestrial Mammals (Excl. Bats)

6.22 The presence and absence of terrestrial fauna species were surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats on site were assessed for signs of usage by protected and red-listed fauna species, and their potential to support these species. Surveys included checks for the presence of badger setts within the subject lands, and to record any evidence of use.

Birds

6.23 Bird species were recorded during the multidisciplinary ecology survey on 10 February 2021. Birds were identified by sight, and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes. No dedicated wintering or breeding bird surveys were

[3] Smith, G.F., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council Church Lane, Kilkenny, Ireland.
[4] Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.
[5] The DAFOR scale is an ordinal or semi-quantitative scale for recording the relative abundance of plant species. The name DAFOR is an acronym for the abundance levels recorded: Dominant (D), Abundant (A), Frequent (F), Occasional (O) and Rare (R).
[6] Weekes, L.C. & FitzPatrick, Ú. (2010) *The National Vegetation Database: Guidelines and Standards for the Collection and Storage of Vegetation Data in Irelan*d. Version 1.0. Irish Wildlife Manuals, No. 49. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
[7] Stace, C. (2019) *New Flora of the British Isles*. 4th Edition. C&M Floristics.
[8] Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland: A Field Guide*. Latimer Trend & Co., Plymouth.

carried out, however, any wintering or breeding birds observed during the aforementioned multidisciplinary survey were noted.

Bats

6.24 A ground-level assessment of all trees and structures within the subject lands, to examine their suitability to support roosting bats and potential to act as important landscape features for commuting and foraging bats, was completed. The assessment of structures included external inspections only. The assessment was based on guidelines (see Table 6.1) in *Bat Surveys for Professional Ecologists: Good Practice Guidance*[9] and included inspections of trees and structures for potential roost features (PRFs), and for signs of bats (staining at roost entrances, droppings, carcasses, insect remains).

Table 6.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, applied according to professional judgement (Taken from Collins (2016)[11]).

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitats. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, treelined watercourses and grazed parkland. Site is close to and connected to known roosts.

6.25 Bat activity surveys were not undertaken within the lands within the last two years, however, bat activity surveys were undertaken in May 2016 for a previous proposed development directly west of the current proposed development, which included the north-south treeline on the western side of the current proposed development. The walkover survey was completed by surveyors who are experienced in bat activity surveys, and a handheld bat detector was used. The surveys were designed with reference to

methodologies in *Bat Surveys for Professional Ecologists: Good Practice Guidelines*[9]. Recordings collected in the field were analysed using specialist sound analysis software to aid in the identification of bat species by their calls, (where this was possible), using professional judgement and with reference to *British Bat Calls: A Guide to Species Identification*[10].

Amphibians and Reptiles

6.26 An assessment of habitat suitability for amphibians and reptiles was completed. Suitable habitat for amphibians, such as ponds and wet ditches, and for reptiles, such as stone walls, rocks or logs suitable for basking, were recorded and mapped, as well as any direct observations of individuals.

Freshwater white-clawed crayfish

6.27 A visual assessment of habitat suitability of the Griffeen River for freshwater white-clawed crayfish was completed by taking note of river depth, width, substrate, vegetation and water quality. Suitable habitat located along the river was mapped, and any direct observations of individuals were noted.

Ecological Evaluation and Impact Assessment

Ecological Evaluation

6.28 Ecological receptors (including identified sites of ecological importance) are valued with regard to the ecological valuation examples set out in *Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2*[11] and the guidance provided in *Guidelines for Ecological Impact Assessment in the UK and Ireland*[12] – refer to Appendix 6.3 for examples of how ecological importance is assigned. In accordance with these guidelines, important ecological features within what is referred to as the Zone of Influence (ZoI) of the proposed development which are "both of sufficient value to be material in decision making and likely to be affected significantly" are deemed to be 'Key Ecological Receptors' (KERs). These are the ecological receptors which may be subject to significant effects from the proposed development, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of local importance (higher value) or greater.

Impact Assessment

6.29 Ecological impact assessment is conducted following a standard source-pathway-receptor model, where, in order for an impact to be established all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism is sufficient to conclude that a potentially significant effect would not occur.

- Source(s) – e.g. pollutant run-off from proposed works
- Pathway(s) – e.g. groundwater connecting to nearby qualifying wetland habitats
- Receptor(s) – e.g. wetland habitats and the fauna and flora species they support

Characterising and Describing the Impacts

6.30 The parameters considered in characterising and describing the potential impacts of the proposed development are per the EPA's *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*[13] and CIEEM's *Guidelines for Ecological Impact Assessment in the UK and Ireland*: whether the effect is positive, neutral or negative; the significance of the effects; the extent and context of the effect; the probability, duration and frequency of effects; and cumulative effects.

[9] Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.
[10] Russ, J. (2012) *British Bat Calls: A Guide to Species Identification*. Pelagic Publishing, Exeter, United Kingdom. ISBN 978-1-907807-25-1.
[11] NRA (2009) *Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2*. National Roads Authority.
[12] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland*. Chartered Institute of Ecology and Environmental Management, Winchester, UK.
[13] Environmental Protection Agency. (2017) *Guidelines on the information to be contained in Environmental Impact Assessment Reports*. Draft, August 2017. (refer to Table 3.3)

6.31 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. The following development types are included in considering cumulative effects:

- Existing projects (under construction or operational)
- Projects which have been granted consent but not yet started
- Projects for which consent has been applied for which are awaiting a decision, including those under appeal
- Projects proposed at a plan level, if relevant (e.g. future strategic infrastructure such as roads or greenways)

6.32 The likelihood of an impact occurring, and the predicted effects, can also be an important consideration in characterising impacts. In some cases, it may not be possible to definitively conclude that an impact will not occur. In these cases, the evaluation of significant effects is based on the best available scientific evidence but where reasonable doubt still remains then the precautionary principle is applied, and it may need to be assumed that significant effects may occur. Professional judgement is used in considering the contribution of all relevant criteria in determining the overall magnitude of an impact.

Significant Effects

6.33 In determining whether potential impacts will result in significant effects, the CIEEM guidelines were followed. The approach considers that significant effects will occur when there are impacts on either:

- the structure and function (or integrity) of defined sites, habitats or ecosystems; or
- the conservation status of habitats and species (including extent, abundance and distribution).

Integrity

6.34 The term "*integrity*" may be regarded as the coherence of ecological structure and function, across the entirety of a site that enables it to sustain all of the biodiversity or ecological resources for which it has been valued (National Roads Authority (NRA), 2009).

6.35 The term "*integrity*" is most often used when determining impact significance in relation to designated areas for nature conservation (*e.g.* SACs, SPAs or pNHA/NHAs) but can also be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and/or species exist with a defined ecosystem at a given geographic scale.

6.36 An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing or changing the processes that support the sites' habitats and/or species; affect the nature, extent, structure and functioning of component habitats; and/or, affect the population size and viability of component species.

Conservation Status

6.37 Similar definitions for conservation status given in the EU Habitats Directive 92/43/EEC, in relation to habitats and species, are also used in the CIEEM (2018) and NRA (2009) guidance which are summarised as follows:

- For natural habitats, conservation status means the sum of the influences acting on the natural habitat and its typical species, that may affect its extent, structure and functions as well as its distribution, or the long-term survival of its typical species, at the appropriate geographical scale
- For species, conservation status means the sum of influences acting on the species concerned that may affect the abundance of its populations, as well as its distribution, at the appropriate geographical scale

6.38 An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status, having regard to the definitions of favourable conservation status provided in the EU Habitats Directive 92/43/EEC – *i.e.* into the future, the range, area and quality

of habitats are likely to be maintained or increased and species populations are likely to be maintained or increased.

6.39 According to the CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological receptor will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (*i.e.* local, county, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a species which is considered to be internationally important. However, an impact may occur at a local level on this internationally important species. In this case, the impact on an internationally important species is considered to be significant at only a local, rather than an international level.

Receiving environment

Designated Areas

European sites

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

6.41 The subject lands are not located within or adjacent to any European sites (see Figure 6.8). The closest European site is Rye Water Valley/Carton SAC (001398), located c.4.4km north-west, which has been designated for petrifying springs, Desmoulin's whorl snail *Vertigo moulinsiana* and narrow-mouthed whorl snail *Vertigo angustior*.

6.42 The Griffeen River flows adjacent to and directly through the majority of the length of the proposed development site and has the potential to hydrologically connect the proposed development site to European sites located downstream in Dublin Bay (see Figure 6.7 Waterbodies in the vicinity of the proposed development.). As it flows north (culverted underneath the Grand Canal) it is joined by the Adamstown stream, c.1km downstream, the Laraghcon stream, c.3.4km downstream, and the Moat stream, c.3.5km downstream of the proposed development site, before it flows into the River Liffey, c.4km downstream of the proposed development site. Kilmahuddrick stream, not shown on the EPA maps, starts at the southern edge of the Griffeen Valley Park, before joining the Griffeen River, c.330m north-west of its starting point in the park. The Griffeen River and the adjoining streams all have a '*Good*' WFD status and are listed as '*At risk*' waterbodies by the EPA.

6.43 The River Liffey is assigned a '*Good*' WFD status until it reaches Lucan village, located downstream of the proposed development site, where its WFD status is '*Unassigned*'. At Chapelizod, its WFD status is '*Moderate*'; however, it then changes to a '*Good*' WFD status before joining the Upper and Lower Liffey Estuary waterbodies at Islandbridge, c.15km downstream and east of the proposed development site. Both of these waterbodies have a '*Good*' WFD status and are listed as being '*At risk*' by the EPA.

6.44 The next nearest waterbody to the proposed development site, the Grand Canal, runs west to east c.50m north of the proposed development site. It has a '*Good*' WFD status and is listed as being '*At Risk*' by the EPA. The Grand Canal joins the Lower Liffey Estuary c.9km east of the proposed development site, before flowing into Dublin Bay c.16km downstream from the proposed development site. The Dublin Bay is considered to be '*Unpolluted*' with a '*Good*' WFD status and is considered to be '*Not at risk*'.

6.45 The Groundwater Body (GWB) underlying the site is the Dublin GWB, which is currently classified by the EPA as having '*Good Status*' and '*Not at risk'*. The Dublin GWB overlaps with only one European site that is designated for groundwater dependent terrestrial habitats and fauna species that are

dependent on groundwater dependent terrestrial habitats, *i.e.* Rye Water Valley/Carton SAC, which is located c.4.4km north-west of the proposed development site.

Figure 6.7 Waterbodies in the vicinity of the proposed development.

6.46 There are four SACs and three SPAs within the vicinity of the proposed development and downstream in Dublin Bay as follows (see Figure 6.8):

- Rye Water Valley/Carton SAC (001398), located c.4.4km to the north-west, and designated for petrifying springs, Desmoulin's whorl snail and narrow-mouthed whorl snail.
- Glenasmole Valley SAC (001209), located c.9.4km to the south-east, and designated for grassland habitats and petrifying springs.
- Wicklow Mountains SAC (002122), located c.11.2km to the south-east, and designated for freshwater and upland habitats and otter *Lutra lutra*.
- North Dublin Bay SAC (000206), which is c.18km east of the proposed development site and designated for a range of coastal habitats, and populations of petalwort *Petalophyllum ralfsii*.
- North Bull Island SPA (004006), which is c.14.9km east of the proposed development site and designated for a range of wintering wetland bird species.
- Wicklow Mountains SPA (004040), which is c.14.1km to the south-east, and designated for merlin Falco columbarius and peregrine Falco peregrinus.
- South Dublin Bay SAC (000210), which is c.15.6km east of the proposed development site and designated for dune and tidal habitats.
- South Dublin Bay and River Tolka Estuary SPA (004024), which is c.15.6km east of the proposed development site and designated for a range of wintering wetland bird species.

6.47 Full lists of the qualifying interests (QI) and special conservation interest (SCI) species of these European sites are presented in Appendix 6.1.

6.48 Based on the results of the desk study and the site walkover surveys, the subject lands do not contain optimal habitat for qualifying interest or special conservation interest species for which any European sites have been designated. The Griffeen River may be potentially used by qualifying interest species, Atlantic salmon, otter and white-clawed crayfish, however the local populations of these three species are not QI populations of SACs as the proposed development site is not hydrologically connected to

European sites designated for the species (*i.e.* the Griffeen River is not located within the same river catchment that supports any SAC population of Atlantic salmon, otter and/or white-clawed crayfish). The subject lands may be potentially used by SCIs as the proposed development is within the normal foraging range of SCI species of North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA, as well as due to the mobile nature of SCI species. In particular with regard to SCI species of the North Bull Island SPA and the South Dublin Bay and River Tolka Estuary SPA, only black-headed gull were recorded using the proposed development site for foraging. However, considering that only very low numbers of this species were recorded within the proposed development, and the distance (c.14.9km) to the North Bull Island SPA itself, there is not considered to be any likely significant effects on SCI species of any European sites as a result of the proposed development.

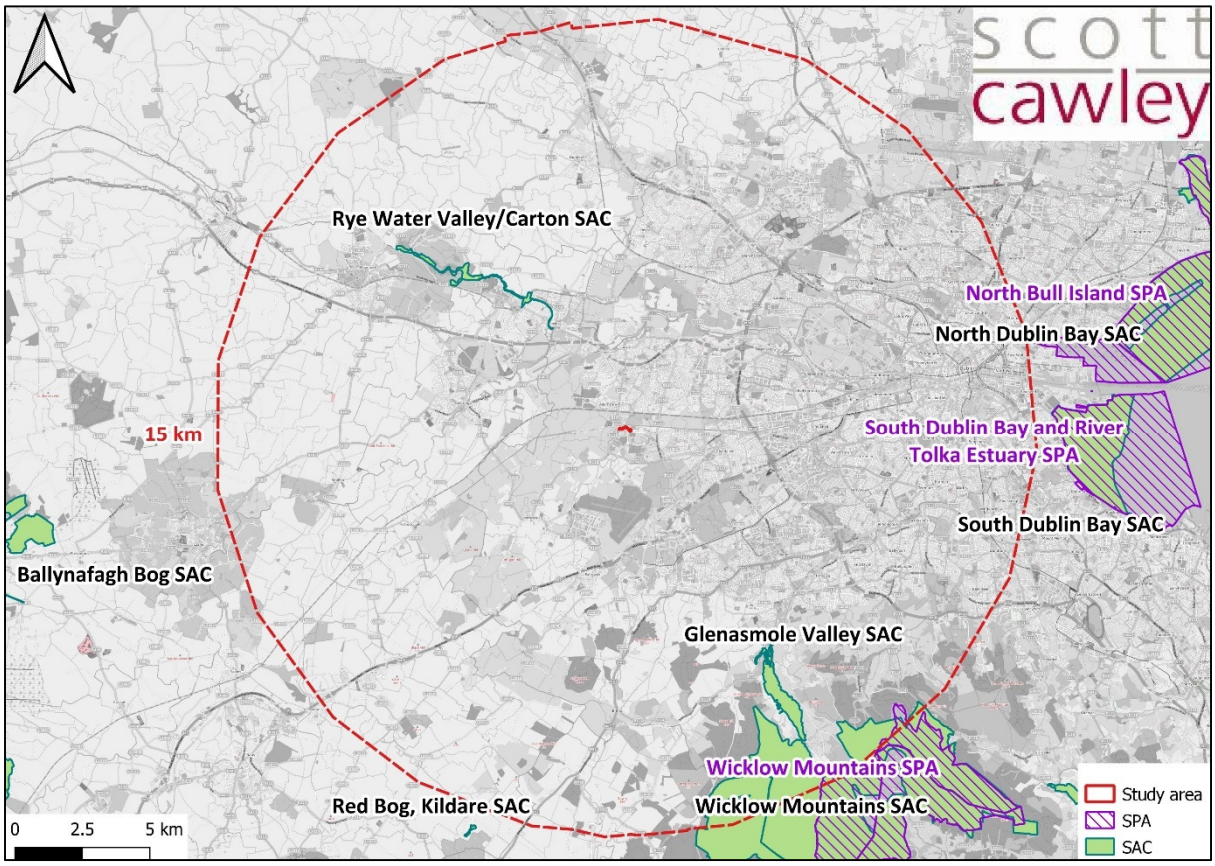

Figure 6.8: European sites in the vicinity of the proposed development site.

Nationally Designated Sites

6.49 Natural Heritage Areas (NHAs) are designations under the Wildlife Acts in order to protect habitats, species or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with European sites. Although many NHA designations are not yet fully in force under this legislation (referred to as '*proposed NHAs*' or pNHAs), they are offered protection in the meantime under planning legislation which requires that planning authorities give recognition to their ecological value[14]. Proposed NHAs are offered protection under county development plans, as is the case for the *South Dublin County Development Plan 2016-2022* through Policy 13 on Natural Heritage Areas, which requires that planning authorities give due regard to their protection in planning policies and decisions (South Dublin County Council, 2016).

6.50 The proposed development site does not overlap with any NHA or pNHA (see Figure 6.10). There are 11 national sites located within c.15km of the proposed development, of which all are pNHAs (see Figure 6.9).

6.51 The Grand Canal pNHA is not hydrologically connected to the proposed development site. The Griffeen River do not connect the pNHA to the proposed development site. The Griffeen River runs northwards culverted beneath the Grand Canal north of the proposed development site.

[14] NPWS (2019). Natural Heritage Areas Webpage. Available online at www.npws.ie/protected-sites/nha. Accessed 10th March 2021.

6.52 There are pNHAs hydrologically connected via surface water network to the proposed development which are located downstream in Dublin Bay, and are designated for similar reasons as their overlapping European sites.

6.53 The pNHAs within the vicinity of the proposed development are as follows:

- Grand Canal pNHA, located c.50m north of the proposed development site. The site has been designated for its habitats and biodiversity.
- Liffey Valley pNHA, located c.3.5km north of the proposed development site. The site is designated for its diversity of habitat and for rare flora.
- Rye Water Valley/Carton pNHA, located c.4.5km north-west of the proposed development site. There is no published information available for this designated site from the NPWS. It overlaps with the Rye Water Valley/Carton SAC and is likely to be designated for the same reasons, i.e. the priority Annex I habitat petrifying springs with tufa formation (Cratoneurion), and populations of the Annex II narrow-mouthed whorl snail and Desmoulin's whorl snail.
- Royal Canal pNHA, located c.4.5km north of the proposed development site. The site is designated for its habitats and biodiversity.
- Lugmore Glen pNHA, located c.6.9km south of the proposed development site. The site is designated for its wooded glen and woodland flora.
- Dodder Valley pNHA, located c.8.3km south-east of the proposed development site. The site is designated for its riparian vegetation.
- Slade of Saggart and Crooksling Glen pNHA, located c.7.1km south of the proposed development site. The site is designated for its wooded river valley and wetland system.
- Glenasmole Valley pNHA, located c.9.4km south-east of the proposed development. There is no published information available for this designated site from the NPWS. It overlaps with the Glenasmole Valley SAC and is likely to be designated for the same reasons, e.g. grassland habitats and petrifying springs.
- Kilteel Wood pNHA, located c.11.5km south-west of the proposed development site. The site is designated for its deciduous woodland.
- North Dublin Bay pNHA, located c.14.1km east of the proposed development site. There is no published information available for this designated site from the NPWS. It overlaps with the North Dublin Bay SAC and North Bull Island SPA and is likely to be designated for the same reasons, e.g. dune and tidal habitats and wintering bird populations.
- South Dublin Bay pNHA, located c.15.5km east of the proposed development site. There is no published information available for this designated site from the NPWS. It overlaps with the South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA and is likely to be designated for the same reasons, e.g. dune and tidal habitats and wintering bird populations.
- Booterstown Marsh pNHA, located c.16.5km east of the proposed development site, which is designated for its tidal habitats, rare flora and wintering bird populations.
- Dolphins, Dublin Docks pNHA, located c.16.7km east of the proposed development site. There is no published information available for this designated site from the NPWS. It overlaps with the South Dublin Bay and River Tolka Estuary SPA and is likely to be designated for the same reasons, i.e. primarily the Arctic and common tern populations it supports.

6.54 More detailed descriptions of the qualifying interests of the pNHA sites in the vicinity of the proposed development are presented in Appendix 6.1.

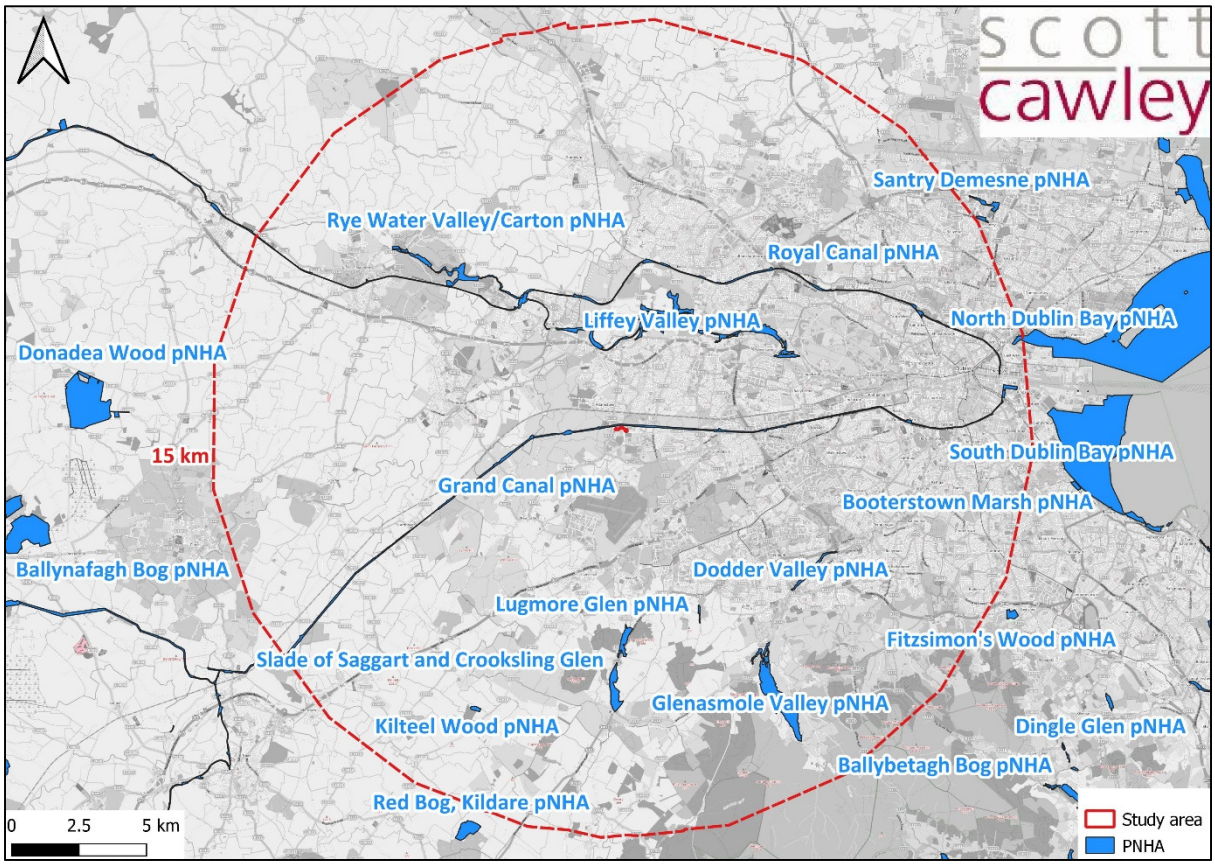

Figure 6.9 Natural Heritage Areas and proposed Natural Heritage Areas within the vicinity of the proposed development site.

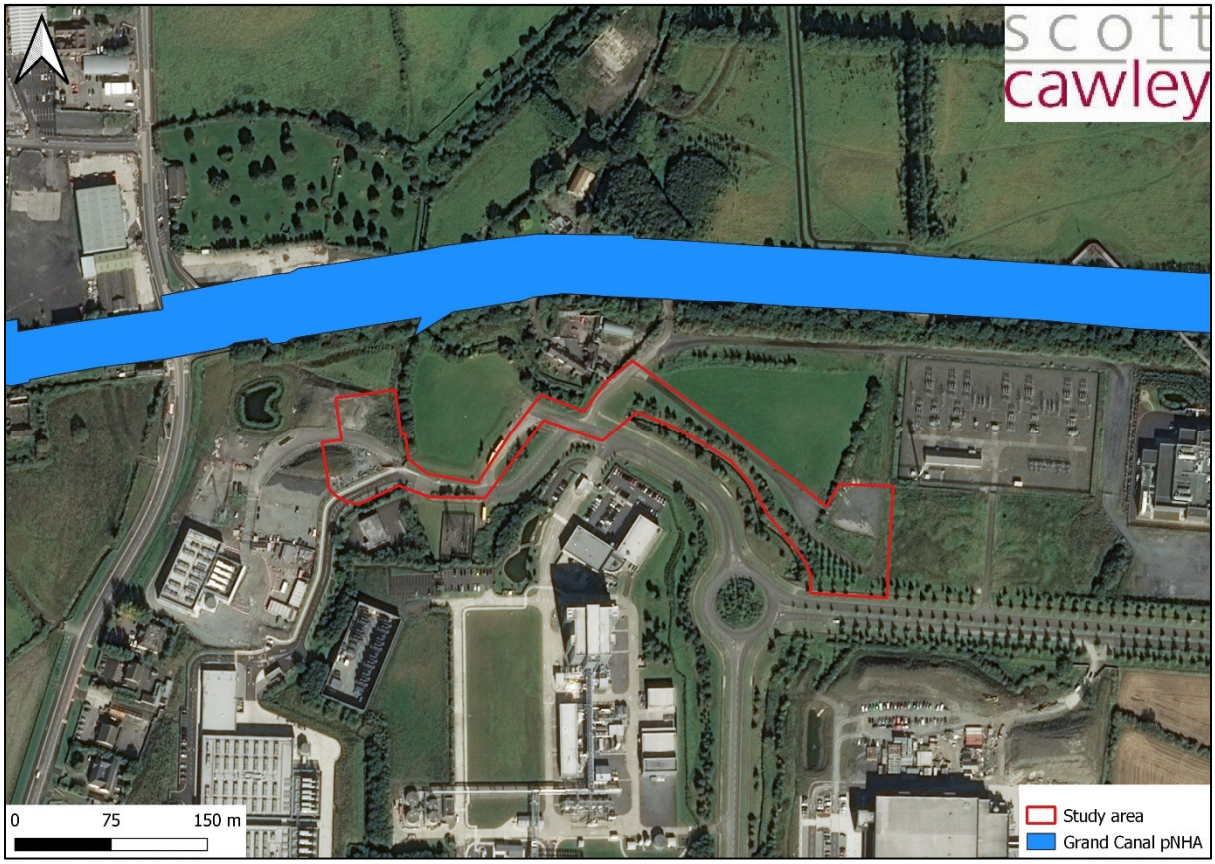

Figure 6.10 Location of the proposed development site in relation to the Grand Canal pNHA.

Habitats and Flora

Rare and Protected Flora

6.55 A search of the National Biodiversity Data Centre (NBDC) database for records of rare and/or protected species within c.2km of the proposed development site returned records for Red-listed species*, Scrophularia umbrosa, Bryum torquescens, Tortula lanceola, Aloina rigida, Pterygoneurum lamellatum, Microbryum starckeanum, Bryum torquescens, Ricciocarpus natans* and *Tortula vahliana*; and Flora Protection Order species, *B. intermedium*, *Pallavicinia lyellii* and *Hordeum secalinum*. The NBDC holds one record for *S. umbrosa* from within c.2km of the proposed development site (recorded c.1.7km north, in 2000).

6.56 In addition to the above species, the NPWS database holds records for *Clinopodium acinos, Galeopsis angustifolia, Groenlandia densa, Betonica officinalis, Hordeum secalinum, Hypericum hirsutum* and *Viola hirta* within the same grid square in which the proposed development is located (*i.e.* O03).

6.57 No protected and/or rare flora were recorded within the proposed development site during the surveys. There is no suitable habitat for *C. acinos* (*i.e.* short dry grassland, rocky slopes, gravel pits, arable fields, roadside and railway embankments and ridge edges on former heathland), *P. lyellii* (*i.e.* bogs and wet woodlands), *T. lanceola* (*i.e.* well-drained calcareous soil), *B. torquescens* (*i.e.* base-rich soils) *V. hirta* (*i.e.* calcareous soils) and *H. secalinum* (old meadows). Suitable habitat for *B. intermedium* (stream banks, road sides), *B. officinalis* (*i.e.* hedgerows, treelines and woodlands), *G. angustifolia* (*i.e.* arable land, waste places and open ground), *G. densa* (*i.e.* canals, streams, rivers), *H. hirsutum* (*i.e.* woodland, scrub and rough grassland) and *S. umbrosa* (*i.e.* streams and rivers) exists within, or directly adjacent to, the proposed development site, however, the surveys undertaken on the 10 February 2021 did not find any protected and/or rare plant species within the subject lands.

Non-native Invasive Flora

6.58 With regards to records for non-native invasive species within c.2km of the proposed development, the NBDC database search returned records for *Elodea nuttallii*, which is listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations, 2011*. The record of *E. nuttallii* is located c.1.6km west of the proposed development, recorded in 2020.

6.59 One stand of *Reynoutria japonica* was also recorded along Kishoge Road in Clonburris, c.430m north-east of the proposed development (Scott Cawley, 2020). *Reynoutria Japonica* is listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations,* 2011 as amended.

6.60 No non-native invasive species listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations,* 2011 were recorded within the proposed development site during the multidisciplinary surveys.

6.61 However, a non-native species, *Acer pseudoplatanus* (currently not listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations, 2011*), was recorded as planted specimens in the treeline habitat within the proposed development footprint. This species is established and widespread in Ireland, being one of the most common tree species in Ireland, naturalised in the wild and widely planted in semi-natural and urban habitats (Reynolds, 2002). It is therefore not considered to be invasive within the site.

Habitats

6.62 The lands contain a range of habitats which are typical of the surrounding commercial and industrial areas to the south of the proposed development site (see Figure 6.6). A full list of species recorded within each habitat is included in Appendix 6.4.

Dry meadows and grassy verges (GS2)/dry calcareous and neutral grassland (GS1) mosaic (total area c.0.147ha)

6.63 Dry meadows and grassy verges (GS2) habitat type is widespread on the banks of the Griffeen River (see Figure 6.7). This habitat type forms a mosaic with dry calcareous and neutral grassland (GS1) along these banks, but the species indicative of this habitat are scattered and less common than those of the former. Species indicative of GS2 found in this area include dominant *Dactylis glomerata,* as

well as *Arrhenatherum elatius, Ranunculus acris* and the weedy herbaceous species *Senecio jacobaea*. The encroaching of scrub along these banks is indicated by the occasional presence of *Rubus fruticosus* agg. The species indicative of GS1 habitat here (although generally less common) include *Anthoxanthum odoratum, Festuca rubra* agg., *Festuca pratensis, Agrostis capillaris, Leucanthemum vulgare, Origanum vulgare, Plantago lanceolata*, *Knautia arvensis* and *Daucus carota*. However, this GS1 habitat does not correspond to the EU Habitat Directive Annex I habitat 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites), as only two species listed as typical of this Annex habitat by NPWS (2019) were recorded here, namely *Origanum vulgare* and *Daucus carota,* and furthermore, no orchid species were recorded.

6.64 This habitat is considered to be of local importance (higher value) due to its relatively high species diversity.

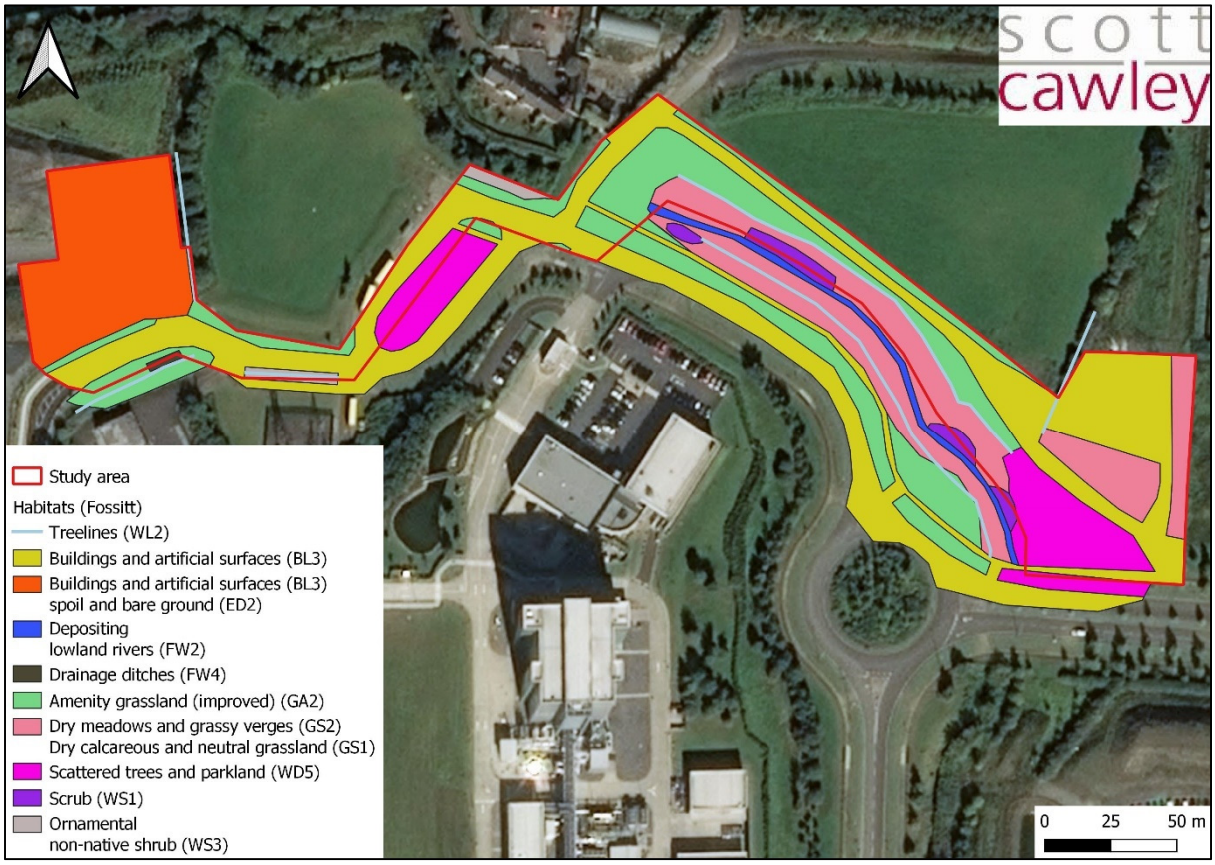

Figure 6.6 Habitats recorded within and directly south of the proposed development site boundary.

Figure 6.7 Dry meadows and grassy verges (GS2)/ dry calcareous and neutral grassland (GS1) mosaic within the proposed development site, on the banks of the Griffeen River.

Figure 6.8 Treeline (WL2) habitat within the proposed development site.

Treelines (WL2) (total length c.239m)

6.65 Treelines (WL2) within the site are comprised of largely young planted specimens of *Acer pseudoplatanus*, *Alnus glutinosa, Betula pendula*, *Salix* species and *Pinus sylvestris* (see Figure 6.8). Underneath the planted trees, such species as *Hedera helix, Rubus fruticosus* agg. and *Rosa canina* agg. can be found. One of the treelines located near the eastern margin of the proposed development site is more mature and established than the other newly planted treelines. The treelines in the site form part of the wider linear network through the landscape and is therefore considered to be of local importance (higher value).

Depositing/lowland rivers (FW2) (total length c.32.2m)

6.66 Depositing/lowland rivers (FW2) comprises of the Griffeen River which flows directly adjacent to the proposed development site (for c.204m in distance) and intersects it in the western section (for c.32.2m in distance) (see Figure 6.9). The river is approximately 2m wide on average, with opaque water. The riverbed appears muddy and silty. The river is overgrown with species such as *Phalaris arundinacea*, *Epilobium hirsutum* and *Juncus effusus* on its banks. Within the water itself, *Apium nodiflorum* can also be found, which is tolerant of water inundation.

6.67 As the habitat forms part of the hydrological network to the wider areas and all the way to Dublin Bay, it is considered to be of local importance (higher value).

6.68 The remaining habitats that are described below are of negligible to local importance (lower value) due to their artificial/manmade and/or disturbed nature, and poor species diversity.

Figure 6.9 Griffeen River (FW2) flowing within the proposed development site.

Figure 6.10 Scrub (WS1) within the proposed development site

Scrub (WS1) (total area c.0.0178ha)

6.69 Scrub (WS1) grows in small patches on the banks of the Griffeen River (see Figure 6.10). The scrub is almost entirely dominated by *Rubus fruticosus* agg., along with occasional *Dactylis glomerata, Lonicera periclymenum,* and lesser quantities of *Epilobium hirsutum*. Due to the low species diversity and presence of non-native species, scrub within the proposed development site is considered to be of local importance (lower value).

Amenity grassland (improved) (GA2) (total area c.0.34ha)

6.70 Amenity grassland (GA2) can be found on the various roadside verges and path margins within the proposed development site. The grass species *Lolium perenne* and *Festuca rubra* agg. dominate this habitat, along with the frequent broadleaved herbs *Trifolium repens, Ranunculus acris* and the bryophyte species *Calliergonella cuspidata*. The habitat is valued as local importance (lower value), due to its low species diversity.

Scattered trees and parkland (WD5) (total area c.0.166ha)

6.71 Scattered trees and parkland (WD5) habitat is present in the centre and east of the site (see Figure 6.11). *Acer pseudoplatanus* and *Betula pendula* largely dominate the tree component of the habitat. Within the grassy ground layer itself, *Festuca rubra* agg. and *Lolium perenne* are common. Herbaceous species include *Trifolium repens* and *Ranunculus acris*. The grassland component is closely analogous to the amenity grassland habitat outlined above. This habitat is considered to be of local importance (lower value), as it is generally low in species diversity and the trees are young and planted in origin.

Figure 6.11 Scattered trees and parkland (WD5) habitat within the proposed development site.

Drainage ditches (FW4) (total length c.33m)

6.72 A small section of drainage ditches (FW4) habitat is present adjacent to a roadway in the west of the proposed development site. It is open and dominated by such species as *Agrostis stolonifera* and *Ranunculus repens*. It does not appear to connect any significant water flow to the Griffeen River. The habitat is valued as local importance (lower value), due to its low species diversity.

Buildings and artificial surfaces (BL3) (total area c.0.661ha)

6.73 Buildings and artificial surfaces (BL3) are present throughout the proposed development site and are comprised of roads and paved areas and gravelled walkway and parking areas. This habitat is considered to be of negligible importance, due to its man-made nature.

Spoil and bare ground (ED2)/buildings and artificial surfaces (BL3) mosaic (total area c.0.354ha)

6.74 One area of spoil and bare ground (ED2)/buildings and artificial surfaces (BL3) mosaic is present as an active building site and mid-construction metal structure in the western edge of the site. This habitat is considered to be of negligible importance, due to its man-made nature.

Ornamental/non-native shrub (WS3) (total area c.0.0252ha)

6.75 Very small isolated areas of ornamental/non-native shrub (WS3) habitat occur in the west of the proposed development site. The shrubs are dominated by the introduced *Cornus sericea*, whilst the native *Hedera helix* can be found creeping beneath the cover of the shrubs. The habitat is valued as local importance (lower value), due to its low species diversity.

Fauna

Badger

6.76 Badger *Meles meles*, and their breeding and resting places, are protected under the Wildlife Acts. The NBDC data search returned no records for badger within c.2km of the site, whilst the NPWS data returned six records for badger within the same grid square in which the proposed development site is located (*i.e.* O03). Furthermore, a disused badger sett was identified just north-east of the proposed development site, in the south-western end of Kischoge Road near the Clonburris Strategic Development Zone (Scott Cawley, 2020).

6.77 No signs of badger activity were noted within the proposed development site. The habitats found within the proposed development site provide suitable foraging and commuting habitat for badgers.

6.78 Badgers, and their breeding and resting places, are protected under the Wildlife Acts. Due to their stable Irish populations, they are of "Least concern" in terms of conservation (Nelson *et al.*, 2019). The local badger populations are valued to be of local importance (higher value), as there is suitable habitat within the proposed development site and its vicinity which is likely to support local badger populations. However, the absence of recent signs of badger may indicate that the surroundings are unlikely to support significant badger populations.

Otter

6.79 Otter *Lutra lutra*, and their breeding and resting places, are protected under the Wildlife Acts. Otter are also listed on Annex II and Annex IV of the EU Habitats Directive and are afforded strict protection under the Habitats Directive and the *European Communities (Birds and Natural Habitats) Regulations, 2011*. The NBDC data search returned one record for otter within c.2km of the proposed development, and the NPWS, seven records within the grid square O03. The most recent record for otter (dated 1980) is located c.50m north-west of the proposed development site, near the Grand Canal.

6.80 There were no signs of otter present within the site. The Griffeen River runs directly adjacent to and through the proposed development site and is potentially used by commuting and foraging otters. The riverbanks here are largely flat, open and sparsely vegetated and are thus low suitability for otter holts, although the canal to the north of the site is very likely used by commuting and foraging otters. The most recent observation of otter by Scott Cawley ecologists along the Grand Canal and near the proposed development is from the 1st February 2021. They have also previously observed otter in the Baldonnell stream that lies upstream of the Griffeen and are aware that artificial otter holts were installed along the Griffeen River when it was realigned as part of the Grangecastle area development (L. Higgins, pers. comm. 1st February 2021). Otters are also known to use the River Liffey and the Camac River (Macklin *et al.,* 2019) and have been recorded on the Grand Canal. Therefore, the usage of the site by otter cannot be ruled out.

6.81 The Grand Canal and the Griffeen River, as well as the Camac River, are located in a separate sub-catchment to any European site designated for otter, and therefore local otter populations do not form part of any SAC populations.

6.82 Due to the aforementioned facts and the presence of suitable habitat within and directly adjacent to the proposed development site, the otter populations upstream and downstream and along the canal are considered to be of county importance.

Small Mammals

6.83 Small mammals, hedgehog *Erinaceus europaeus*, Irish hare *Lepus timidus hibernicus*, Irish stoat *Mustela erminea hibernica*, pine marten *Martes martes*, pygmy shrew *Sorex minutus* and red squirrel *Sciurus vulgaris* are protected under the Wildlife Acts. The NBDC database search identified the following records within c.2km of the proposed development site: one record of pygmy shrew; and, one record for hedgehog.

6.84 No signs of protected mammal fauna were noted within the lands. Mammal tracks were identified in the grasslands, however in the absence of other signs, *e.g.* droppings, it was not possible to identify which species had created them. The grasslands and hedgerows within the proposed development site offer suitable foraging and breeding habitat for hedgehogs and pygmy shrews.

6.85 All small mammal species returned in the NBDC search are of "Least" conservation concern (Nelson *et al.*, 2019). They are widely distributed throughout Ireland. Although the habitats on site do not present optimal breeding habitat for all small mammal species, they may be potentially used for commuting and foraging by all. The local small mammal populations are valued to be of local importance (higher value).

Non-native Invasive Mammals

6.86 With regards to records for invasive, non-native, mammal species within c.2km of the proposed development, the NBDC database search returned records for sika deer *Cervus nippon* and Eastern grey squirrel *Sciurus carolinensis* which are both listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations, 2011* (only specific provisions of Regulations 49 and 50 apply to sika deer). There is one record for sika deer from within the grid square O03, from 2008. There are three records of Eastern grey squirrel; the most recent of which is located c.1.5km south of the proposed development site, in Corkagh Park, from 2016.

Birds

6.87 All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the EU Birds Directive. The NBDC database holds records for 99 bird species which are known to occur within c.2km of the proposed development site. Species listed under the Birds Directive or in the *Bird of Conservation Concern of Ireland 2014-2019*[15] are presented in a table in Appendix 6.2.

Breeding birds

6.88 A range of common bird species were noted using the site for foraging purposes during the multidisciplinary survey undertaken in February 2021. These include blackbird *Turdus merula*, blue tit *Cyanistes caeruleus*, hooded crow *Corvus cornix*, magpie *Pica pica*, house sparrow *Passer domesticus,* starling *Sturnus vulgaris* and woodpigeon *Columba palumbus*.

6.89 All of the breeding bird species recorded within the proposed development site were Green-listed and therefore considered to be of Low Conservation Concern by Colhoun & Cummins (2013).

6.90 Breeding birds use various habitats, including trees, structures, grasslands and scrub, for nesting. The presence of several bird species with territories and with young within the proposed development site indicate that it is likely to be used for breeding by various species. No nests were observed during the present surveys, however, they may well occur on the site but were camouflaged and therefore well hidden, or may only be visible during the nesting season (i.e. 1 March to 31 August inclusive).

6.91 Barn swallows *Hirundo rustica*, house martins *Delichon urbicum* and swifts *Apus apus* frequently use eaves and crevices on buildings as nesting places. As there are no buildings within the proposed development site, the possibility of these species nesting in these buildings during the breeding period can be conclusively ruled out.

6.92 Due to the aforementioned facts and the presence of suitable habitat within and directly adjacent to the proposed development site, the local breeding bird populations are considered to be of local importance (higher value).

Wintering birds

6.93 The desk study records from the NBDC include 26 wintering waterfowl, gull and wader species within c.2km of the proposed development site. These records are present in Appendix 6.2. In addition, the multidisciplinary survey in February 2021 recorded one gull species, namely black-headed gull *Chroicocephalus ridibundus*, within the site.

6.94 Of the wintering bird species recorded, only black-headed gull is an SCI species of European sites. The nearest European site for black-headed gull, is the South Dublin Bay and River Tolka Estuary SPA, located c.15.6km east of the proposed development. Furthermore, this species is Red-listed and is therefore considered to be of High Conservation Concern by Colhoun & Cummins (2013).

6.95 The proposed development is within the normal foraging range of SCI species of North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA, however, it comprises of limited areas of suitable foraging habitat (*e.g.* open amenity grassland) due to grasslands being enclosed by roadways,

[15] Colhoun, K. & Cummins, S. (2013) *Birds of Conservation Concern in Ireland 2014-2019*. Irish Birds 9:523-544.

pathways and/or treelines, and the presence of relatively high levels of disturbance from walkers and dogs. No other SCI species of any European sites was recorded in the vicinity of the proposed development site during field surveys.

6.96 The habitats within the site offer suitable foraging habitat and shelter for smaller overwintering species such as passerine species fieldfare and redwing. Considering the above, the local populations of wintering birds, are considered to be of local importance (higher value).

Bats

6.97 Bats, and their breeding and resting places, are protected under the Wildlife Acts. All bat species are also listed on Annex IV of the EU Habitats Directive (with the lesser horseshoe bat also listed on Annex II) and are afforded strict protection under the Habitats Directive and the *European Communities (Birds and Natural Habitats) Regulations, 2011*. The NBDC and the NPWS hold records for the following five bat species in the vicinity of the proposed development site:

- Brown long-eared *Plecotus auritus*, nine records, with the most recent and closest record located c.30m west from 2008.
- Common pipistrelle *Pipistrellus pipistrellus*, 13 records, with the most recent and closest record located c.30m west from 2008.
- Daubenton's bat *Myotis daubentonii*, 33 records, with the most recent and closest record located c.30m west from 2008;
- Leisler's bat *Nyctalus leisleri*, 13 records, with the most recent and closest record located c.30m west from 2008.
- Soprano pipistrelle *P. pygmaeus*, 15 records, with the most recent and closest record located c.30m west from 2008.

6.98 The habitat within the lands provides good commuting and foraging routes for bats using the wider environs and its level of suitability is valued high as per the Bat Conservation Trust (BCT) guidelines (Collins ed., 2016). The treelines located within and directly adjacent to the proposed development site create linear corridors together with the Griffeen River and the Grand Canal, which connect the site to the surrounding area. The lands within the proposed development are largely unlit along the river, however, some light spill does originate from the local roadways. Therefore the lands are suitable for commuting and/or foraging bats.

6.99 No trees within the lands were identified with potential bat roost features during the ground-level assessment on 25 February 2021. The vast majority of the trees within the lands were planted specimens and not of highly mature age.

6.100 Although no bat activity surveys were carried for the purposes of the current proposed development, bat activity surveys have been previously completed directly west of the current proposed development in May 2016 (and which focussed on the area around the north-south treeline at the western edge of the current proposed development) (Scott Cawley, 2018). Four bat species were recorded foraging and commuting within this general area, *i.e.* common pipistrelle, Leisler's bat, soprano pipistrelle and an unidentified *Myotis* sp.

6.101 The bat species recorded during the surveys and returned in the NBDC data search are all common species and of "Least concern" (Nelson *et al.*, 2019). The local bat populations using the proposed development site and the surroundings as foraging and commuting habitat are valued as being of local importance (higher value).

Amphibians and Reptiles

6.102 The Wildlife Acts provide protection to Ireland's only reptile species, common lizard*, Zootoca vivipara* and two amphibian species, common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris.*

Common frog

6.103 The NBDC and the NPWS database holds one and 48 records, respectively, for common frog within c.2km of the subject lands and the same grid square in which the proposed development site is located

(*i.e.* O03). The species is widely distributed throughout the country and is associated with standing water.

6.104 No areas of standing water suitable for common frog were identified within the proposed development site. The single small drainage ditch on site was not showing standing water at the time of the field survey, but may hold water intermittently at times. Although no individuals were observed during the surveys, their presence on site cannot be ruled out based on availability of suitable habitat within the subject lands and their wide distribution across the country.

6.105 There is suitable habitat for common frog in the proposed development site and its immediate vicinity and there are records of common frog in the area, therefore the site is valued to be of local importance (higher value) for local common frog populations.

Smooth newt

6.106 The NBDC database search returned one records and the NPWS database six records for smooth newt from within the same grid square in which the proposed development site is located (i.e. O03). The most recent record is from 2018.

6.107 No individuals were observed at the time of the survey, and it is considered unlikely that smooth newts are present within the proposed development site due to lack of suitable habitat. Smooth newts are typically associated with waterbodies of standing water such as permanent ponds which are absent from the site. Local smooth newt populations are of local importance (higher value), however, they are not considered to be a key ecological receptor due to lack of suitable habitat, provided that there will be no indirect off-site effects.

Common lizard

6.108 There are no records of common lizard located within c.2km of the proposed development site in the NBDC database, however, the NPWS holds one record for the species within the same grid square in which the proposed development site is located (i.e. O03), from 1970. The nearest record for common lizard on the NBDC database is located c.9.8km east of the proposed development site in Terenure, from 2020.

6.109 This species is widely distributed in Ireland and is found in a variety of habitats[16], including grassland, scrub and hedgerows, which all occur on site and the surrounding environment, therefore the local common lizard populations are considered to be of local importance (higher value).

Fish

6.110 There are no records of fish species within c.2km of the proposed development site on the NBDC database, however, the *Water Framework Directive Fish Stock Survey of Rivers in the Eastern River Basin District* (Kelly *et al*., 2012) contains records of four species (brown trout *Salmo trutta*, European eel *Anquilla anquilla*, roach *Rutilus rutilus* and three-spined stickleback *Gasterosteus aculeatus*) in the Griffeen River. According to Inland Fisheries Ireland, the Griffeen River also holds populations of Atlantic salmon *Salmo salar* and sea trout *Salmo trutta trutta*.

6.111 Of the above species, only two are of conservation concern: Atlantic salmon and European eel. These two species are listed as “Vulnerable” and “Critically Endangered”, respectively (Nelson et al., 2019). In addition, Atlantic salmon is listed in Annex II and Annex V of the EU Habitats Directives.

6.112 Fish are present in a wide range of waterbodies with varying water quality throughout Ireland. Considering that the waterbodies hydrologically connected to the proposed development site contain protected and/or rare fish species (*i.e.* Atlantic salmon and European eel) these fish populations are considered to be of county importance, whereas fish populations of species of no conservation concern (*e.g.* stickleback and roach) are valued as local importance (lower value).

[16] The Herpetological Society of Ireland (2020). *Common Lizard*. Available online at www.thehsi.org. Accessed 10th March 2021.

Freshwater white-clawed crayfish

6.113 Freshwater white-clawed crayfish *Austropotamobius pallipes* is protected under the Wildlife Acts. The species is also listed on Annex II and Annex V of the EU Habitats Directive and are afforded strict protection under the Habitats Directive and the *European Communities (Birds and Natural Habitats) Regulations, 2011.*

6.114 There are no records for freshwater white-clawed crayfish c.2km of the proposed development site in the NBDC database. The nearest record is from the Camac River, c.3.7km east. The most recent record is from 2007.

6.115 South Dublin County Council carried out a white-clawed crayfish survey in the Camac River in 2018 and found that the river holds good populations of the species (Scott Cawley, 2020). As the Camac River is connected to the Griffeen River via the River Liffey and holds good populations of white-clawed crayfish, Inland Fisheries Ireland have recommended to assume that the species is present within the Griffeen River as well (Scott Cawley, 2020).

6.116 Surveys carried out by Forest, Environmental Research and Services (FERS) Ltd. in 2018, did not record any white-clawed crayfish in the Griffeen River or the Grand Canal, although the species has been recorded in the latter in the past. However, the surveys did record three individual white-clawed crayfish in the Cappagh feeder stream, which is located to the east of the proposed development site (Scott Cawley, 2020).

6.117 There are no designated sites for freshwater white-clawed crayfish within the same river catchment as the proposed development. The nearest designated site for the species is the Lough Lene SAC, c.61km north-west of the proposed development site. Freshwater white-clawed crayfish populations present in the Camac River, the Griffeen River, the Cappagh feeder stream, the Grand Canal or the River Liffey downstream are not connected to, or support, any SPA populations.

6.118 Freshwater white-clawed crayfish is found in rivers, streams and lakes, and considering that the Camac River supports their populations and that there is a hydrological link between the Camac River and the Griffeen River, it is possible that the species can be found in the Griffeen River also. Due to the presence of suitable habitat, local freshwater white-clawed crayfish populations are considered to be of county importance.

Summary of Ecological Evaluation

6.119 Table 6.2 and Table 6.3 below summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance, and identifies the Key Ecological Receptors (KERs). Species, habitats and features not qualifying as KERs are not subjected to impact assessment in line with current best practice of assessing the impacts on what are determined to be important ecological or biodiversity features: CIEEM and TII guidelines (CIEEM, 2018 and National Roads Authority, 2009).

Table 6.2 Summary of the ecological evaluation of designated sites.

Ecological Receptor	Ecological Valuation	KER?
Designated Sites		
North Bull Island SPA	International	No
South Dublin Bay SAC	International	No
South Dublin Bay and River Tolka Estuary SPA	International	No
North Dublin Bay SAC	International	No
All other European sites	International	No
Grand Canal pNHA	National	**Yes**
Dolphins, Dublin Docks pNHA	National	No
South Dublin Bay pNHA	National	No
Booterstown Marsh pNHA	National	No
North Dublin Bay pNHA	National	No
All other nationally designated sites	National	No

Table 6.3 Summary of the ecological evaluation of habitats and fauna.

Ecological Receptor	Ecological Valuation	KER?
Habitats		
Dry meadows and grassy verges (GS2)/dry calcareous and neutral grassland (GS1) mosaic	Local importance (higher value)	**Yes**
Amenity grassland (improved) (GA2)	Local importance (lower value)	No
Scattered trees and parkland (WD5)	Local importance (lower value)	No
Scrub (WS1)	Local importance (lower value)	No
Ornamental/non-native shrub (WS3)	Local importance (lower value)	No
Treelines (WL2)	Local importance (higher value)	**Yes**
Depositing/lowland rivers (FW2) (Griffeen River)	Local importance (higher value)	**Yes**
Drainage ditches (FW4)	Local importance (lower value)	No
Spoil and bare ground (ED2)/buildings and artificial surfaces (BL3) mosaic	Local importance (lower value)	No
Buildings and artificial surfaces (BL3)	Local importance (lower value)	No
Fauna Species		
Badger	Local importance (higher value)	**Yes**
Otter	County importance	**Yes**
Small mammals	Local importance (higher value)	**Yes**
Breeding birds	Local importance (higher value)	**Yes**
Wintering birds	Local importance (higher value)	**Yes**
Bats	Local importance (higher value)	**Yes**
Common frog	Local importance (higher value)	**Yes**
Smooth newt	Local importance (higher value)	No
Common lizard	Local importance (higher value)	**Yes**
Fish (species of no conservation concern)	Local importance (lower value)	No
Fish (species of conservation concern)	County importance	**Yes**
Freshwater white-clawed crayfish	County importance	**Yes**

Characteristics of the Proposed Development

6.120 The proposed development primarily comprises the provision of two no. 110kV transmission lines along with associated and ancillary works. The proposed transmission lines will connect the permitted and under construction Coolderrig 110kV Gas Insulated Switchgear (GIS) substation compound that was granted permission under SDCC Reg. Ref. SD18A/0298 with the existing Grange Castle – Kilmahud Circuits. The site of the proposed development has an area of c. 1.49 hectares (ha). A full description of the Proposed Development is provided within Chapter 2 of this EIA Report.

6.121 There will be no surface water or foul water drainage works. There will be no piling or other works that will affect groundwater. The construction programme will last approximately two months.

Potential impacts of the Proposed Development

Construction phase

Potential Impacts on Designated Sites

European Sites

6.122 The assessment presented in the Appropriate Assessment Screening Report concluded that the potential impacts associated with the proposed development do not have the potential to affect the receiving environment and, consequently, do not have the potential to affect the conservation objectives supporting the qualifying interests or special conservation interests of any European sites; either alone or in combination with any other plans or projects:

- As the proposed development does not traverse any European sites there is no potential for habitat fragmentation to occur.

- The proposed development site does not support populations of any fauna species linked with the QI/SCI populations of any European site(s).
- Chapter 8 of this EIAR submitted with this application deals with the hydrology of the proposed development site. The chapter assesses the hydrological and hydrogeological risks associated with the proposed development. The assessment noted that based on the potential sources of pollution from the proposed development during construction and operation phases and distance of c.20 km downstream, there is no potential for impacts to occur on European sites in Dublin Bay. This conclusion is based on a good understanding of the hydrological and hydrogeological environment, plausible sources of impact and knowledge of receptor requirements. This allows possible source-pathway-receptor linkages to be identified. Potential sources of impacts during construction and operation were considered in Chapter 8 and all potential sources of contamination were considered in relation to European sites without taking account of any measures intended to avoid or reduce harmful effects of the proposed development (mitigation measures) i.e. a worst-case scenario.
- The results of Chapter 8 (Hydrology) carried out by AWN indicate that surface run-off from the proposed development, during both construction and operational phases respectively, will not result in any perceptible impact on water quality in downstream receiving waters in Dublin Bay (and thus in the European sites therein). This is in light of expected hazard loading, dilution and attenuation within the Griffeen River, and considerable distance between the proposed development site and Dublin Bay.
- Therefore, there is no possibility of the proposed development undermining the conservation objectives of any of the qualifying interests or special conservation interests of the European sites in, or associated with, Dublin Bay as a result of surface water run-off or discharges.
- Construction-related disturbance and displacement of fauna species could potentially occur within the vicinity of the proposed development. For mammal species such as otter, disturbance effects would not be expected to extend beyond 150m[17]. For birds, disturbance effects would not be expected to extend beyond a distance of c.300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance[18]. There are no European sites within the disturbance ZoI; the next nearest European site to the proposed development is c.4.4km away.

6.123 There are no habitat areas within the disturbance ZoI of the proposed development that support populations of qualifying interest species of nearby SACs or SPAs[19]:

- The nearest SAC designated for otter is the Wicklow Mountains SAC, c.14.1km south of the proposed development. The Griffeen River is a small order stream located in a different sub-catchment than the Wicklow Mountains SAC. Considering the size of otter territories in Ireland[20], and its location relative to the Wicklow Mountains SAC, any otters potentially using the Griffeen River do not form part of, or support, any SAC population.
- The nearest designated site for freshwater white-clawed crayfish is the Lough Lene SAC, c.61.4km north-west of the proposed development site. Considering that the Griffeen River and the Camac river are located in a different catchment than the Lough Lene SAC and its location relative to the proposed development site, freshwater white-clawed crayfish populations found in these rivers do not form part of, or support, any SAC population.
- The nearest designated site for Atlantic salmon is the River Boyne and River Blackwater SAC, c.31.7km north-west of the proposed development. Considering that the Griffeen River and the Camac river are located in a different catchment than the River Boyne and River Blackwater SAC

17 This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes) documents. This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual ZoI of construction related disturbance likely to be much less in reality.

18 The disturbance zone of influence for waterbirds is based on the relationship between the noise levels generated by general construction traffic/works (BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise) and the proximity of those noise levels to birds – as assessed in Cutts, N. Phelps, A. & Burdon, D. (2009) Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance, and Wright, M., Goodman, P & Cameron, T. (2010) Exploring Behavioural Responses of Shorebirds to Impulsive Noise. Wildfowl (2010) 60: 150–167. At 300m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold below which no disturbance or displacement effects would arise.

19 There is a need to consider use of habitat areas outside of an SPA by SCI bird species where they support the SCI populations and the site's conservation objectives. These habitat areas can comprise alternative roosting sites, foraging areas, staging grounds or migration routes and can, but not necessarily exclusively, be situated within the immediate hinterland of the SPA, or in areas ecologically connected to it.

20 Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

and its location relative to the proposed development site, Atlantic salmon populations found in these rivers do not form part of, or support, any SAC population.

- The nearest SPA to the proposed development site designated for wintering special conservation interest species is the North Bull Island SPA, located c.14.9km east of the proposed development. The proposed development is within the normal foraging range of some SCI species of this European site, e.g. black-headed gull, and indeed, this species was recorded within the proposed development site during the 2021 surveys. The nearest published inland feeding site for light-bellied brent geese is at Le Fanu Park, c.5.8km east of the proposed development, so the lands are significantly further inland than the farthest known (published) inland feeding site for this species from Dublin Bay (Enviroguide Consulting, 2019). Furthermore, the habitats within the proposed development are deemed not suitable as an inland feeding habitat for light-bellied brent goose, which utilise expansive areas of open grassland pitches and fields with a short sward height as foraging and/or roosting habitat.

6.124 Therefore, as the proposed development will not result in the disturbance or displacement of the qualifying or special conservation interest species of any European site, there is no potential for any in combination effects to occur in that regard.

Nationally Designated Sites

6.125 The proposed development does not overlap with any national site. The Grand Canal pNHA is located c.50m north of the proposed development. There are no other nationally designated sites in the immediate vicinity. The proposed development does not have the potential to affect the receiving environment and, consequently, do not have the potential to affect the integrity of any nationally designated site; either alone or in combination with any other plans or projects.

6.126 As the proposed development does not traverse any national site there is no potential for habitat fragmentation to occur.

6.127 The proposed development is not hydrologically connected to the Grand Canal pNHA; however, it is connected to nationally designated sites in Dublin Bay via Griffeen River. As there are no hydrological or hydrogeological risks associated with the proposed development, therefore there are no nationally designated sites at risk of habitat degradation.

6.128 Construction-related disturbance and displacement of fauna species could potentially occur within the vicinity of the proposed development site. For mammal species such as otter, disturbance effects would not be expected to extend beyond 150m[21]. For birds, disturbance effects would not be expected to extend beyond a distance of c.300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance[22]. The Grand Canal pNHA is within the disturbance ZoI.

6.129 The Grand Canal pNHA is designated for its canal-side habitats and the diversity of species they support, and Flora Protection Order species *Groenlandia densa*, while South Dublin Bay pNHA, North Dublin Bay pNHA, Booterstown Marsh pNHA and Dolphins, Dublin Docks pNHA are designated for the presence of coastal and estuarine habitats and usage of these sites species of interest, including wintering birds. It is likely that these sites are also designated for similar reasons to those for which South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA are respectively designated. Therefore, these nationally designated sites would be subjected to the same potential impacts, or lack of described above, with respect to potential impacts on European sites. In absence of mitigation, potential impacts may result in a likely significant

21 This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes) documents. This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual ZoI of construction related disturbance likely to be much less in reality.

22 The disturbance zone of influence for waterbirds is based on the relationship between the noise levels generated by general construction traffic/works (BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise) and the proximity of those noise levels to birds – as assessed in Cutts, N. Phelps, A. & Burdon, D. (2009) Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance, and Wright, M., Goodman, P & Cameron, T. (2010) Exploring Behavioural Responses of Shorebirds to Impulsive Noise. Wildfowl (2010) 60: 150–167. At 300m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold below which no disturbance or displacement effects would arise.

effect at the national geographic scale on the Grand Canal pNHA only. For the reasons already set out above in 6.5.1.1.1, there is no potential to for significant effects on the pNHA sites in Dublin bay.

6.130 The Planning Scheme provides for a 30m set-back for all development from the northern side of the Grand Canal pNHA boundary, to afford the optimal degree of a protection to the Grand Canal ecological corridor. In addition, the *South Dublin County Development Plan 2016-2022* (South Dublin County Council, 2016) contains policies and objectives for the protection of the Grand Canal.

Introducing or spreading non-native invasive plant species

6.131 Planting, dispersing, or allowing and causing the dispersal, spread or growth of certain non-native plant species is controlled under Regulation 49 of the *European Communities (Birds and Natural Habitats) Regulations, 2011*; and refers to plant or animal species listed on the Third Schedule of those regulations. The spread of non-native invasive plant species as a result of construction works has the potential to impact upon terrestrial habitats within and immediately adjacent to the proposed development site boundary; potentially affecting plant species composition, diversity and abundance over the long-term. The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (*e.g.* pNHAs) has the potential to result in a likely significant negative effect, at geographic scales ranging from local to national.

6.132 No non-native invasive species listed on the Third Schedule, or unlisted, were recorded within the proposed development site during the surveys, and therefore no likely significant negative effects on designated sites at any geographic scale are envisaged as a result of the construction phase of the propose development.

Dust deposition

6.133 The proposed development has the potential to generate dust during construction works which could potentially affect the Grand Canal and the vegetation of habitats within, and result in a significant negative effect ranging from local to national level. However, this is unlikely due to the temporary nature of the proposed construction works, and the presence of vegetation (*i.e.* hedgerows) and distance (c.50m) between the proposed development site and the Grand Canal, which may provide a buffer from dust deposition between the Grand Canal pNHA and the proposed development.

Potential Impacts on Habitats and Flora

Habitat loss

6.134 Trees and hedgerows are afforded protection in the *South Dublin County Development Plan 2016-2022* policies and objectives, such as Green Infrastructure (G) Policy 6 New Development in Urban Areas, Objective 1: "*to protect and enhance existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design process*", and Heritage, Conservation and Landscapes (HCL) Policy 15 Non-Designated Areas, Objective 3: "*to protect existing trees, hedgerows, and woodlands which are of amenity or biodiversity value and/or contribute to landscape character and ensure that proper provision is made for their protections and management in accordance with Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020*". Other relevant policies and objectives of *South Dublin County Development Plan 2016-2022* can be found in Appendix 6.5.

6.135 Construction of the proposed development will result in no permanent loss of existing habitat on site. As the development will be largely underground, habitat will only be removed on a temporary basis for the duration of construction, after which the habitats will be replaced with the same habitat and the same tree species (but not the same individuals, rather new tree specimens). None of the habitats directly affected by the proposed development on a temporary basis are considered to be any greater than of local biodiversity importance (higher value).

6.136 The majority of the habitats within the proposed development boundary (c.1.49ha in total area) are of local biodiversity importance (lower value) and predominantly comprise of amenity grassland (c.0.34ha in total area) and buildings and artificial surfaces (c.0.661ha in total area). The temporary loss or

modification of habitats of local biodiversity importance (lower value) will not result in a likely significant effect on biodiversity.

6.137 The habitat types within the proposed development boundary, and the area of each, that are of local importance (higher value) are:

- Dry meadows and grassy verges (GS2)/dry calcareous and neutral grassland (GS1) mosaic – c.0.147ha
- Treelines (WL2) – c.239m
- Depositing/lowland rivers (FW2) – c.32.2m

6.138 These habitats will largely be retained where they fall within the footprint of the proposed development. The treeline to be removed (c.168m of the 239m of treeline habitat within the lands) is not natural/semi-natural and is rather a landscaped feature and will be replaced with the same habitat and tree species (but not the same individuals, rather new tree specimens) post-construction. However, given that the temporary removal of this section of treeline may temporarily affect wildlife corridor connectivity in the locality and that the replacement trees will likely take multiple years to reach maturity, the temporary removal of this habitat type is considered to be significant at a local geographic scale.

6.139 Furthermore, the depositing/lowland rivers (FW2) and dry meadows and grassy verges (GS2)/dry calcareous and neutral grassland (GS1) mosaic habitats here will be left completely intact. Indeed, the grid connection will be constructed over the existing culvert which currently traverses the Griffeen River.

Introducing or spreading non-native invasive plant species

6.140 Planting, dispersing, or allowing and causing the dispersal, spread or growth of certain non-native plant species is controlled under Regulation 49 of the *European Communities (Birds and Natural Habitats) Regulations, 2011*; and refers to plant or animal species listed on the Third Schedule of those regulations. The accidental spread of non-native invasive plant species as a result of construction works has the potential to impact upon terrestrial habitats within and immediately adjacent to the proposed development site boundary; potentially affecting plant species composition, diversity and abundance over the long-term. The effects of introducing such non-native invasive plant species to sensitive and ecologically important habitat areas (*e.g.* areas of local importance (higher value)) has the potential to result in a likely significant negative effect, at geographic scales ranging from local to national.

6.141 No non-native invasive species listed on the Third Schedule were recorded within the proposed development site during the surveys, and therefore no likely significant negative effects on habitats and flora at any geographic scale are envisaged as a result of the construction phase of the propose development.

Potential Impacts on Fauna

Potential Impacts of Habitat Loss

Badger

6.142 No evidence of badgers was recorded within the proposed development site. However, considering this and the presence of suitable breeding, foraging and commuting habitat for badgers, the proposed development site has the potential to be utilised by badger. The construction of the proposed development will slightly reduce the amount of semi-natural habitat available to local badger populations and potentially fragment habitat corridors used by badger. However, considering the absence of evidence of badger use of the proposed development site and the overall abundance of suitable habitat in the environs and particularly to the north of the site, the proposed development will not result in a significant impact on badgers at any geographical scale.

Small mammals

6.143 The proposed development site contains suitable foraging, commuting and breeding habitat for hedgehogs and pygmy shrews, and commuting opportunities for other small mammals. The construction of a development will disconnect habitat corridors and reduce the amount of semi-natural habitat available to local small mammal populations; however, the overall area of (temporary) habitat loss is small, especially when considered in the context of the abundance of available suitable habitat in the surrounding environment and particularly in the lands to the west, and the habitats will be replaced with the same habitats post-construction. Therefore, the proposed development will not result in a significant impact on small mammals at any geographical scale.

Breeding birds

6.144 In the absence of mitigation to protect birds and their nests, there is potential for direct impacts on breeding birds due to loss of suitable breeding bird habitat and/or the risk of direct mortality and injury to birds, which may arise from the clearance of vegetation within the proposed development site. This potential impact would be most likely to arise if clearance works are undertaken during the time of year when birds are likely to be nesting (*i.e.* 1 March to 31 August, inclusive).

6.145 The bird species recorded at the proposed development site during surveys include those that are commonly found in suburban and urban habitats (*e.g.* blackbird, hooded crow, starling, etc.). These habitats include hedgerows, treelines, grasslands and areas of woodland, which can be found in the wider surrounding area, such as to the north of the proposed development site. All seven of the breeding bird species recorded on site during the surveys were BoCCI Green-listed species and are considered to be of least conservation concern (Colhoun & Cummins, 2013).

6.146 The temporary clearance of vegetation for construction works may result in a temporary loss of breeding bird habitat, however considering that the habitats will be replaced with the same habitats post-construction, the temporary habitat loss will not result in a significant negative effect on the populations of bird species at any geographical scale.

6.147 Under the Wildlife Acts, it is an offence to disturb birds while on their nests, or to wilfully take, remove, destroy, injure or mutilate their eggs or nests. Mitigation measures have been provided to ensure adherence to the Wildlife Acts.

Wintering birds

6.148 The Red-listed black-headed gull was recorded within the proposed development site during the surveys. This species is an SCI species of the South Dublin Bay and River Tolka Estuary SPA. Black-headed gulls are generally associated with grassland fields, urban areas or larger waterbodies (*i.e.* lakes, coastal areas).

6.149 Any clearance of vegetation may result in a loss of sub-optimal foraging and/or roosting habitat of wintering bird species, however considering that the removal of vegetation is only temporary and will be replaced with the same habitats post-construction, the temporary habitat loss will not result in a significant negative effect on the populations of bird species at any geographical scale.

Bats

6.150 Bats, and their breeding and resting places, are strictly protected under the Birds and Habitats Regulations, and under the Wildlife Acts, and it is an offence under that legislation to kill or injure bats or to interfere with or destroy their breeding or resting places.

6.151 Although no trees with suitability for bat tree roost sites were observed during the surveys, there is still potential for direct impacts on roosting bats to occur as a consequence of temporary vegetation removal and/or works associated with the proposed development.

6.152 According to the NBDC database, there are records of five bat species within c.2km of the proposed development, *i.e.* brown long-eared bat, common pipistrelle, Daubenton's bat, lesser noctule and soprano pipistrelle. A total of three common bat species were recorded (*i.e.* common pipistrelle, lesser noctule, soprano pipistrelle) directly west of the proposed development site in 2016; all of which are of

"Least concern" (Nelson *et al.*, 2019). Considering that the majority of bat activity is generally concentrated in unlit areas, there is potential for direct impacts on foraging and commuting bats from increased light levels during construction in e.g. along the Griffeen River. However, the impact is considered to be insignificant on the local bat populations due to working hours being restricted to day-time when there is no requirement for lighting in the summer, and due to bats hibernating during winter months when there is a more significant requirement for lighting during construction. The temporary clearance of treeline vegetation may result in a loss of bat foraging habitat. However, considering that the removal of treeline vegetation is only temporary and will be replaced with the same habitat and tree species post-construction, and considering the amount of suitable foraging/commuting habitat located within the wider area of the development, the temporary habitat loss will result in a significant negative effect on the populations of bat species at a local scale only.

Common Frog

6.153 There is potential for direct impacts on individual common frogs due to the loss of suitable habitat and/or the risk of direct mortality and injury, which may arise from the clearance of vegetation within the proposed development site, however, these impacts will not affect local populations at any significant geographic level. The proposed development will result in the temporary loss of suitable common frog habitat (*e.g.* grassland); however, there is suitable breeding and foraging habitat located in the wider area of the development. In consideration of this and that no suitable breeding habitat will be lost, the potential temporary loss of habitat will not result in a significant negative effect on common frog populations at any geographic scale.

6.154 Common frog is protected under the Wildlife Acts and it is an offence to hunt, take or kill them, or wilfully to interfere with or destroy their breeding places. Mitigation measures have been provided to ensure adherence to the Wildlife Acts.

Common lizard

6.155 The Wildlife Acts provide protection to Ireland's only reptile species, common lizard. It is an offence to hunt, take or kill them, or wilfully to interfere with or destroy their breeding places. In the absence of mitigation to protect common lizards during construction, there is potential for direct impacts on common lizards due to the loss of suitable habitat within the proposed development footprint, and/or the risk of direct mortality and injury to common lizards, which may arise from the site clearance of suitable habitats within the proposed development site. Due to common lizard being a mobile species, and the amount of suitable habitat in the wider environs of the proposed development, the risk of disturbance and mortality is not considered significant at any geographic level.

Fish

6.156 There is no potential for direct impacts on individual fish due to loss of suitable habitat and/or the risk of direct mortality and injury as no such habitat will be directly impacted on. Therefore, the risk of disturbance and mortality is not considered to significantly affect local populations at any geographic level.

White-clawed crayfish

6.157 There is no potential for direct impacts on individual white-clawed crayfish due to loss of suitable habitat and/or the risk of direct mortality and injury as no such habitat will be directly impacted on. Therefore, the risk of disturbance and mortality is not considered to significantly affect local populations at any geographic level.

Potential Impacts Arising from Disturbance or Displacement

6.158 Construction-related disturbance and displacement of fauna species could potentially occur within the vicinity of the proposed development. For mammal species such as otter, disturbance effects would not be expected to extend beyond 150m[23]. For birds, disturbance effects would not be expected to

23 This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes) documents.

extend beyond a distance of c.300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance[24].

Badger

6.159 While the proposed development will result in increased human presence on site, the potential effects on badgers in the environs from construction works are not significant in this instance. This is because the proposed works will be largely confined to daylight hours, when badgers are least likely to forage within the proposed development site. Even in the event that the construction phase of the proposal coincides with construction of other projects in the immediate vicinity, there will be no significant disturbance or displacement effects on badgers, as there are large areas of suitable habitat in the wider environs towards the west of the proposed development site. Badgers are widespread in Ireland and found in close proximity to human settlements, including in Dublin City, and therefore are likely to adapt to the temporary changes in human activity levels in the proposed development site and surrounding area. Disturbance or displacement during construction is therefore unlikely to result in a significant negative effect, at any geographic scale.

Otter

6.160 The Grand Canal, the Griffeen River, the Camac River, the River Liffey and adjacent waterbodies are likely to form a part of the territories of local otter populations based on desktop records of otter and recent observations from Scott Cawley field workers. The only waterbody within and immediately adjacent to the proposed development, the Griffeen River, a tributary of the River Liffey, is likely to be used by commuting and/or foraging otters. The potential effects on otters in terms of disturbance from the proposed development are not significant in this instance. This is because, the proposed construction works are limited in terms of scale and duration (c.2 months) and works will largely be confined to daylight hours, when otters are least likely to forage along the river and the canal corridors. Additionally, as the Griffeen River runs through some already built up environment, and it is anticipated that the local population of otters will be habituated to a certain level of human disturbance. Disturbance/displacement during construction therefore is unlikely to result in a significant negative effect, at any geographic scale.

Small mammals

6.161 In conjunction with any displacement effects associated with (temporary) habitat loss, increased human presence and/or noise and vibration associated with construction works, has the potential to displace small mammals from both breeding and resting places and from foraging habitat. However, given the limited potential for the majority of the site to support any locally significant small mammal populations, and disturbance will be short-term (c.2 months), it is extremely unlikely to result in any long-term effects on the local small mammal populations or their conservation status. Disturbance or displacement during construction therefore is unlikely to result in a significant negative effect, at any geographic scale.

Breeding Birds

6.162 The construction of the proposed development will result in a temporary increase in construction-related noise and vibration and human disturbance over a construction period of c.2 months. This could potentially result in a short-term (c.2 months) reduction in the breeding success of birds that utilise suitable breeding habitat in the locality of the proposed development site.

6.163 However, given the existing background noise in the surrounding urban environment and similar habitats found in the surrounding areas, it will not result in a significant negative effect on the populations of these bird species at any geographic scale.

This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual ZoI of construction related disturbance likely to be much less in reality.

24 The disturbance zone of influence for waterbirds is based on the relationship between the noise levels generated by general construction traffic/works (BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise) and the proximity of those noise levels to birds – as assessed in Cutts, N. Phelps, A. & Burdon, D. (2009) Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance, and Wright, M., Goodman, P & Cameron, T. (2010) Exploring Behavioural Responses of Shorebirds to Impulsive Noise. Wildfowl (2010) 60: 150–167. At 300m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold below which no disturbance or displacement effects would arise.

Wintering Birds

6.164 The impacts of construction of the proposed development will result in similar impacts associated with increase in construction-related noise and vibration and human disturbance over a construction period of c.2 months on wintering birds. This could potentially result in a short-term displacement of foraging and/or roosting wintering birds within the proposed development site, and birds utilising similar foraging habitat in the surrounding areas up to *c.*300m of the proposed development. However, considering the small number of wintering bird noted as using the proposed development site (black-headed gull, maximum count: 1 individual), and given the existing background noise in the surrounding semi-urban and agricultural environment, it will not result in a significant negative effect on the populations of these bird species at any geographic scale.

Bats

6.165 Temporary artificial lighting associated with the construction works will further illuminate the site and its immediate environs. In absence of mitigation, this could potentially displace bats foraging and/or commuting bats from the lands within the proposed development site and in the locality. In consideration of the nature of the surrounding environment (*i.e.* semi-urban) and the fact that any artificial lighting during construction would be temporary and the site is partially lit by the adjacent existing roadways and buildings to the south, west and east, it is considered that the proposed development will not result in a significant negative effect on local bat populations at any geographical scale. As a precaution, lighting mitigation has been provided to minimise any effect on individual bats during construction.

Common Frog

6.166 Displacement effects associated with (temporary) habitat loss, increased human presence and/or noise and vibration associated with construction works, has the potential to displace individual common frog from the proposed development site. However, given that disturbance will be short-term (c.2 months), it is extremely unlikely that disturbance related impacts as a consequence of the proposed development will result in any long-term effects on local common frog populations or their conservation status. Disturbance or displacement during construction is unlikely to result in a significant negative effect, at any geographic scale.

Common Lizard

6.167 Displacement effects associated with (temporary) habitat loss, increased human presence and/or noise and vibration associated with construction works, has the potential to displace individual common lizards from the proposed development site. However, given that the disturbance will be medium-term, it is extremely unlikely that disturbance related impacts as a consequence of the proposed development will result in any long-term effects on their local populations or their conservation status. Disturbance or displacement during construction is unlikely to result in a significant negative effect, at any geographic scale.

Potential Impacts of Surface Water Pollutants on Prey Availability

Otter

6.168 In the absence of any mitigation, there is potential for a pollutant event during the construction phase of the proposed development to result in a fish kill, and therefore affect prey availability in waterbodies located in the immediate environs (*i.e.* the Griffeen River). The effects on prey availability could be amplified should a pollution episode coincide with a pollution event triggered by other plans, projects, or land use activities in the Liffey sub-catchment. The effects on otter would be significant, likely at the local geographic level only.

Potential Impacts of Surface Water Pollutants

Fish

6.169 In the absence of any mitigation, there is potential for a pollutant event during the construction phase of the proposed development to result in a fish kill within the waterbodies located in the immediate environs (*i.e.* the Griffeen River). The effects on fish could be amplified should a pollution episode coincide with a pollution event triggered by other plans, projects, or land use activities in the Liffey sub-catchment. The effects on fish would be significant, likely at the local geographic level only.

Freshwater White-clawed Crayfish

6.170 In the absence of any mitigation, there is potential for a pollutant event during the construction phase of the proposed development to result in mortality of freshwater white-clawed crayfish in the waterbodies located in the immediate environs (*i.e.* the Griffeen River). The effects of mortality on freshwater white-clawed crayfish could be amplified should a pollution episode coincide with a pollution event triggered by other plans, projects, or land use activities in the Liffey sub-catchment. The effects on freshwater white-clawed crayfish would be significant, likely at the local geographic level only.

Potential Impacts of Habitat Severance/Barrier Effect

Fish

6.171 Although the proposed development will cross the Griffeen River, this crossing will occur aboveground, and above an existing culvert crossing of the river. Therefore, no in-stream works within the river will be required as part of the development. There is therefore no potential for habitat severance/barrier effect on fish during construction, at any geographic scale.

Freshwater White-clawed Crayfish

6.172 Although the proposed development will cross the Griffeen River, this crossing will occur aboveground, and above an existing culvert crossing of the river. Therefore, no in-stream works within the river will be required as part of the development. There is therefore no potential for habitat severance/barrier effect on freshwater white-clawed crayfish during construction, at any geographic scale.

Operational phase

Potential Impacts on Designated Sites during Operational Stage

European Sites

6.173 The assessment presented in the Appropriate Assessment Screening Report concluded that the potential impacts associated with the proposed development do not have the potential to affect the receiving environment and, consequently, do not have the potential to affect the conservation objectives supporting the qualifying interests or special conservation interests of any European sites; either alone or in combination with any other plans or projects.

6.174 There will be no surface water or foul water drainage works due to the nature of the development (see Chapter 2 for description of the proposed development). The proposed lines will pass outside of the EdgeConnex site and along and under the internal road infrastructure within the site and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Kilmahud Circuit. The works will involve working along the Griffeen River and will require the excavation of one trench along each of the routes. Due to the close proximity of the works to the Griffeen River, the Zone of Influence (ZoI) of potential effects on water quality from the proposed development could extend to Dublin Bay via river network during construction phase. Once the construction phase is complete, there will be no pollution originating from the operational phase as the site will be landscaped and established vegetation managed (see Chapter 11 Landscape and Visual Impact for details).

Surface Water

6.175 Chapter 8 Hydrology in the EIAR submitted with this application deals with the hydrology of the proposed development site. The chapter assesses the hydrological and hydrogeological risks associated with the proposed development. The assessment noted that based on the potential sources of pollution from the proposed development during construction and operation phases and distance of c.20 km downstream, there is no potential for impacts to occur on European sites in Dublin Bay. This conclusion is based on a good understanding of the hydrological and hydrogeological environment, plausible sources of impact and knowledge of receptor requirements. This allowed possible source-pathway-receptor linkages to be identified. Potential sources of impacts during construction and operation were considered in Chapter 8 and all potential sources of contamination were considered in relation to European sites without taking account of any measures intended to avoid or reduce harmful effects of the proposed development (mitigation measures) i.e. a worst-case scenario.

6.176 Chapter 8 undertaken by AWN and which inform this AA screening report, indicate that surface water run-off from the proposed development during construction will not result in any impact on water quality in downstream receiving waters in Dublin Bay (and thus in the European sites therein). This is considering expected hazard loading, dilution and attenuation within the Griffeen River, and considerable distance between the proposed development site and Dublin Bay. There will be no operational phase impacts as the site will be landscaped and vegetation returned close to its original pre-construction status.

6.177 In line with good practice effective mitigation measures have been included in the construction design and management of construction programme. However, it must be noted that these are included in the design, not for the purposes of avoiding or reducing any potential harmful effects to any European sites but are required for new developments under the under the objectives of the Greater Dublin Strategic Drainage Study and South Dublin County Council Development Plan and in line with good construction practice.

Foul Water

6.178 No foul water will be produced from the proposed development, therefore, there is no possibility of the proposed development undermining the conservation objectives of any of the qualifying interests or special conservation interests of the European sites in, or associated with, Dublin Bay as a result of foul water discharges during operation. In conclusion, there is no potential for a significant effect on any European sites as a result of foul water discharge.

Nationally Designated Sites

6.179 Nationally designated sites would be subjected to the same potential impacts from operational stage described above with respect to potential impacts on European sites. In absence of mitigation, such potential impacts may result in a likely significant effect at the national geographic scale. The boundary of the Grand Canal pNHA is located c.50m north of the site. As there are no direct hydrological connections between the canal and the proposed development site, there is no pathway for potential impacts to occur.

Dust deposition

6.180 The proposed development has the potential to generate dust during the operational stage from traffic which could potentially affect the Grand Canal, c.50m from the proposed development boundary, and the vegetation of habitats within, and result in a significant negative effect ranging from local to national level. However, this is unlikely due to the presence of vegetation (*i.e.* hedgerows) along the banks of the canal itself, which may provide a buffer from dust deposition between the Grand Canal pNHA and the proposed development.

Potential Impacts on Habitats and Flora

6.181 The majority of the habitats along the proposed development will be replaced as before prior to operation of the proposed development. The only remaining sensitive habitat located within the proposed development site is the Griffeen River which connects to the River Liffey. Refer to Section on “Impacts on Designated Sites” above with regards to potential impacts during operation on

downstream sensitive habitats located within the boundaries of protected designated sites. In consideration of this, the proposed development will not result in a significant negative effect on habitats within the proposed development site at any geographical scale as a consequence of surface water degradation.

Potential Impacts on Fauna

Otter

6.182 In the absence of any mitigation, there is potential for a pollutant event during the operational phases of the proposed development to result in a fish kill, and therefore affect prey availability within waterbodies located in the immediate environs (*i.e.* the Griffeen River). The effects on prey availability could be amplified should a pollution episode coincide with a pollution event triggered by other plans, projects, or land use activities in the Liffey sub-catchment. The effects on otter would be significant, likely at the local geographic level only.

Birds

6.183 The proposed development during operation will not result in a significant increase in levels of noise and human disturbance at the proposed development site from those levels currently present at the existing site. As the proposed development will be largely underground, it will not create a barrier to bird movement through these lands or increase the likelihood of collisions. Therefore, there are no potential impacts on birds as a consequence of noise and/or human disturbance, at any geographic scale.

Bats

6.184 There will be no new permanent artificial lighting associated with the operation of the proposed development and therefore there is no potential for displacement of foraging and/or commuting bats from the lands within the proposed development site as a result of artificial lighting, at any geographic scale. Furthermore, the wider surrounding lands are commercial/urban in nature towards the west, east and south.

6.185 The proposed development during operation will not result in a significant increase in levels of noise and human disturbance at the proposed development site from those levels currently present at the existing site. As the proposed development will be largely underground, it will not create a barrier to bat movement through these previously under-developed lands or increase the likelihood of collisions. Therefore, there are no potential impacts on bats as a consequence of noise and/or human disturbance, at any geographic scale.

Fish

6.186 In the absence of any mitigation, there is potential for a pollutant event during the operation phase of the proposed development to result in mortality of fish in waterbodies located in the immediate environs (*i.e.* the Griffeen River). The effects on mortality on fish could be amplified should a pollution episode coincide with a pollution event triggered by other plans, projects, or land use activities in the Liffey sub-catchment. The effects on fish would be significant, likely at the local geographic level only.

Freshwater white-clawed crayfish

6.187 In the absence of any mitigation, there is potential for a pollutant event during the operation phase of the proposed development to result in mortality of freshwater white-clawed crayfish in waterbodies located in the immediate environs (*i.e.* the Griffeen River). The effects on mortality on freshwater white-clawed crayfish could be amplified should a pollution episode coincide with a pollution event triggered by other plans, projects, or land use activities in the Liffey sub-catchment. The effects on freshwater white-clawed crayfish would be significant, likely at the local geographic level only.

Do-Nothing Impact

6.188 The continuation of the existing management practices at the proposed development site in a "do-nothing" scenario, would maintain the current habitats present; however, it is likely that the scrub (WS1) habitat on the banks of the Griffeen River would continue to spread and overcome the mosaic grassland on the banks over time. The proposed development site would continue to provide suitable foraging and breeding habitat for bird and small mammal species and suitable foraging habitat for common bat species. The Griffeen River and other downstream waterbodies would continue to sustain fish and freshwater white-clawed crayfish populations and otters feeding on them.

6.189 The lands are currently zoned under the South Dublin County Development Plan 2016-2022 for enterprise and employment, and so the lands would likely be developed for industrial or enterprise purposes in the future.

Remedial and mitigation measures

Construction phase

Terrestrial Habitats

6.190 None of the habitats within the proposed development site will be permanently lost, as the proposed landscape plans include re-planting of all affected treelines (WL2) and grasslands (only GA2 grassland will be affected and require re-planting, GS2/GS1 mosaic grassland will be unaffected) after underground construction is completed. The planted treelines will mainly consist of *Pinus sylvestris, Acer campestre* and *Betula pendula*. The planted grassland will be re-planted with *Festuca rubra, Festuca ovina, Poa pratensis* and *Trifolium repens*. An annual mowing regime (once per year in September/October) is also recommended for the dry meadows and grassy verges (GS2)/dry calcareous and neutral grassland (GS1) mosaic which occurs on the banks of the Griffeen River, in order to enhance the quality of this habitat. Although this grassland mosaic will not be lost due to the development and therefore mitigation measures to compensate for its loss is not required, this measure will help to improve the local biodiversity of the river banks. The Griffeen River will be left entirely undisturbed during the construction stage of the development.

Water quality

6.191 The following mitigation measures will ensure there are no impacts on water quality in the immediate vicinity of the proposed development from release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters control during the construction stage of the proposed development and therefore no potential impacts on the depositing/lowland river habitat (FW2, *i.e.* the Griffeen River) within the proposed development site:

- Specific measures to prevent the release of sediment over baseline conditions to the existing surface water drainage network, during the construction work, which will be implemented as the need arises. These measures include, but are not limited to, the use of silt fences, silt curtains, settlement lagoons and filter materials.
- Provision of exclusion zones and barriers (e.g. silt fences) between earthworks, stockpiles and temporary surfaces to prevent sediment washing into the existing drainage systems and hence the downstream receiving water environment.
- Provision of temporary construction surface drainage and sediment control measures to be in place before earthworks commence.
- Weather conditions will be taken into account when planning construction activities to minimise risk of run-off from the site.
- Prevailing weather and environmental conditions will be taken into account prior to the pouring of cementitious materials for the works adjacent to any surface water drainage features, or drainage features connected to same. Pumped concrete will be monitored to ensure no accidental discharge. Mixer washings and excess concrete will not be discharged to existing surface water drainage systems. Concrete washout areas will be located remote any surface water drainage features, where feasible, to avoid accidental discharge to watercourses. Washing out of any concrete trucks on site will be avoided (dry brush shoots will be used instead).

- Any fuels or chemicals (including hydrocarbons or any polluting chemicals) will be stored in a designated, secure bunded area(s) to prevent any seepage of potential pollutants into the local surface water network. These designated areas will be clearly sign-posted and all personnel on site will be made aware of their locations and associated risks.
- All mobile fuel bowsers shall carry a spill kit and operatives must have spill response training. All fuel containing equipment such as portable generators shall be placed on drip trays. All fuels and chemicals required to be stored on-site will be clearly marked. Care and attention should be taken during refueling and maintenance operations. Particular attention should be paid to gradient and ground conditions, which could increase risk of discharge to waters.
- A register of all hazardous substances, which will either be used on site or expected to be present (in the form of soil and/or groundwater contamination) will be established and maintained. This register will be available at all times and shall include as a minimum:
  - Valid Safety Data Sheets;
  - Health & Safety, Environmental controls to be implemented when storing, handling,
  - using and in the event of spillage of materials;
  - Emergency response procedures/precautions for each material; and,
  - The Personal Protective Equipment (PPE) required when using the material.
  - Implementation of response measures to potential pollution incidents.
- Robust and appropriate Spill Response Plan and Environmental Emergency Plan will be prepared prior to works commencing and they will be communicated, resourced and implemented for the duration of the works. Emergency procedures/precautions and spillage kits will be available and construction staff will be trained and experienced in emergency procedures in the event of accidental fuel spillages.
- All trucks will have a built-on tarpaulin that will cover excavated material as it is being hauled off-site and wheel wash facilities will be provided at all site egress points.
- Water supplies shall be recycled for use in the wheel wash. All waters shall be drained through appropriate filter material prior to discharge from the construction sites.
- The removal of any made ground material, which may be contaminated, from the construction site and transportation to an appropriate licenced facility shall be carried out in accordance with the Waste Management Act, best practice and guidelines for same.
- A discovery procedure for contaminated material will be prepared and adopted by the appointed contractor prior to excavation works commencing on site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase.
- Implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste (most notably wet concrete, pile arisings and asphalt).
- All of the above measures implemented on site will be monitored throughout the duration of construction to ensure that they are working effectively, to implement maintenance measures if required and applicable, and to address any potential issues that may arise.

Birds

Vegetation clearance/demolition of a structure

6.192 The following mitigation measures are proposed to comply with the legal protection afforded to breeding birds and their nests under the Wildlife Acts:

- In order to avoid disturbance or harm to breeding birds, their nests, eggs and/or their unflown young, all works involving the removal of trees, hedgerows, grasslands or the demolition of the structure will be undertaken outside of the nesting season (i.e. 1 March to 31 August inclusive)

  Or where this seasonal restriction cannot be observed then:

- A breeding bird survey will be undertaken by a suitably experienced ecologist to assess whether birds are nesting within suitable habitat affected by or immediately adjacent to the proposed works. Should nesting birds be encountered during surveys, it may be necessary to delay the removal of trees until after the nesting season (i.e. 1 March to 31 August inclusive).

6.193 The proposed development will result in (temporary) foraging and breeding habitat loss of various bird species on a temporary (c.2 months) basis. The proposed landscape plans include re-planting of all

affected treelines and grasslands after underground construction is completed, which will mitigate these short-term impacts.

Bats

Lighting

6.194 During construction, any external lighting to be installed, including facilitating night-time working or security lighting, on the site shall be sensitive to the presence of bats in the area, downlighting, and time limited where possible. Lighting of sensitive wildlife areas and primary ecological corridors (*e.g.* Grand Canal, Griffeen River) and light pollution in general should be avoided. Lighting of the site during construction is designed in accordance with the following guidance:

- Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2020)
- Bats & Lighting - Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, December 2010)
- Bats and Lighting in the UK – Bats and the Built Environment Series (Bat Conservation Trust UK, January 2008).

Vegetation Clearance

6.195 Although no potential roost features were observed during the survey, as a precautionary measure the following mitigation measures are proposed in relation to trees which will be removed within the site, as bats could occupy suitable roosting features within the trees at any time prior to the commencement of works. Therefore, there is an inherent risk that bats could be affected by tree removal works. The following mitigation procedures will be followed:

- Removal of trees will be undertaken (outside the bat breeding and hibernation seasons) during the periods of April to May, or September to October, as during this period bats are capable of flight and may avoid the risks from tree felling if proper measures are undertaken, such as leaving felled trees on the ground overnight to allow them to leave if they are present.
- Where it is safe and appropriate to do so for both bats and humans, such trees may be felled using heavy plant to push over the tree. In order to ensure the optimum warning for any roosting bats that may still be present, the tree will be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. The tree should then be pushed to the ground slowly and should remain in place until it is inspected by a bat specialist
- Trees should only be felled “in section” where the sections can be rigged to avoid sudden movements or jarring of the sections
- Where remedial works (e.g. pruning of limbs) are to be undertaken to trees deemed to be suitable for bats, the affected sections of the tree will be checked by a bat specialist (using endoscope under a separate derogation licence held by that individual) for potential roost features before removal. For limbs containing potential roost features high in the tree canopy, this will necessitate the rigging and lowering of the limb to the ground (with the potential roost feature intact) for inspection by the bat specialist before it is cut up or mulched. If bats are found to be present, they will be removed by a bat specialist licenced to handle bats and released in the area in the evening following capture
- If any bat tree roosts are confirmed, and will be removed by the proposed felling works, then a derogation licence will be required from the NPWS and appropriate alternative roosting sites will be provided in the form of bat boxes.

6.196 The proposed development will result in (temporary) foraging and roosting habitat loss of various bat species on a temporary (c.2 months) basis. The proposed landscape plans include re-planting of all affected treelines and grasslands after underground construction is completed, which will mitigate these short-term impacts.

Fish, Otter and White-clawed Crayfish

6.197 Mitigation measures outlined for the protection of water quality in the depositing/lowland river (FW2) habitat (*i.e.* the Griffeen River) and its immediate environs will mitigate against impacts of water pollution on fish, otter and white-clawed crayfish during construction stage.

Badgers

6.198 Before works to clear any of the habitat features suitable to supporting badgers commence, a pre-construction survey will be undertaken to determine whether badgers are present on site. If required, a licence permitting their filming to assess locations of activity and their subsequent removal should be applied for from the NPWS. Any active badger setts located within the development or 30m from the development must be safely closed with the use of one-way badger gates and (infra-red camera) monitoring to ensure that all badgers have left the sett(s) and that it is no longer occupied, prior to sett removal.

6.199 Any sett closing works shall be undertaken between the months of July to November inclusive (to avoid peak breeding season for this species and therefore avoid risk of disturbance to or mortality of cubs), in advance of site clearance and construction works commencing.

Operational phase

6.200 None of the habitats within the proposed development site will be permanently lost, as the proposed landscape plans include re-planting of all affected treelines and grasslands after underground construction is completed. The planted treelines will mainly consist of *Pinus sylvestris*, *Acer campestre* and *Betula pendula*. The planted grassland will be re-planted with *Festuca rubra*, *Festuca ovina, Poa pratensis* and *Trifolium repens.* An annual mowing regime (once per year in September/October) is also recommended for the dry meadows and grassy verges (GS2)/dry calcareous and neutral grassland (GS1) mosaic which occurs on the banks of the Griffeen River, in order to enhance the quality of this habitat. Although this grassland mosaic will not be lost due to the development and therefore mitigation measures to compensate for its loss is not required, this measure will help to improve the local biodiversity of the river banks. The Griffeen River will be left entirely undisturbed during the operational stage of the development.

Residual Impact

Construction and Operational phases

6.201 Following the implementation of the mitigation measures outlined in Section above, the proposed development will not result in any significant residual effect on the Key Ecological Receptors identified (see Table 6.4) on its own, or cumulatively together with other proposed developments.

Table 6.4 Summary of the significant residual ecological effects of the proposed development during construction and operational stages.

Ecological Receptor	Ecological Valuation	Impacts with Potentially Significant Effects	Potential Significance of Effects	Mitigation Measures	Compensation	Significance of Residual Effects
Designated Sites						
Grand Canal pNHA	National	None	N/A	None	N/A	None
Habitats						
Dry meadows and grassy verges (GS2)/dry calcareous and neutral grassland (GS1) mosaic	Local importance (higher value)	None	N/A	None	N/A	None
Treelines (WL2)	Local importance (higher value)	Temporary loss of habitat (*c.*168m)	Local importance (higher value)	Landscape planting outlined in Chapter 11 of the EIAR	None	None
Depositing/lowland rivers (FW2) (Griffeen River)	Local importance (higher value)	Reduction in water quality	Local importance (higher value)	Mitigation measures to protect water quality	N/A	None
Fauna Species						
Badger	Local importance (higher value)	None	N/A	Pre-construction checks	N/A	None
Otter	County importance	Water quality impacts on prey availability	County importance	Mitigation measures to protect water quality	N/A	None
Small mammals	Local importance (higher value)	None	N/A	None	N/A	None
Breeding birds	Local importance (higher value)	Temporary habitat loss	Local importance (higher value)	Seasonal vegetation clearance Landscape planting outlined in Chapter 11	N/A	None
Wintering birds	Local importance (higher value)	Temporary habitat loss	Local importance (higher value)	Landscape planting outlined in Chapter 11	N/A	None
Bats	Local importance (higher value)	Temporary habitat loss	Local importance (higher value)	Mitigation measures outlined in construction phase. Landscape planting outlined in Chapter 11	N/A	None
Common frog	Local importance (higher value)	None	N/A	None	N/A	None
Common lizard	Local importance (higher value)	None	N/A	None	N/A	None
Fish (species of conservation concern)	County importance	Water quality impacts	County importance	Mitigation measures outlined in construction phase	N/A	None
Freshwater white-clawed crayfish	County importance	Water quality impacts	County importance	Mitigation measures outlined in construction phase	N/A	None

Cumulative impacts

6.202 This section of the report presents the assessment carried out to examine whether any other proposed developments have the potential to act cumulatively with the proposed development to give rise to likely significant effects on biodiversity.

6.203 As set out in the *South Dublin County Development Plan 2016-2022*, the proposed development site (as well as lands to the south and east) is zoned for employment and enterprise and indeed future developments within the area include largely commercial and industrial developments, with land to the north of the Grand Canal identified to be developed for residential and amenity purposes.

Construction and Operation phase

Surface and Foul Water

6.204 There is potential for cumulative or "in-combination" effects on water quality of downstream waterbodies located in the Liffey sub-catchment and Liffey and Dublin Bay catchment from any other projects carried out within the functional areas of the *South Dublin County Development Plan 2016-2022* (South Dublin County Council, 2016) and any other county level land use plans which can influence conditions in River Liffey: *Dublin City Development Plan 2016-2022* (Dublin City Council, 2016), the *Dún Laoghaire-Rathdown County Development Plan 2016-2022* (Dún Laoghaire-Rathdown County Council, 2016), the *Fingal Development Plan 2017-2023* (Fingal County Council, 2017), *South Dublin County Council Development Plan 2016-2022* (South Dublin County Council, 2016), or any other county level land use plans which can influence conditions in Dublin Bay via rivers and other surface water features.

Dublin Bay

6.205 The proposed development will not impact on the water quality in Dublin Bay, as concluded by as concluded by the associated Appropriate Assessment screening report (Scott Cawley, 2021) and Hydrology chapter of this EIAR (AWN, 2021). As noted within this chapter, Dublin Bay is currently unpolluted, and the proposed development will not result in any measurable effect on water quality in Dublin Bay. There are also protective policies and objectives in place at a strategic planning level to protect water quality in Dublin Bay (as outlined below and in Appendix 6.5).

6.206 It is also an objective of the Greater Dublin Strategic Drainage Study, and all development plans within the catchment of Ringsend WWTP, to include Sustainable Urban Drainage Systems (SUDS) within new developments. The relevant development plans also have protective policies/objectives in place to protect water quality in the receiving freshwater and marine environments, and to implement the Water Framework Directive in achieving good water quality status for Dublin Bay.

6.207 Therefore, there is no possibility of any other plans or projects acting in combination with the proposed development to undermine the conservation objectives of any of the qualifying interests or special conservation interests of Natural Heritage Areas or European sites in, or associated with, Dublin Bay as a result of water quality effects.

Habitat Loss and Disturbance and/or Displacement

6.208 In the event that temporary habitat loss of c.168m of treelines (WL2) coincided with the loss of similar habitats in the vicinity of the proposed development, the geographic scale of the effects could rise from local level only to county level, as these types of habitats are important for the biodiversity value of the locality and for local fauna (*e.g.* bats and breeding birds) in terms of providing foraging and breeding opportunities, and in addition, linear habitats create ecological corridors throughout the wider landscape. The adjacent lands near the proposed development are likely to be developed for industrial/commercial purposes in the future.

6.209 There are potential impacts on fauna as a result of (temporary) habitat loss arising from the development. In addition, there is potential for cumulative impacts on fauna in the area to arise as a result of (temporary) habitat loss, if hedgerows, treelines and woodland in the locality are removed, or semi-natural grassland areas are replaced by areas of hard standing or buildings and artificial surfaces. However, given the nature of permitted development to the immediate west and already developed urban nature of the remaining surrounding environment, no significant cumulative effects are predicted that would increase the magnitude of the residual impacts associated with the proposed development as a result of (temporary) habitat loss, in conjunction with the proposed development.

6.210 There are granted planning permissions for large industrial and commercial developments such as extensions data centres, etc. in the vicinity of the proposed site, some of which may be in construction at the same time as the proposed development. In addition, to the north of the site (north of the Grand Canal) planning permission has been applied for road and drainage infrastructure works within the Clonburris Strategic Development Zone to form part of the public roads and drainage networks for the scheme, which will be developed for residential purposes in the future. There is potential for cumulative impacts to arise with other local developments that would also result in the increased noise,

vibration, human presence and lighting. Any disturbance effects from other such local developments are likely to be relatively minor in nature, temporary, localised and over a similarly short duration. Therefore, they are not likely to cumulatively affect the bird or bat populations in conjunction with the proposed development considering that they have to adhere to the same policies and objectives of the South Dublin County Council Development Plan as the proposed development.

Protective Policies and Objectives and Conclusion

6.211 Any long-term effects on biodiversity are likely to be moderated by the environmental protective policies and objectives of the *South Dublin County Development Plan 2016-2022* and *Draft Biodiversity Action Plan for South Dublin County 2020-2026*.

6.212 There are general overarching policies in the *South Dublin County Development Plan 2016-2022* to ensure that proposals for development integrate the protection and enhancement of biodiversity (Policies G1 and G2) and to identify and protect sites of local biodiversity importance (Policy HCL15). There are also specific objectives to protect European sites and to prevent development that would adversely affect the integrity of any European site(s) (Policy HCL12), protect designated or proposed natural heritage areas (Policy HCL13), to ensure that development does not have significant impact on protected habitats and species (Policy HCL15), and to control and eradicate invasive species (Policy G2). The *South Dublin County Development Plan 2016-2022* also has specific policies and objectives relating to the protection of surface water and groundwater resources (e.g. Policies G3, IE1 and IE2) and the protection of air quality (Policy IE7).

6.213 Land use plans for the other local authorities (*e.g.* Meath County Council, Kildare County Council, Wicklow County Council and the Dublin local authorities; also the Eastern & Midland Regional Assembly) whose functional areas also include the Liffey and Dublin Bay catchment or other surface water catchments that drain to Dublin Bay, were examined and analysed and those land use plans also include protective environmental policies to protect biodiversity, designated sites for nature conservation and the receiving surface water, estuarine and marine environments (see Appendix 6.5).

6.214 Considering the predicted impacts associated with the proposed development, the mitigation measures proposed to protect the local biodiversity resource and the receiving environment, and the protective policies and objectives on the land-use plans that will direct future development locally, significant cumulative negative effects on biodiversity are not predicted.

Do nothing scenario

6.215 The continuation of the existing management practices at the proposed development site in a "do-nothing" scenario, would maintain the current habitats present; however, it is likely that the scrub (WS1) habitat on the banks of the Griffeen River would continue to spread and overcome the mosaic grassland on the banks over time. The proposed development site would continue to provide suitable foraging and breeding habitat for bird and small mammal species and suitable foraging habitat for common bat species. The Griffeen River and other downstream waterbodies would continue to sustain fish and freshwater white-clawed crayfish populations and otters feeding on them. The lands are currently zoned under the South Dublin County Development Plan 2016-2022 for *enterprise, and employment*, and so the lands would likely be developed for industrial or enterprise purposes in the future.

Monitoring

6.216 Not applicable. No ecological monitoring is required during the construction or operational phase of the proposed development.

Reinstatement

6.217 No reinstatement measures are proposed.

Difficulties Encountered

6.218 Breeding bird surveys were not carried out due to the timing of surveys outside the breeding bird season (March to August inclusive). However, the timing of the surveys does not pose any limitations

on the ecological assessment of the subject lands, as the site is semi-urban and holds mostly common agricultural and garden species which can be identified after the end of the bird breeding season. No dedicated wintering bird or raptor surveys were undertaken within the lands, however, wintering birds and raptors would have been recorded during the multidisciplinary field visit in 2021. Therefore, this is not considered to have posed any significant limitations on the ecological assessment of the subject lands.

6.219 Although bat activity was carried out directly west of the proposed development site in 2016, bat activity surveys were not carried out within the site itself due to the timing of surveys during the bat hibernation season (November to May inclusive). Due to such limitations, where necessary a precautionary approach to the impact assessment was taken to account for an absence of bat surveys.

6.220 The surveys in 2021 also did not include dedicated amphibian presence/absence surveys, due to sub-optimal survey timings for these species. Common frog surveys are typically carried out in February and March and include searches for their spawn, while smooth newt surveys include specialist surveys involving trapping and/or night-time torching of suitable waterbodies between March and June. Due to such limitations, where necessary a precautionary approach to the impact assessment was taken to account for an absence of dedicated frog surveys. The aforementioned factors are not considered to pose any significant limitations on the ecological assessment of the subject lands with regard to smooth newt due to a lack of suitable habitat within the lands.

7. LAND, SOIL, GEOLOGY AND HYDROGEOLOGY

7.1 AWN Consulting Ltd (AWN) has prepared this chapter of the EIA Report that assesses and evaluates the potential impacts of the Proposed Development on the land, soil, geological and hydrogeological aspects of the site and surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

Methodology

Criteria for rating of effects

7.2 This chapter evaluates the effects, if any, which the Proposed Development has had or will have on Land, Soils, Geology and Hydrogeology as defined in the Environmental Protection Agency (EPA) '*Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (EPA, 2017). The Draft EPA document entitled *'Advice Notes for Preparing Environmental Impact Statements'* (EPA, 2015) is also followed in this geological and hydrogeological assessment and classification of environmental effects. Due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'* (IGI 2013). In addition, the document entitled *'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'* by the National Roads Authority (NRA, 2009) is referenced where the methodology for assessment of impact is appropriate.

7.3 The NRA rating of potential environmental effects on the land, soil, geological and hydrogeological environment is based on the matrix presented in Table 1 in Appendix 7.1 of the Appendix document which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the Draft EPA Guidelines (2017) publication).

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

7.5 The TII criteria for rating the magnitude and significance of impacts on the geological related attributes and the importance of hydrogeological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-5 in Appendix 7.1 of the Appendix document.

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

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

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

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

7.8 Site specific data was derived from the following sources:

- Edgeconnex Substation 110kV Cable Route, Grange Castle, Co. Dublin. Site Investigation Report. Site Investigations Ltd (included as Appendix 7.2). February 2021;
- Outline Construction Environmental Management Plan. Edgeconnex 110kV Duct Route. Clifton Scannell Emerson. March 2021.
- Various design site plans and drawings; and
- Consultation with site engineers.

Receiving environment

7.9 The receiving environment is discussed in terms of land geology, soils, hydrogeology and site history including potential for existing and historical contamination. The proposed development is located on former agricultural lands and within infrastructure lands in Newcastle, Co. Dublin. The development comprises the provision of two no. 110kV transmission lines along with associated and ancillary works that will connect the permitted Coolderrig 110kV Gas Insulated Switchgear (GIS) substation that includes 2 no. transformers and an MV switch room within an overall compound that was granted permission under SDCC Reg. Ref. SD18A/0298 with the Grange Castle - Kilmahud Circuit.

7.10 The Proposed Development is to be located on a site of c. 1.49 hectares. The permitted Coolderrig 110kV GIS Substation and Transformers / MV control room compound is located within the north-east of the overall Edgeconnex landholding that is bounded by the R120 and residential properties to the west; the Grand Canal and an access road along its southern bank to the north; the Takeda facility and Grange Castle Business Park to the east (through which the transmission lines will be built); and a Microsoft data centre facility to the south within the townland of Grange, Dublin 22.

Topography

7.11 The site falls generally from east to west, with topographical levels ranging from c. 67mAOD in the east to c. 61 mAOD in the north of the development boundary. Regionally, topography gently decreases to the north towards the Grand Canal pNHA (proposed National Heritage Area) and River Liffey.

Drainage

7.12 The site is in the catchment of the Griffeen River and the existing drainage is discussed in Chapter 8 of this EIAR. There is no connectivity with the Grand Canal which is lined and hydrogeological and hydrologically isolated. There is an indirect hydrological pathway to nationally designated sites in Dublin Bay via the Griffeen River.

Land use

7.13 The site was previously used for agricultural purposes. An assessment of site history using historical maps (OSI, 2021) indicates that the site has been in agricultural use since the earliest mapping available (1837-1842).

7.14 The land surrounding the site is a mixture of agricultural (currently used as pasture land predominantly for livestock grazing to the west of the R120 and to the north of the canal), residential and industrial (forming the Grangecastle Industrial Park). According to the EPA website, there are a number of licensed IPPC facilities in the locality (Takeda Pharma Ltd, Grange BackUp Power Ltd. and Pfizer Biotech) and there are no licensed waste facilities in the vicinity of the subject site. Consultation with South Dublin County Council confirmed that there are no known illegal/historic landfills within 500 metres of the site.

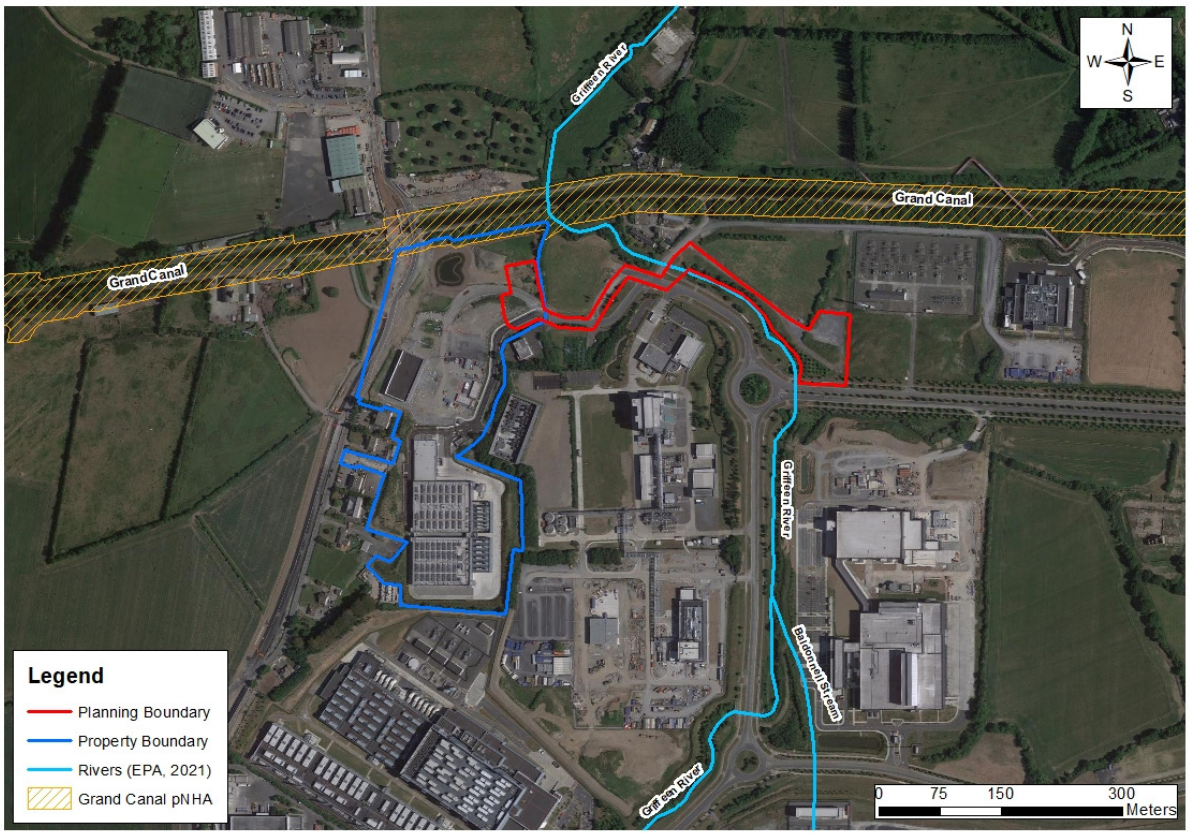

Figure 7.7 Site Location

Soils and Subsoils

7.15 The GSI/ Tegasc mapping shows that the soil type beneath the local area is composed of BminPD, mainly basic poorly drained soils and BMinDW mainly basic deep well-drained soils as presented in Figure 7.2 below.

7.16 The Quaternary geological period extends from about 1.5 million years ago to the present day and can be sub-divided into the Pleistocene Epoch, which covers the Ice Age period and which extended up to 10,000 years ago, and the Holocene Epoch, which extends from that time to the present day.

7.17 The GSI subsoil mapping database of the quaternary sediments in the area of the subject site indicates two principal soil types, as shown in Figure 7.3 below. These comprise Quaternary Glacial Till (TLs) and Rock – bedrock close to or at the surface. The Glacial Till is derived from limestone and is a common soil cover in this region.

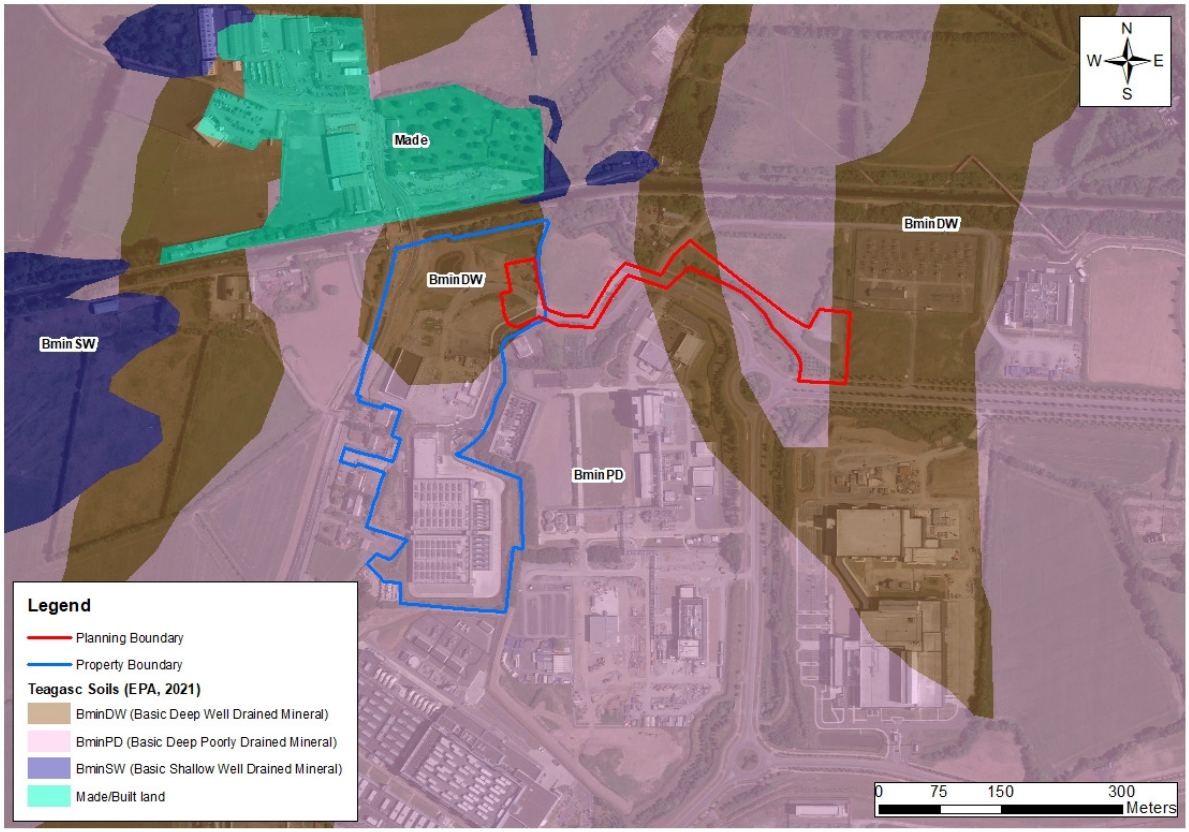

Figure 7.8 Soil Map (Source: GSI, 2020)

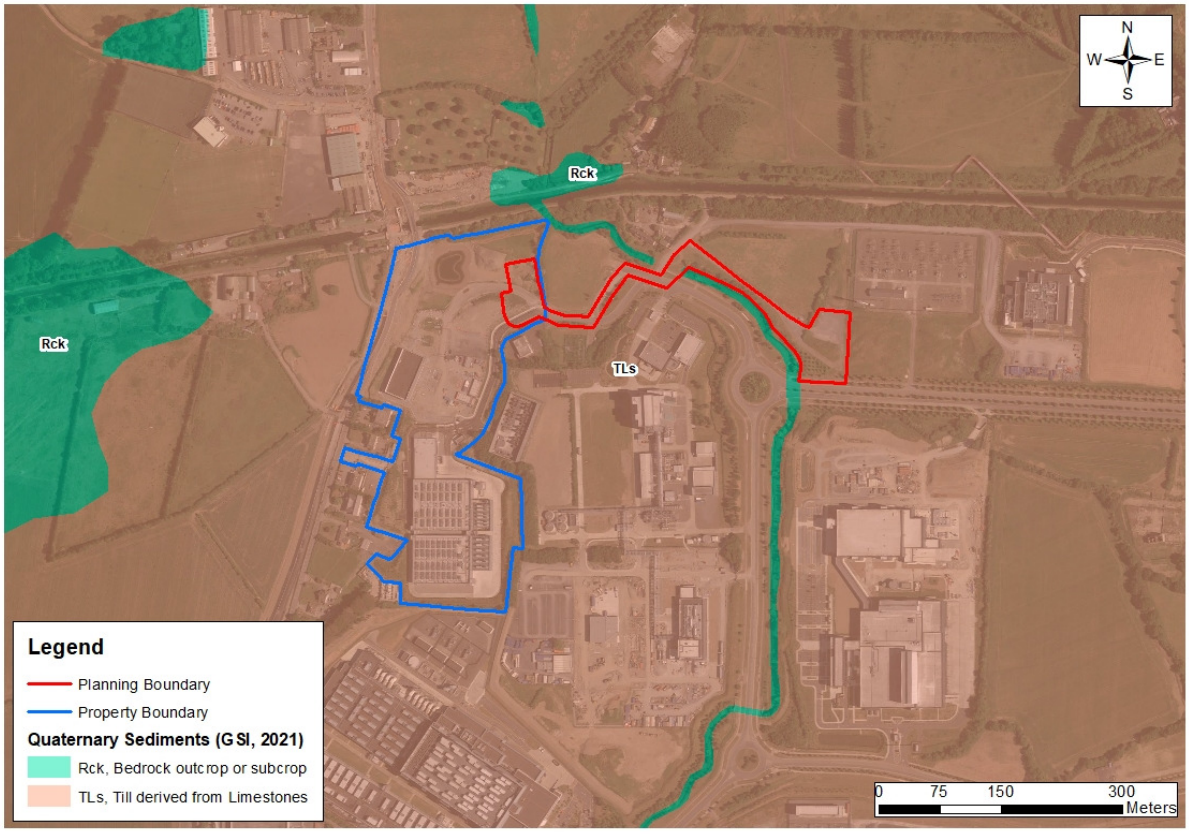

Figure 7.9 Subsoil Map (Source: GSI, 2020).

7.18 Site-specific investigations were undertaken by Site Investigations Ltd (SIL) (January 2021). These investigations consist of 3 no. rotary coreholes, 41 no. silt trenches and 2 no. thermal resistivity locations.

7.19 Rotary coreholes were completed at 3 No. locations to investigate the depth and type of Bedrock. Open hole drilling techniques were used to advance through the overburden and bedrock was encountered at 2.5mbgl, 2.7mbgl and 3.4mbgl respectively. The trenches were completed to check the location and depth of any services that were identified to be on site from service drawings. No groundwater was encountered during the site investigations. Figure 7.4 below shoes the boreholes locations.

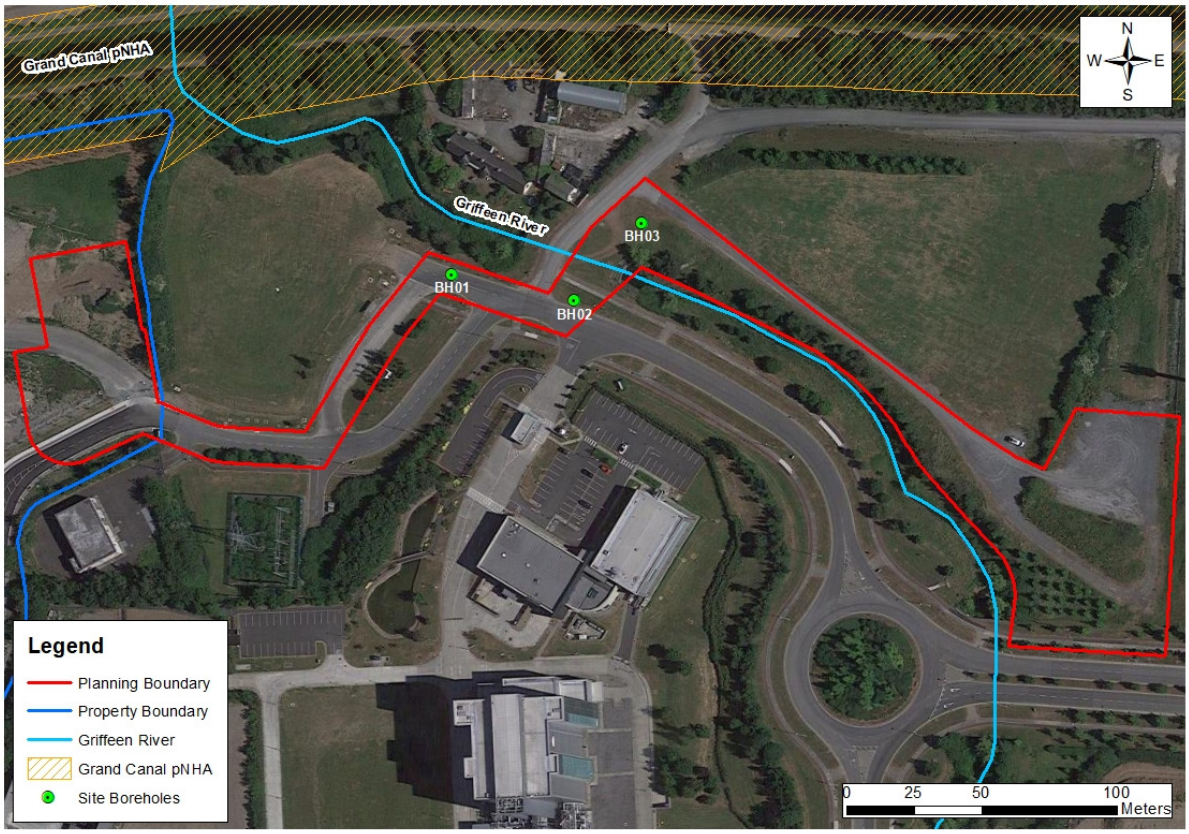

Figure 7.10 Site Investigation Boreholes (Source: SIL, 2021)

7.20 According to the site investigations aforementioned, the site is underlain by c. 1.8 metres of Made Ground which, in turn, is underlain by sandy gravelly CLAY to the bedrock, which was encountered at depths of 2.5-3.4 mbgl. Borehole logs are included in Appendix 7.2 of the Appendix document.

Bedrock geology

7.21 Inspection of available GSI data shows that the bedrock geology underlying the site and surrounding area is dominated by rocks of Carboniferous Age. The site and local area is underlain by Dinantian (Upper Impure) Limestones or 'Calp' limestone that is dark grey to black limestone and shale of the Lucan Formation (refer to Figure 7.5 below).

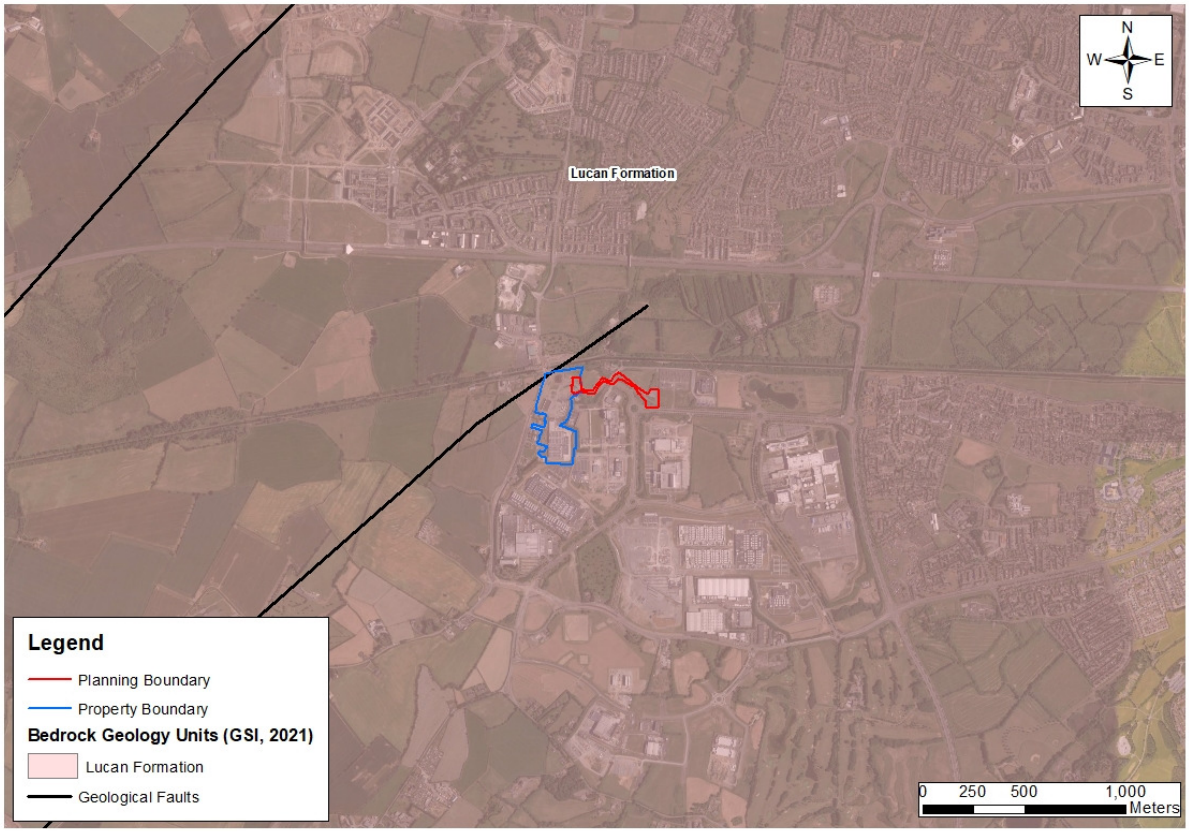

Figure 7.11 Bedrock Geology Map (Source: GSI, 2020)

7.22 According to the site investigations carried out by SIL (2021), the depth to bedrock throughout the site was confirmed as 2.5-3.4mbgl. The site investigation also confirms identification of the bedrock as strong to very strong light grey fine grained muddy Limestone. The report attached (Appendix 7.3) provides borehole data for the area proposed for this development.

7.23 No bedrock outcrops were encountered during the site investigations or are recorded by the GSI within the red line of the proposed development. However, bedrock outcrops would occur along the Griffeen River as illustrated in Figure 7.3 above. The GSI database presently lists no karst features in the immediate vicinity of the subject site and significant karstification would not be expected in this type of limestone.

7.24 In terms of the structural relationship of the area, the GSI (2021) bedrock geology map (100K structural database) shows a fault line to the northeast of the subject site (refer to Figure 7.5 above).

Regional Hydrogeology

Description of the Groundwater Body

7.25 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), specific capacity ($m^3/d/m$) and groundwater transmissivity (mm^3/d). 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 includes 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).

7.26 The bedrock aquifers underlying the proposed development site according to the GSI National Draft Bedrock Aquifer Map 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. Figure 7.6 presents the bedrock aquifer map for the proposed development area.

Figure 7.12 Aquifer Clasification (Source: GSI, 2021).

Aquifer vulnerability

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

7.26 The GSI presently classifies the aquifer in the region of the site as Extreme (E) which indicates an overburden depth of 0-3m is present. This is consistent with site investigation carried out by SIL (2021) which encountered the bedrock at depths of 2.5-3.4 mbgl. Refer to Figure 7.7 below.

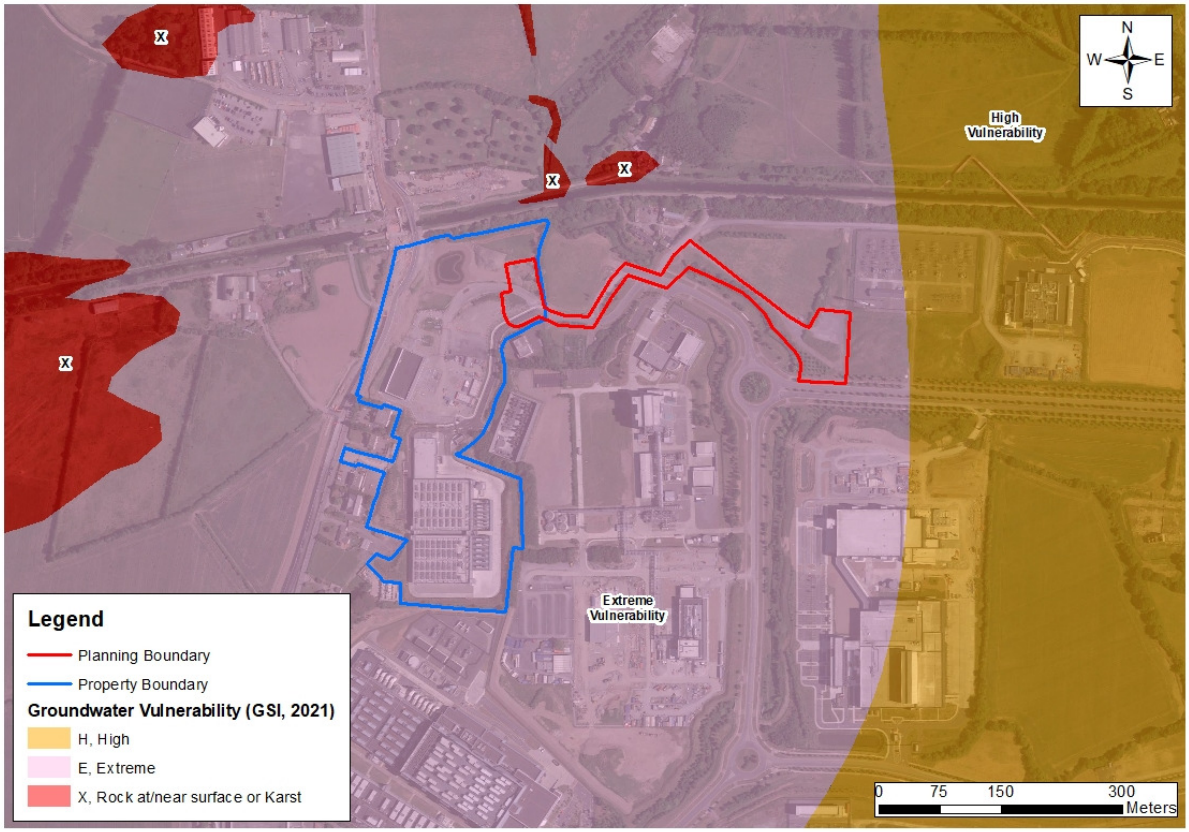

Figure 7.7 Aquifer Vulnerability (Source: GSI, 2020)

Groundwater Wells

7.27 There is no licensing system for wells in Ireland at present and as such no complete data set. The GSI Well Card Index is a record of wells drilled in Ireland, kept by the Geological Survey of Ireland. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in Ireland and therefore it requires individual drillers to submit details of wells in each area. This current index indicates there are no groundwater wells, boreholes or dug wells within the subject site boundary within a 2km radius of the site area. The area is serviced by public mains therefore it is unlikely that any wells are used for potable supply. The site is not located near any public groundwater supplies or group schemes. There are no groundwater source protection zones in the immediate vicinity of the site

Soil quality

7.28 During the site investigation 4 no. of samples were taken from silt trenches in order to assess the potential material to be removed from site. Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill.

7.29 The laboratory results show that the samples tested can be classified as non-hazardous material. Three samples recorded Total Petroleum Hydrocarbons above the limit of detection but the levels were low and not in the liquid phase so the soils can be classified as non-hazardous.

7.30 Following this analysis of the solid test results, the leachate disposal suite results indicate most of the parameters are below the inert threshold. However, three samples recorded elevated total dissolved solids and two samples recorded elevated sulphate levels.

7.31 Refer to Appendix 7.2 of the Appendix document for further details.

Groundwater quality

7.32 The Water Framework Directive (WFD) Directive 2000/60/EC, was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In

addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present.

7.33 The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both 'good ecological status' and 'good chemical status'.

7.34 The proposed development is located over the 'Dublin' (EU Code IE_EA_G_008) WFD groundwater body (GWB). The most recent WFD groundwater status (2013-2018) is 'Good' for this GWBs and the WFD environmental risk score is under review.

7.35 No groundwater was encountered during the site investigations.

Hydrogeological features

7.36 There is no evidence of springs or karstification in this area according to the GSI Karst database (2015).

Areas of conservation

7.37 The lands in which the proposed development is located have no formal designations. The nearest designated land to the site at Grange Castle Business Park is the Grand Canal pNHA (Site Code: 002104) at c.80m to the north of the northern boundary of the Proposed Development site. As the canal is a contained feature (fully lined) there is no potential for a source pathway linkage. The lands are indirectly connected to nationally designated sites in Dublin Bay via the Griffeen River.

Geological heritage

7.38 The Geological Survey of Ireland (GSI) Public Viewer www.gsi.ie/mapping was reviewed to identify sites of geological heritage for the site and surrounding area. There are no recorded sites on the development site. A full audit has not yet been completed for Dublin; however, there is no evidence of any site which could be considered suitable for protection under this programme or recorded in the South Dublin County Development Plan 2016-2022. The closest geological heritage site is the Belgard Quarry, which is located c. 3.6kms south-east of the site.

Economic geology

7.39 The Extractive Industry Register (www.epa.ie) and the GSI mineral database was consulted to determine whether there were any mineral sites close to the proposed development. There are no active quarries located in the immediate vicinity with the nearest quarry located approximately 4kms to the south-east which is classified as the Belgard Quarry. The EPA ENVision website also confirmed that there are no mines on or near the site.

Geo-hazards

7.40 There are no expected geohazards at this location. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the nearest landslide to the proposed development was 4km to the north, referred to as the 'Strawberry beds landslide' event which occurred in 2016. There have been no recorded landslide events at the site. Due to the local topography and the underlying strata there is a negligible risk of a landslide event occurring at the site.

7.41 In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied

for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish sea (1.0 – 2.0 Ml magnitude) and ~55 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the proposed development site.

Conceptual site model

7.42 The site falls generally from east to west, with topographical levels ranging from c. 67mAOD in the east to c. 61 mAOD in the north of the development boundary. Regionally, topography gently decreases to the north towards the Grand Canal pNHA (proposed National Heritage Area) and River Liffey.

7.43 According to the site investigations, made ground deposits were encountered across the site at depths of c. 1.8 mbgl. The made ground is underlain by soft cohesive deposits which were described typically as a sandy gravelly Clay. Depth to bedrock is shallow across the site (2.5-3.4 mbgl). No bedrock outcrops were encountered during the site investigations or are recorded by the GSI within the red line of the proposed development. However, bedrock outcrops would occur along the Griffeen River. No groundwater was encountered during the site investigations but regional groundwater flow direction would be towards northeast, following the surface topography.

7.44 Review of the hydrogeology and geology in the surrounding region indicates that there are no sensitive receptors such as groundwater-fed wetlands, Council Water Supplies/ Group Water Schemes or geological heritage sites which could be impacted by this development. No evidence of disposal of waste material was identified the location area proposed for excavation.

7.45 A cross section of the site geology can be seen in Figure 7.8 below.

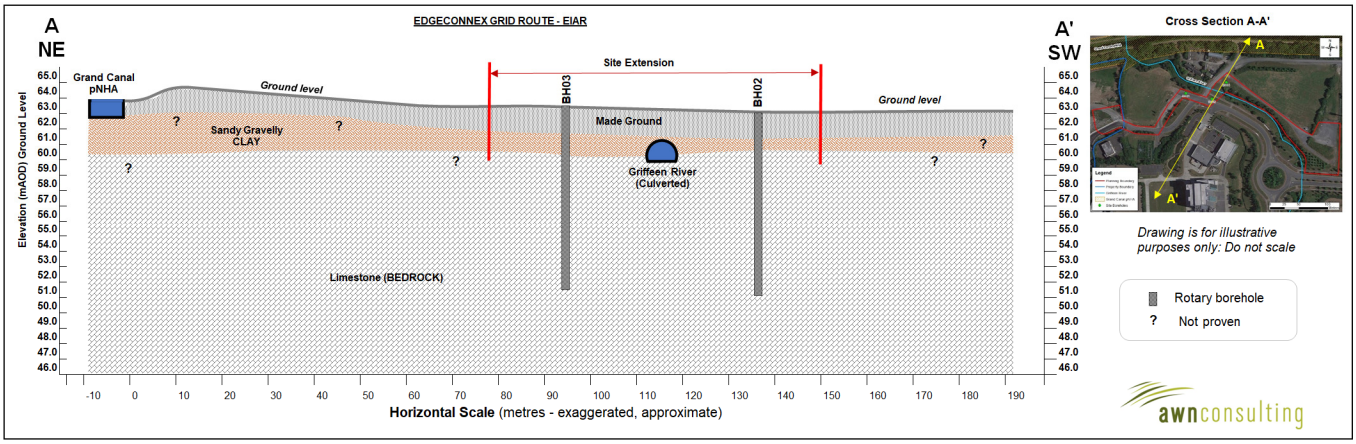

Figure 7.8 Cross-section showing the local site geology

Rating of importance of geological and soil attributes

7.46 Based on the TII methodology (2009) (See Appendix 7.1), criteria for rating site importance of geological features, the importance of the bedrock and soil features at this site is rated as '*Low importance*' with low quality significance or value on a local scale. There are no extractable minerals or areas of geological heritage and the soils are suitable for agricultural use but are typical of surrounding agricultural land.

Rating of site importance of hydrogeological features

7.47 Based on the TII methodology (2009) (See Appendix 7.1) the importance of the hydrogeological features at this site is rated as '*Medium importance'* based on the assessment that the attribute has a medium quality significance or value on a local scale. The aquifer is a *Locally Important Aquifer* but is not widely used for public water supply or generally for potable use.

Characteristics of the Proposed Development

7.48 The proposed development comprises the provision of two no. 110kV transmission lines along with associated and ancillary works and is described as follows:

- Two proposed underground circuit 110kV transmission lines will connect the permitted and under construction Coolderrig 110kV GIS Substation to the existing Grange Castle - Kilmahud circuits. The proposed parallel transmission lines cover a distance of approximately 559m and 574m within the townlands of Grange, and Dublin 22;
- Construction of 2 no. jointing chambers with associated comms chambers on the existing Grange Castle - Kilmahud circuits. Jointing chambers will be 6m x 2.5m in plan and circa 2.5m to underside of base.
- Construction of 2 no. push-pull chambers which will be 6m x 2.5m in plan and circa 2.5m to underside of base.
- All associated reinstatement works and landscaping improvement works.

7.49 The proposed transmission lines will pass outside of the substation compound and along and under the internal road infrastructure within the Edgeconnex site and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Kilmahud Circuit.

7.50 The design of each underground 110kV transmission line will comprise a single 110kV circuit installed underground in high-density polyethylene (HDPE) ducting. The 110kV cables will be a standard XLPE (cross-linked polyethylene) copper cable. XLPE does not contain oil, therefore there is no risk of migration of oil into the ground in the event of a failure (such as a short circuit, a joint fail, a termination failure etc.).

7.51 The installation of the HDPE ducting will require the excavation of one trench along each of the routes; each containing one 110kV circuit. The optimum depth of excavation of the trenches will typically be 1.25m below ground level but may increase up to c. 3.5m at utility crossings. The typical width of each trench is 0.6m, however this may vary depending on ground conditions and the location of existing services. Five and separate ducts will be installed in each trench.

7.52 A detailed description of the Proposed Development is provided in Chapter 2 of this EIA Report. The activities associated with the Proposed Development which are relevant to the land, soils, geology and hydrogeological environment are detailed in Table 7.1 below.

Table 7.1 Site Activities Summary

Phase	Activity	Description
Construction	Discharge to Ground	Only stormwater run-off percolating to ground at the construction site.
	Earthworks: Excavation of Superficial Deposits	Ground works will be required to clear the site and to facilitate, access roads, utilities and landscaping. Tarmac, made ground, topsoil and subsoil will be excavated to facilitate the construction of the proposed transmission cable installation route and other ancillary works. Soil stripping and localised stockpiling of soil will be required for short periods of time during construction. Suitable soils and stones will be reused on-site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of the excavated material will require removal offsite. Soil testing in accordance with the EPA Waste Classification has been completed and results confirm that the soil tested is “inert”. The surplus soils and stones may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities. The construction of the cable route will involve excavation of a small amount of soil in close proximity to the Griffeen River. This is further discussed in Chapter 8 – Hydrology.

Phase	Activity	Description
	Storage of hazardous Material	Fuel for construction vehicles will be stored in the already approved contractors' compound at the development site during construction phase
	Export of Materials	It has been estimated that along the 559m and 574m route that up to a maximum of 2,030 m^3 of excavated material will be generated including tarmac, made ground, soils/stones. It is envisaged that majority of the excavated material will be removed as a waste off site. Any material re-used offsite for beneficial use on other sites with appropriate planning/waste permissions/derogations (e.g. in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011) or will be recovered and/or disposed off-site at appropriately authorised waste facilities. The soil removed as part of the transmission lines will be tested prior to disposal. The removal of waste from the site will be carried out in accordance with Waste Regulations, Regional Waste Plan and Waste Hierarchy/Circular Economy Principals. Refer to Chapter 14 Waste Management for further details.
Operation	Increase in hard standing area	The proposed development will not result in the increase in hardstanding area. Therefore, groundwater recharge and groundwater regime will not be affected.
	Storage of hazardous Material	There will be no bulk storage of any chemicals during the operational phase of this development.

7.53 As outlined in Table 7.1 above the activities required for the construction phase of the Proposed Development represents the greatest risk of potential impact on the geological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation, levelling and infilling activities required to high voltage cable routes.

Potential impacts of the Proposed Development

7.54 An analysis of the potential impacts of the proposed development on the land, soils, geology and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 7 and 8 of the EIAR. Waste Management is also considered an interaction. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Sections 7.60 below. There is no direct or indirect hydrogeological connection to the Grand Canal pNHA, there is an indirect hydrological pathway to nationally designated sites in Dublin Bay via the Griffeen River.

Construction phase

Excavation and Infilling

7.55 Due to the lack of previous development beyond the business park infrastructure and works within the Edgeconnex campus, and the historical agricultural use of the Proposed Development site, the risk of contaminated soils being present onsite is low and this was confirmed by onsite soil sampling and analysis. Nonetheless material, which is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments.

7.56 The construction and installation of the underground ducting for the two underground single circuit 110kV transmission lines, will require the excavation of made ground, topsoil, subsoil and possibly bedrock (if encountered). As mentioned above, the expected depth of excavation will be c 1.25 mbgl but may increase up to c. 3.5m at utility crossings. Bedrock was encountered at depths of 2.5-3.4 mbgl. Local removal and reinstatement of the 'protective' topsoil and subsoil cover across the development area at the site will not change the overall vulnerability category for the site which is already 'extreme'. Excavated material will be reused on site for infilling and landscaping works where possible. Import of fill would not be required. Site investigation and laboratory analysis has not identified any existing contamination. However, if contaminated soil/water is encountered, it will be required to be removed by a licensed waste contractor. The excess of topsoil cut will be used for landscaping berms, where possible.

Accidental spills and leaks

7.57 During construction of the 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;
- Spillage of wastewater from poor on-site toilets and washrooms; and
- Run-off from concrete and cement during pad foundation construction.

7.58 Accidental spillages, which are not mitigated, may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoil's and impact the underlying groundwater. Groundwater vulnerability at the site is currently classified as extreme. Any soil stripping will also further reduce the thickness of subsoil and the natural protection they provide to the underlying aquifer.

Operational phase

Direct or Indirect discharges

7.59 There will be no direct or indirect discharges of contaminated water to groundwater or soil environment during the operational phase. There is no projected storage of hazardous liquids at the site or along the projected lines which could potentially affects the soils and water environment.

'Do-nothing' scenario

7.60 No impact is predicted from the Do-nothing scenario as it will remain in its natural condition.

Remedial and Mitigation Measures

7.61 The design has taken account of the potential impacts of the development on the soils, geology and hydrogeology environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the surrounding soils, geology and hydrogeology. These are described below.

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

Construction phase

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

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

Construction Environment Management Plan

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

outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

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

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

Control of soil excavation

7.66 Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of the excavated material will require removal offsite. According to the GSI database the bedrock vulnerability is already extreme due to the thin cover of overburden on the site. Removal and reinstatement of subsoil cover will not alter the vulnerability category of the underlying bedrock. However due to levelling works imported fill will need to be deposited over a sizable proportion of the proposed development area.

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

7.68 Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Site investigations classified the subsoils as 'non-hazardous'; however, low levels of petroleum hydrocarbons were detected. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.

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

Fuel and chemical handling

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

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

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

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

Control of Water during Construction

7.74 Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. No significant dewatering will be required during the construction phase which would result in the localised lowering of the water table. No discharge of construction water is anticipated during the construction of the proposed underground circuits 110kV and transmission cable installation. There may be localised pumping of surface run-off from the excavations (up to 3m) during and after heavy rainfall events to ensure that the trenches are kept relatively dry. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

7.75 Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon interceptors.

Operational phase

7.76 No remedial or mitigation measures have been considered during the operational phase, since no impacts on the geological and hydrogeological environment are projected.

Predicted impacts of the Proposed Development

7.77 This section describes the predicted impact of the proposed development following the implementation of the remedial and mitigation measures.

Construction phase

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

Operational phase

7.79 The implementation of mitigation measures highlighted above will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the operational phase and that the residual impact will be ***long-term-imperceptible-neutral.*** Following the TII criteria (Appendix 7.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

Residual impacts

7.80 Based on the natural conditions present and with appropriate mitigation measures to reduce the potential for any impact of accidental discharges to ground during the construction phase, the potential impact on land soils, geology and hydrogeology during construction (following EPA, 2017) are considered to have a ***temporary, imperceptible*** significance, with a ***neutral*** impact on quality.

7.81 There are no likely significant impacts on the land, geological or hydrogeological environment associated with the proposed operational development of the site with mitigation in place. As such the impact is considered to have a long-term, imperceptible significance with a neutral impact on quality i.e., no effects of effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

7.82 Following the TII criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of the impact is considered ***negligible*** for the construction and operational phases.

Cumulative Impacts

7.83 The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below.

Construction phase

7.84 The potential for impact on land, soils and groundwater during construction primarily arises from localised accidental leaks and spills to ground. The proposed development does not require dewatering and with standard mitigation in place (as outlined in Section 7.63) for management of accidental discharges, the effect due to construction in this area is considered to be a neutral on quality and an imperceptible significance. Contractors for the proposed development will be contractually required to operate in compliance with a CEMP which will include the mitigation measures outlined in this EIA report. There is no direct or indirect hydrogeological connection to the Grand Canal pNHA, there is an indirect hydrological pathway to nationally designated sites in Dublin Bay via the Griffeen River. Other developments will also have to incorporate measures to protect soil and water quality in compliance with legislative standards for receiving water quality. As a result, there will be no cumulative potential for change in soil quality or the natural groundwater regime. The cumulative impact is considered to be neutral and imperceptible.

Operational phase

7.85 Overall, there will be a local change in recharge pattern due to the increase in compaction of soils from the proposed development. However, based on the overall size of the underlying aquifer and measures to protect soil and water quality there will be no overall change on the groundwater body status. There are no other large projects proposed within this area of the aquifer so no cumulative impact on recharge to the aquifer. All developments are required to manage groundwater discharges in accordance with no. 366 of 2016 and amendments. As such there will be no cumulative impact to groundwater quality. As such there will be no cumulative impact on the Groundwater Body Status. The operation of the proposed development is concluded to have a long-term, imperceptible significance with a neutral impact on soil and water quality.

7.86 There will be a loss of agricultural land, but the overall loss will be minimal therefore, the cumulative impact on the land is considered to be long-term, imperceptible significance with a neutral impact.

Monitoring

7.87 No monitoring is required to maintain and protect the conditions of the soil, geology and hydrogeology upon completion of the development.

Reinstatement

7.88 Topsoil will be reinstated to greenfield areas of the site during the landscaping operations to protect the subsoil and geology underlying the site.

8. HYDROLOGY

8.1 This chapter of the EIA Report assesses and evaluates the potential impacts of the proposed development described in Chapter 2 (Description of the Proposed Development) on the hydrological aspects of the site and surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

Methodology

Criteria for rating of effects

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

8.3 The rating of potential environmental effects on the hydrological environment is based on the matrix presented in Table 1.1 of the EIAR which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the Draft EPA Guidelines (2017) publication).

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

8.5 The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-5 in Appendix 8.1 of the Appendix document.

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

- River and stream water quality in the vicinity of the site (where available);
- Surface watercourses near the site and potential impact on surface water quality arising from proposed development related works including any discharge of surface water run-off;
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.

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

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

- National Parks and Wildlife Services (NPWS) – Protected Site Register.

8.8 Site specific data was derived from the following sources:

- Flood Risk Assessment. 2 No. 110Kv Transmission lines connecting the Grange Castle – Kilmahud Circuits to the permitted and under construction Coolderrig substation. Pinnacle Consulting Engineers. March 2021.
- Outline Construction Environmental Management Plan. Edgeconnex 110kV Duct Route. Clifton Scannell Emerson, March 2021.
- Various design site plans and drawings; and
- Consultation with site engineers.

Receiving environment

8.9 The receiving environment is discussed in terms of surface water and hydrology including potential for existing and historical contamination. The proposed development is located on former agricultural lands and within infrastructure lands within the Edgeconnex campus and the Grange Castle Business Park within the Grange townland, Dublin 22. The development comprises the provision of two no. 110kV transmission lines along with associated and ancillary works. The transmission lines will connect the permitted Coolderrig 110kV Gas Insulated Switchgear (GIS) substation that includes 2 no. transformers and an MV switch room within an overall compound that was granted permission under SDCC Reg. Ref. SD18A/0298 with the Grange Castle - Kilmahud Circuit.

8.10 The Proposed Development is to be located on a site of c. 1.49 hectares. The permitted Coolderrig 110kV GIS Substation and Transformers / MV control room compound is located within the north-east of the overall Edgeconnex landholding that is bounded by the R120 and residential properties to the west; the Grand Canal and an access road along its southern bank to the north; the Takeda facility and Grange Castle Business Park to the east (through which the transmission lines will be built); and a Microsoft data centre facility to the south within the townland of Grange, Dublin 22.

Hydrology

8.11 The site falls generally from east to west, with topographical levels ranging from c. 67mAOD in the east to c. 61 mAOD in the north of the development boundary. Regionally, topography gently decreases to the north towards the Grand Canal pNHA (proposed National Heritage Area) and River Liffey.

8.12 The proposed development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09), River Liffey sub-catchment (WFD name: Liffey_SC_090, Id 09_15). The River Liffey catchment encompasses an area of approximately 1,369 km^2. The river extends from the mountains of Kippure and Tonduff in County Wicklow to the sea at Dublin Bay. The main channel covers approximately 120kms and numerous tributaries enter along its course. The proposed development site is within the sub catchment of the Griffeen River which is tributary of the River Liffey.

8.13 The Griffeen River (stream) flows through the Grange Castle Business Park. The proposed route of the two 110kV transmission cables will cross above the Griffeen River, which is culverted in this section and will pass along a wayleave to the north of the Griffeen River (refer to Figure 8.1 below). The Griffeen River rises in the townland of Greenoge, approximately 4 km south of the proposed development. It flows in a northerly direction where it is culverted beneath the Grand Canal and from there it flows north through Lucan. The Griffeen River enters the River Liffey just north of Lucan town. A section of the Griffeen was realigned during the construction of the Grange Castle Business Park and associated access roads. It now runs alongside the internal access road of the Business Park in a northerly direction. The Baldonnel Stream flows in a northerly direction and is a tributary to the Griffeen River.

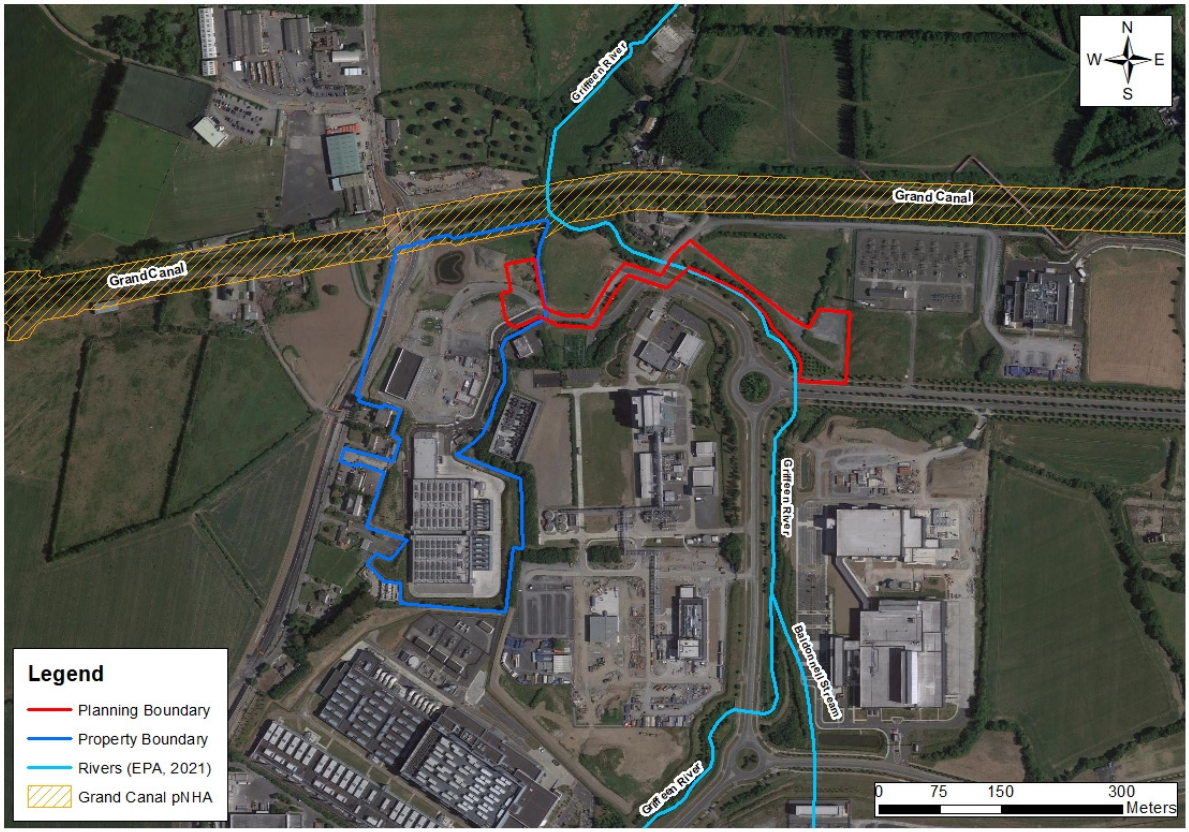

Figure 8.1 Site Location

8.14 There is no direct or indirect hydrological or hydrogeological connection to the Grand Canal pNHA as it is fully lined; there is an indirect hydrological pathway to nationally designated sites in Dublin Bay via the Griffeen River.

Surface Water Quality

8.15 The proposed development is located within the former ERBD (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). It is situated in Hydrometric Area No. 09 of the Irish River Network and is located within the River Liffey Catchment.

8.16 The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the ERBD River Basin Management Plan (RBMP) 2009-2015 was published. In the ERBD RBMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g., water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD by 2015 and include a programme of measures to address and alleviate these pressures by 2015. This was the first River Basin Management planning cycle (2010-2015). The second cycle river basin management plan for Ireland is currently in place and will run between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD).

8.17 This second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). In more general terms, three key lessons have emerged from the first cycle and the public consultation processes. These lessons have been firmly integrated into the development of the second cycle RBMP. Firstly, the structure of multiple RBDs did not prove effective, either in terms of developing the plans efficiently or in terms of implementing those plans.

Secondly, the governance and delivery structures in place for the first cycle were not as effective as expected. Thirdly, the targets set were too ambitious and were not grounded on a sufficiently developed evidence base. The second cycle RBMP has been developed to address these points.

8.18 The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended by SI No. 77 of 2019)
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010, S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010);
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011)
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988;
- Local Government (Water Pollution) Acts 1977-1990; and
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998.

8.19 Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

8.20 In relation to the subject site, the nearest active EPA monitoring station is '*Griffeen in Lucan Village*' (RS09G010600), located in Lucan c. 200 m upstream from where the Griffeen River enters the River Liffey. The status recorded from the Griffeen station and provided by the EPA in 2019 is classified as Q3-Poor, which is related to poor ecological conditions recorded in August 2019.

8.21 The Water Framework Directive (WFD) Directive 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both 'good ecological status' and 'good chemical status'.

8.22 The Griffeen River belongs to the Liffey_170 WFD surface water body, which currently, the EPA classifies as having 'Good Status' and a risk rating of not achieving 'Good' status as 'Under Review'.

Flood risk

8.23 Pinnacle Consulting Engineers undertook a flood risk assessment which is included with the planning application. Based on the indicative flood mapping, the development site is mostly located within Flood Zone C "Low Probability".

8.24 The records of fluvial flooding on the permitted Edgeconnex campus or environs, i.e. 0.1% AEP Extreme Event (1:1000yr, Zone B), indicate that a portion of this flood zone area encroaches in to a small area of the 20Kv MV switch room, to the northern end of the site, which forms part of the permitted Coolderrig 110kV Gas Insulated Switchgear (GIS) substation compound.

8.25 This has necessitated that flood compensatory storage be provided, in order to displace this area of flood volume, i.e. 28.11m^3. This has been achieved by a) proposing an identical volume in an area of open space along the western edge of the existing flooded area and b) by providing a retaining

structure between the existing flooded area and the proposed 20Kv MV switch room. With these measures, the site will be positively drained and surface water will be contained within the overall sites drainage network and managed in a sustainable manner, in accordance with all relevant guidelines and specifications.

8.26 In addition, the 1:1000yr flood level at the above location, is indicated as being at 59.81m OD, which is 1.39m lower than the Finished Floor Level of the nearest building, i.e. the 20Kv MV switch room and transformer compound, currently under construction, which is located within the Edgeconnex campus on the western boundary of Grange Castle Business Park.

8.27 There are no locations of historical pluvial flooding indicated on the subject site and ground water flooding is not considered a risk in this area of County Dublin.

Areas of conservation

8.28 The lands in which the proposed development is located have no formal designations. The nearest designated land to the site at Grange Castle Business Park is the Grand Canal pNHA (Site Code: 002104) at c. 80m to the north of the northern boundary of the subject site. As the canal is a contained feature (fully lined) there is no potential for a source pathway linkage. In addition, there is an indirect hydrological pathway to nationally designated sites in Dublin Bay via the Griffeen River. Dublin Bay is located c. 18 kms to the subject site.

Rating of importance of hydrological and soil attributes

8.29 Based on the TII methodology (2009) (See Appendix 8.1), criteria for rating site importance of hydrological features, the importance of the nearest receiving environment (i.e., Griffeen River) is rated as '*Low importance*' with low quality significance or value on a local scale.

Characteristics of the Proposed Development

8.30 The proposed development comprises the provision of two no. 110kV transmission lines along with associated and ancillary works and is described as follows:

- Two proposed underground circuit 110kV transmission lines will connect the Coolderrig 110kV GIS Substation to the existing Grange Castle - Kilmahud circuits. The proposed parallel transmission lines cover a distance of approximately 559m and 574m within the townlands of Grange, Dublin 22;
- Construction of 2 no. jointing chambers with associated comms chambers on the existing Grange Castle - Kilmahud circuits. Jointing chambers will be 6m x 2.5m in plan and circa 2.5m to underside of base;
- Construction of 2 no. push-pull chambers which will be 6m x 2.5m in plan and circa 2.5m to underside of base; and
- All associated reinstatement works and landscaping improvement works.

8.31 The proposed transmission lines will pass outside of the permitted and under construction substation compound and along and under the internal road infrastructure within the Edgeconnex campus and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Grange Castle - Kilmahud Circuits.

8.32 The design of each underground 110kV transmission line will comprise a single 110kV circuit installed underground in high-density polyethylene (HDPE) ducting. The 110kV cables will be a standard XLPE (cross-linked polyethylene) copper cable. XLPE does not contain oil, therefore there is no risk of migration of oil into the ground in the event of a failure (such as a short circuit, a joint fail, a termination failure etc.).

8.33 The installation of the HDPE ducting will require the excavation of one trench along each of the routes; each containing one 110kV circuit. The optimum depth of excavation of the trenches will typically be 1.25m below ground level but may increase up to c. 3.5m at utility crossings. The typical width of each trench is 0.6m, however this may vary depending on ground conditions and the location of existing services. Five separate ducts will be installed in each trench.

8.34 The Griffeen River is culverted through Grange Castle Business Park and beneath the New Nangor Road where it flows northerly towards the River Liffey. This stream is also culverted in the area where the transmission lines are projected to cross above it.

8.35 Figures 8.2 and 8.3 below presents the projected transmission lines in relation to the Griffeen River.

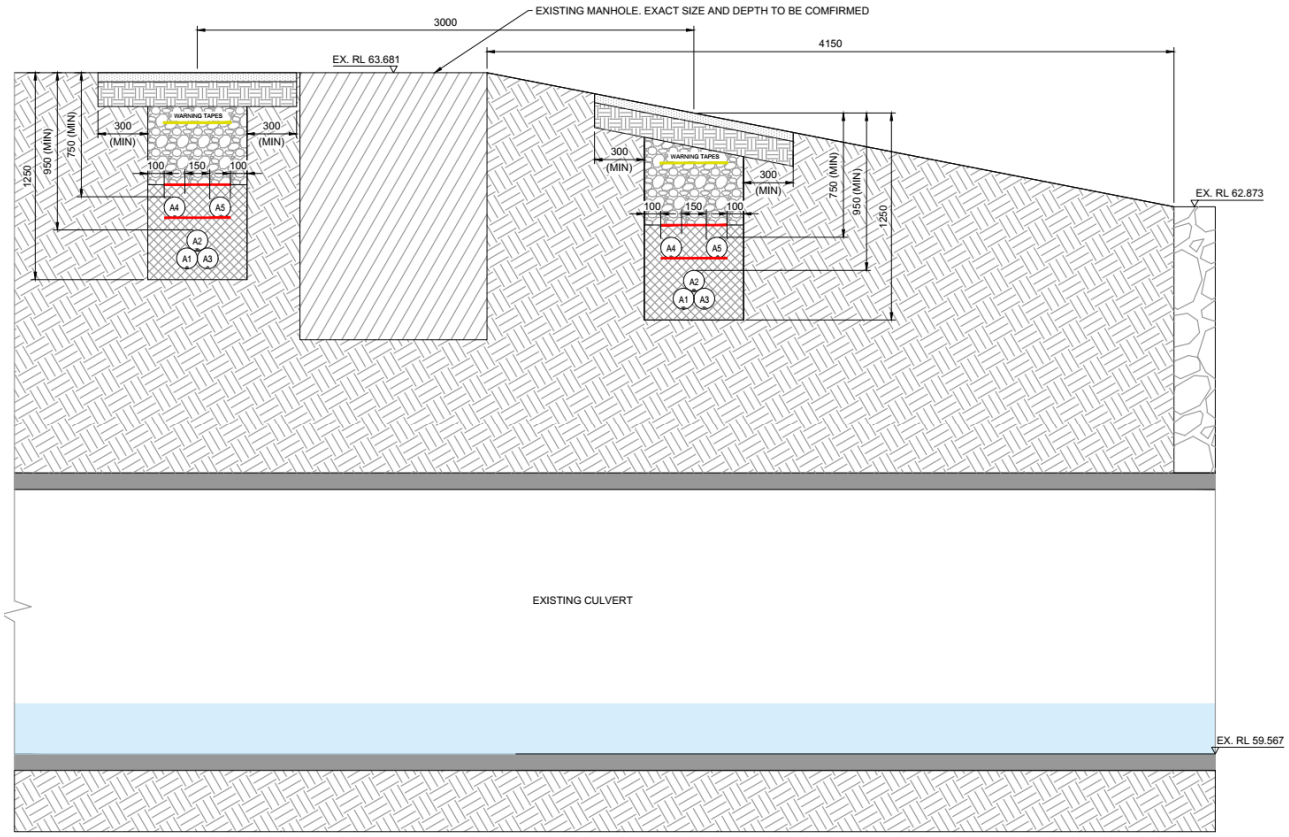

Figure 8.2 Crossing of Projected Lines above the Griffeen River (source: Detail from 20_167 - CSE - GEN - ZZ - DR - C - 2130. Clifton Scannell Emerson, 2021)

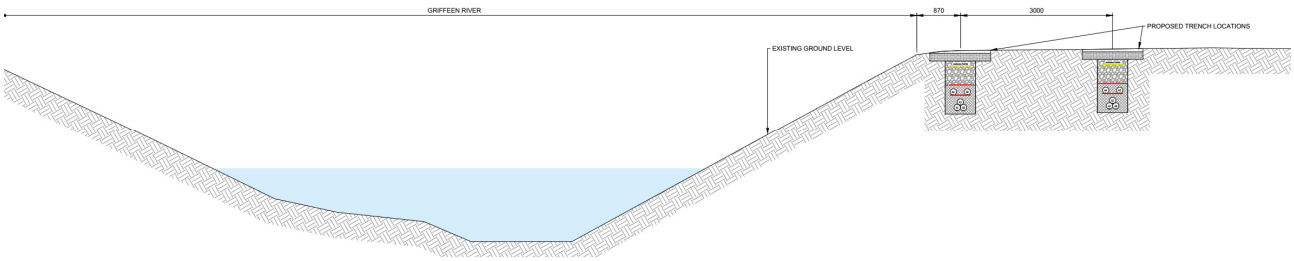

Figure 8.3 Relative location of Projected Lines in relation to the Griffeen River (source: Detail from 20_167 - CSE - GEN - ZZ - DR - C - 2130. Clifton Scannell Emerson, 2021)

8.36 A detailed description of the Proposed Development is provided in Chapter 2 of this EIA Report. The characteristics of the proposed development regarding the hydrological environment, related to both construction and operation activities are described below.

Construction phase

8.37 The key civil engineering works which will have a potential impact on the water and hydrological environment during construction of the proposed development are summarised below.

- Ground works will be required to clear the site and to facilitate, access roads, utilities and landscaping. Soil stripping and localised stockpiling of soil will be required for short periods of time during construction.
- Possible discharge of collected rainwater during excavation works and groundworks (the extent of which is dependent on the time of year development works are carried out); and

- Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

Operational phase

8.38 There are no projected effects on the local hydrological regime during operational phase. No increase of hardstand areas and no discharge to surface waters are projected.

Potential impacts of the Proposed Development

8.39 An analysis of the potential impacts of the proposed development on the hydrological environment during the construction and operation is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water the following impacts discussed will be considered applicable to both Chapter 7 and 8 of the EIAR. Waste Management is also considered an interaction. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Sections 7.60 below.

8.40 There is no direct or indirect hydrological connection to the Grand Canal pNHA as it is fully lined, and therefore there is no potential for impacts from the proposed development. There is an indirect hydrological pathway to internationally and nationally designated sites in Dublin Bay via the Griffeen River and River Liffey. The proposed transmission route through the design utilises an existing culvert on the Griffeen River and the construction works will have no interaction with the watercourse itself. Given the potential loading and the distance from source to any downstream European site, the pollution risk in the absence of mitigation measures would be imperceptible as potential contaminant would be attenuated, diluted and dispersed below statutory guidelines by the time it reaches European sites in Dublin Bay.

Construction phase

Increased sediments loading in run-off

8.41 Surface water runoff during the construction phase may contain increased silt levels or become polluted from construction activities. Runoff containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from dewatering excavations, exposed ground, stockpiles and access roads.

8.42 During the construction phase at this site there is potential for an increase in run-off due to the compaction of soils. This will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off and sediment loading which could potentially impact local drainage. Site investigations classified the subsoils as ‘non-hazardous’; low levels of petroleum hydrocarbons were detected.

8.43 The construction of the cable route will involve excavation of a small amount of soil in close proximity to the Griffeen River. This creates the potential for sediment and/or nutrient run-off, especially if soil is stored in an unconsolidated state for a period of time. Suspended solids or nutrients resulting from the decomposition of organic material could potentially enter the adjacent Griffeen River and other drainage features. It is considered unlikely that this would happen to a significant degree given the presence of dense riparian vegetation along the existing watercourses.

Accidental spills and leaks

8.44 During construction of the 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;
- Spillage of wastewater from poor on-site toilets and washrooms; and
- Run-off from concrete and cement during pad foundation construction.

8.45 Machinery activities on site during the construction phase may result in contamination of runoff/surface water. Potential impacts could arise from accidental spillage of fuels, oils, paints etc. which could impact surface water if allowed to infiltrate to runoff to surface water systems and/or receiving watercourses. However, implementation of the mitigation measures detailed below will ensure that this does not occur.

8.46 Concreting operations carried out near surface water drainage points during construction activities could lead to discharges to a watercourse. Concrete (specifically, the cement component) is highly alkaline and any spillage to a local watercourse would be detrimental to water quality and local fauna and flora. However, employment of the mitigation measures highlighted below will ensure that any impact will be mitigated.

Operational phase

Direct or Indirect discharges

8.47 There will be no direct or indirect discharges of contaminated water to local drainage during the operational phase. There is no projected storage of hazardous liquids at the site or along the projected lines which could potentially affects the soils and water environment.

Remedial and Mitigation Measures

8.48 The design of the proposed development has taken account of the potential impacts of the development and the risks to the water environment specific to the areas where construction is taking place.

8.49 The Griffeen River flows through the Grange Castle Business Park. The proposed route of the two 110kV transmission cables will cross above the Griffeen River, which is culverted in this section and will pass along a wayleave to the north of the Griffeen River. Therefore, specific mitigation measures have been considered to mitigate the potential effects on this local water environment. Construction works will have a buffer zone from any drainage ditches which discharge to this waterbody or any waterbody in the area. The following measures seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation.

8.50 There is no direct or indirect hydrological connection to the Grand Canal pNHA as it is fully lined, and therefore there is no potential for impacts from the proposed development.

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

Construction phase

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

- Works adjacent to the Griffeen River;
- Control of sediment loading and water quality; and
- Fuel and chemical handling, transport and storage;

Construction Environment Management Plan

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

relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

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

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

Works adjacent to the Griffeen River

8.55 In order to mitigate the potential for sediment and/or nutrient run-off into the Griffeen River, the following measures have been considered for the earthworks adjacent to the stream.

- Excavation and infilling will be carried out in small progressive stages;
- Any topsoil that is of use for landscaping will be stored on the site. Where this is required during the construction phase, it will be stored suitably far away from the Griffeen River and covered to avoid excessive sediment run-off or wind blow;
- Given the proposed construction methodology no significant run off of silt laden run off is anticipated, the site will be regularly monitored by construction staff for signs of run-off such as silt in surrounding vegetation and measures will be put in place to prevent this where necessary. This may include the erection of a silt fence if required
- Excavations will be carried out using a suitably sized excavator and always from the northern bank of the River;
- Any excavated soil that is not re-used will be disposed of to a Local Authority approved waste disposal facility;
- In all circumstances, excavation depths and volumes will be minimised and excavated material will be re-used where possible.

Control of sediment loading and water quality

8.56 As there is potential for run-off to enter current stormwater systems and indirectly discharge to a watercourse, mitigations will be put in place to manage run-off during the construction phase.

8.57 Run-off into excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

8.58 Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. No significant dewatering will be required during the construction phase which would result in the localised lowering of the water table. No discharge of construction water is anticipated during the construction of the proposed underground transmission cable installation. There may be localised pumping of surface run-off from the excavations (up to 3m) during and after heavy rainfall events.

8.59 Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).

8.60 The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact.

8.61 All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

8.62 Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon interceptors.

8.63 Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained.

Fuel and chemical handling

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

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

8.66 Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite. In the case of drummed fuel or other chemical which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Operational phase

8.67 No remedial or mitigation measures have been considered during the operational phase, since no impacts on the hydrological environment are projected.

Predicted impact of the Proposed Development

8.68 This section describes the predicted impact of the proposed development following the implementation of the remedial and mitigation measures.

Construction phase

8.69 The implementation of mitigation measures outlined above will ensure that the predicted impacts on the hydrological environment do not occur during the construction phase and that the residual impact will be ***temporary-imperceptible-neutral***. Following the TII criteria for rating the magnitude and

significance of impacts on the hydrological related attributes, the magnitude of impact is considered ***negligible***.

Operational phase

8.70 The implementation of mitigation measures highlighted above will ensure that the predicted impacts on the hydrological environment do not occur during the operational phase and that the residual impact will be ***long-term-imperceptible-neutral.*** Following the TII criteria (Appendix 8.1) for rating the magnitude and significance of impacts on the hydrological related attributes, the magnitude of impact is considered ***negligible***.

Residual impacts

8.71 Based on the natural conditions present and with appropriate mitigation measures to reduce the potential for any impact of accidental discharges to ground during the construction phase, the potential impact on hydrology during construction (following EPA, 2017) are considered to have a ***temporary, imperceptible*** significance, with a ***neutral*** impact on quality.

8.72 There are no likely significant impacts on hydrological environment associated with the proposed operational development of the site with mitigation in place. As such the impact is considered to have a long-term, imperceptible significance with a neutral impact on quality i.e., no effects of effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

8.73 Following the TII criteria for rating the magnitude and significance of impacts on the hydrological related attributes, the magnitude of the impact is considered ***negligible*** for the construction and operational phases.

Cumulative impacts

8.74 The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below.

Construction phase

8.75 The potential for impact on hydrology during construction primarily arises from localised accidental leaks and spills to ground. The proposed development does not require significant dewatering and with standard mitigation in place for management of accidental discharges, the effect due to construction in this area is considered to be a neutral on quality and an imperceptible significance.

8.76 Contractors for the proposed development will be contractually required to operate in compliance with a CEMP which will include the mitigation measures outlined in this EIA report. Other developments will also have to incorporate measures to protect surface water quality in compliance with legislative standards for receiving water quality. As a result, there will be no cumulative potential for change in surface water quality or the natural hydrological regime. The cumulative impact is considered to be ***temporary, neutral*** **and** ***imperceptible.***

Operational phase

8.77 All developments will be required to manage any discharges to water and operate in compliance with relevant legislation (European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended by SI No. 77 of 2019). As such there will be no likely cumulative impact on water quality.

Monitoring

8.78 No monitoring is required to maintain and protect the conditions of the hydrology upon completion of the development.

Reinstatement

8.79 Not applicable in respect of hydrology issues.

9. NOISE AND VIBRATION

9.1 As detailed in Chapter 1 Introduction, this EIA Report has been prepared to accompany an application for the provision of two no. 110kV transmission lines along with associated and ancillary works hereafter referred to as the 'Proposed Development'. This development will connect the permitted Coolderrig 110kV Gas Insulated Switchgear (GIS) substation that includes 2 no. transformers and an client contriol room within an overall compound that was granted permission under SDCC Reg. Ref. SD18A/0298; with the Grange Castle – Kilmahud Circuit to its east.

9.2 This proposed development has been assessed and discussed in terms of potential noise and vibration impacts on the surrounding environment.

Methodology

Proposed Approach

9.3 The following methodology has been adopted for this assessment:

- review appropriate guidance and planning conditions applicable to the associated site, etc. in order to identify appropriate noise criteria for the site operations;
- review noise monitoring at a number of locations (e.g. in the vicinity of nearest sensitive properties/boundaries) to identify existing levels of noise in the vicinity of the development;
- calculate construction noise levels associated with the key construction activities to consider the potential noise impact of the proposed development; and
- comment on predicted levels against the appropriate criteria and existing noise levels and outline required mitigation measures (if any).

9.4 Appendix 9.1 of the Appendix document presents a glossary of the acoustic terminology used throughout this document. In the first instance it is considered appropriate to review some basic fundamentals of acoustics.

Fundamentals of Acoustics

9.5 In order to provide a broader understanding of some of the technical discussion in this report, this section provides a brief overview of the fundamentals of acoustics and the basis for the preparation of this noise assessment.

9.6 A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. In order to take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB).

9.7 The audible range of sounds expressed in terms of Sound Pressure Levels is 0dB (for the threshold of hearing) to 120dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3dB.

9.8 The frequency of sound is the rate at which a sound wave oscillates and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. Several weighting mechanisms have been proposed but the 'A-weighting' system has been found to provide one of the best correlations with perceived loudness. SPL's measured using 'A-weighting' are expressed in terms of dB(A). An indication of the level of some common sounds on the dB(A) scale is presented in Figure 9.1.

9.9 The 'A' subscript denotes that the sound levels have been A-weighted. The established prediction and measurement techniques for this parameter are well developed and widely applied. For a more

detailed introduction to the basic principles of acoustics, reference should be made to an appropriate standard text.

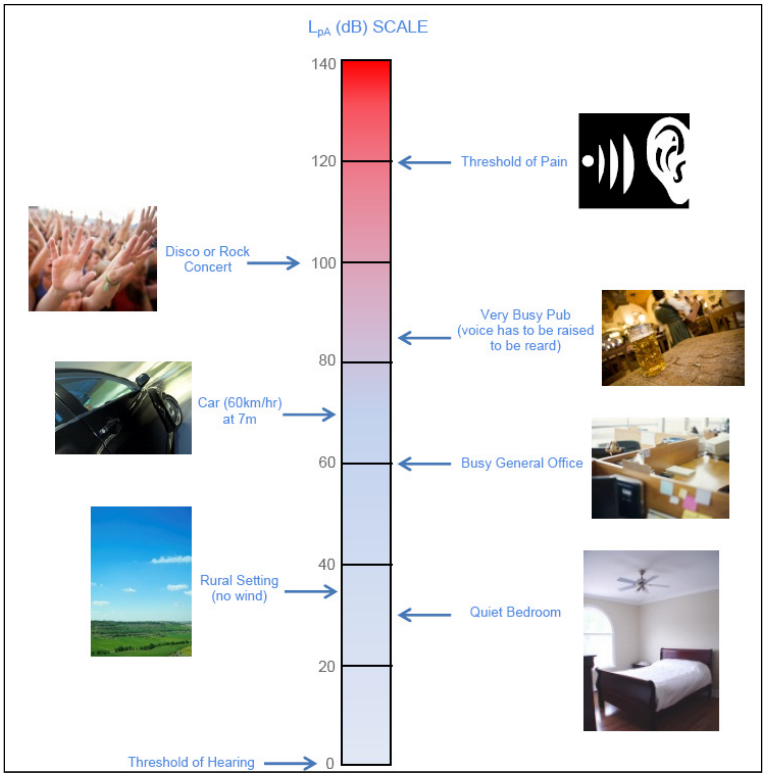

Figure 9.1 dB(A) Scale & Indicative Noise Levels – (EPA: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4 – 2016))

Significance of Impacts

9.10 The significance of noise and vibration impacts has been assessed in accordance with the EPA's *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports* 2017 and the EPA's Draft *Advice Notes for Preparing Environmental Impact Statements* 2015, see Tables 9.1 to 9.3 below. As these guidelines do not quantify the impacts in decibel terms, further reference has been made to the '*Guidelines for Environmental Noise Impact Assessment*' produced by the Institute of Environmental Management and Assessment (IEMA) (2014).

9.11 With regard to the quality of the impact, ratings may have positive, neutral or negative applications where:

Table 9.1 Quality of Potential Effects

Quality of Effects	Definition
Negative	A change which reduces the quality of the environment (e.g. by causing a nuisance).
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment (e.g. by removing a nuisance).

9.12 The significance of an effect on the receiving environment are described as follows:

Table 9.2 Significance of Effects

Significance of Effects on the Receiving Environment	Description of Potential Effects
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	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 a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

9.13 The duration of effects as described in the EPA Guidelines are:

Table 9.3 Duration of Effects

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

Construction Phase Guidance

Criteria for Rating Noise Impacts

9.14 There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local Authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

9.15 In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009+A1:2014*: Code of practice for noise and vibration control on construction and open sites – Noise*.

9.16 The approach adopted in BS 5228 – 1 calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

9.17 BS5228 – 1 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 – 1. These are construction noise levels only and not the cumulative noise level due to construction plus existing ambient noise.

Table 9.4 Example threshold of significant effect at dwellings

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 07:00hrs)	45	50	55
Evenings and weekends Note D	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 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.

9.18 It should be noted that this assessment method is only valid for residential properties.

9.19 For the appropriate periods (i.e. daytime, evening and night-time) the ambient noise level is determined and rounded to the nearest 5dB. Baseline monitoring carried out as part of this assessment, indicate that the baseline categories summarised in Table 9.5 are appropriate in terms of the nearest noise sensitive locations being considered in this instance.

Table 9.5 Rounded baseline noise levels and associated categories

Period	Baseline Noise Category	Construction Noise Threshold Value $L_{Aeq,T}$ (dB)
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	A	65
Evening (19:00 to 23:00hrs)	A	55
Night time (23:00 to 07:00hrs)	A	45

9.20 If the construction noise level exceeds the appropriate category value, then a potential significant effect is deemed to occur.

9.21 The assessment process outlined above determines if a potential significant construction noise impact is likely. Notwithstanding the outcome of this assessment, the overall acceptable levels of construction noise are set out in the Transport Infrastructure Ireland (TII) publication *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*[25], which should not be exceeded at noise sensitive locations during the construction phase of the development. Table 9.6 sets out these levels.

Table 9.6 Maximum Permissible Noise Levels at the Facade of Dwellings during Construction

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

Note * Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

9.22 In exceptional circumstances there may be a requirement that certain construction works are carried out during evening and night-time periods. In these instances, the relevant evening (60 dB L_{Aeq1hr}) and night time (50 dB $L_{Aeq,1hr}$) will apply.

[25] *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*, Transport Infrastructure Ireland

9.23 Therefore, based on the above the following construction noise criteria are proposed for the site in relation to day to day works during the stated construction hours:

70 dB $L_{Aeq,1hr}$ at noise sensitive location
75 dB $L_{Aeq,1hr}$ at commercial property

Criteria for rating vibration impacts

9.24 Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

9.25 It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5 mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant of such activities during the night.

9.26 Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard BS 7385: 1993: *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*, and;
- British Standard BS 5228-2: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Vibration*.

9.27 BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15 mm/s at low frequencies rising to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.

9.28 BS 5228 recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. Below these values minor cosmetic damage is unlikely. Where continuous vibration is such as to give rise to dynamic magnification due to resonance, the guide values may need to be reduced by up to 50%. BS 5288-2 also comments that important buildings which are difficult to repair might require special consideration on a case by case basis.

9.29 The Transport Infrastructure Ireland (TII) document *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* also contains information on the permissible construction vibration levels as follows:

Table 9.7 Allowable vibration during construction phase

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 10 Hz	**10 to 50 Hz**	**50 to 100 Hz (and above)**
8 mm/s	12.5 mm/s	20 mm/s

Operational phase – Noise Guidance

9.30 Due to the fact that the proposed 110kV lines will be located underground there are is no operational noise impact associated with the Proposed Development.

Operational Phase – Vibration Guidance

9.31 There will be no vibration emissions from the operation of the proposed cable installation. Consequently, there is no requirement to assess any vibration emissions.

Forecasting Methods

9.32 Construction noise calculations have been conducted generally in accordance with BS 5228: 2009+A1:2014: *Code of practice for noise control on construction and open sites - Noise.*

9.33 Changes in road traffic noise on the local road network have been considered using prediction guidance contained within *Calculation of Road Traffic Noise (CRTN)* issued by the Department of Transport in 1988.

Receiving environment

9.34 An environmental noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017 Acoustics – *Description, Measurement and Assessment of Environmental Noise*. Specific details are set out below.

Monitoring locations

9.35 Noise measurements were conducted at two positions on and in the vicinity of the site that are representative of noise environment expected at the nearest noise sensitive locations. Details for the particular locations are outlined below:

Location A Located in the north eastern corner of the site in line with the common boundary of the nearest noise sensitive locations at the junction of the R120 and the Grand Canal.

Location B Located in the vicinity of a residential location to the north east of the proposed development site. The property is located on the boundary of the Grange Castle Business Park and is immediately adjacent to a number of priave and commercial premises.

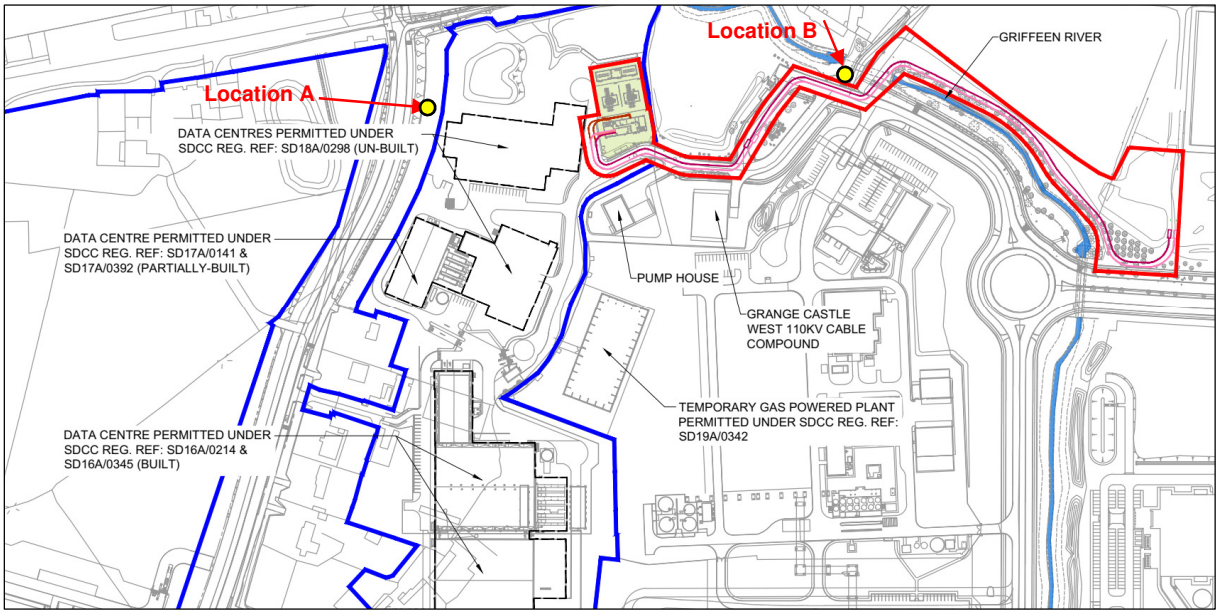

Figure 9.2 Site plan indicating baseline noise monitoring locations

9.36 A review of daytime, evening and night time noise levels at the monitoring locations are presented in Table 9.8. See Appendix 9.2 for further details.

Table 9.8 Review of noise levels

Location	Period	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)		
		$L_{Aeq,15min}$	L_{AFMax}	$L_{A90,15min}$
A	Day	58 – 61	76	44 – 47
	Evening	53	63	45
	Night	48 – 49	67	42 – 43
B	Day	52 – 53	76	47 – 48
	Evening	51	68	49
	Night	49 – 51	70	48

9.37 In terms of the various locations the following significant noise sources (in subjective order of influence) were noted:

Table 9.9 Significant noise sources

Location	
A	**B**
- R120 road traffic noise. - Water running in a nearby canal in absence of traffic. - Site work and plant noise associated with existing sites. - During evening period noise dominated by traffic and water noise associated with the canal. - During night time plant noise from existing facilities (to the East and South) is the dominant background source.	- Noise dominated by existing plant noise from adjacent facility. - Occasional bus passing by. - Water flow from nearby watercourse. - Reverse alarms and construction noise from nearby site. - As above for evening period with the exception of construction noise. - During night time plant noise from the adjacent facility and water flow from nearby watercourse noted.

9.38 It should be noted that baseline noise monitoring was carried out during periods where construction work was not ongoing on adjacent sites.

Characteristics of the Proposed Development

9.39 A variety of items of plant will be in use for the purposes of site preparation, construction and site works. There will be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for generation of high levels of noise for the temporary duration of the construction process. The underground cables will be laid along a strip of land to the permitted and under construction Coolderrig substation to the Grange Castle – Kilmahud Circuits using a methodology similar to the one detailed below:

- The area where excavations are planned will be surveyed, prior to the commencement of works, with a cable avoiding tool and all existing underground services will be identified;
- A team consisting of a rubber tracked excavator, a dumper and a tractor and stone cart with side-shoot will dig the trench for and lay a short length of the underground cabling per day;
- The excavators will open a trench, the trench will be a maximum of 600mm wide;
- Clay plugs will be installed at 50m intervals to prevent the trench becoming a conduit for surface water runoff;
- The excavated material will be loaded into the dumpers to be transported to a designated temporary stockpiling area to be reused as backfilling material where appropriate;
- Once the trench has been excavated, a base layer of blinding will be installed by the tractor and cart and compacted by the excavators;
- The ducting will then be placed in the trench as per relevant specifications;
- Blinding will be installed above the cable ducting and compacted;
- The remainder of the trench will be backfilled with granular material and compacted; and
- The trench will be reinstated as per existing surfacing i.e. landscaped in greenfield area where appropriate.

9.40 Construction activities will mostly be carried out during normal daytime working hours. Normal construction hours will be specified by planning conditions of a grant of permission for the Proposed Development, or by the local authority.

9.41 Once operational, there will be no significant off-site noise emissions from the operation of the cable installations or 110 kV substations and associated cable bays.

9.42 These issues are discussed in detailed in the following sections.

Potential impacts of the Proposed Development

Construction phase

9.43 Construction noise predictions have been carried out using guidance set out in British Standard *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise*.

9.44 Construction works associated with the underground cable will be temporary in duration. It is estimated that the civil works will take approximately 6 weeks, with a further 2 weeks estimated for cable installation, jointing and testing and reinstatement.

9.45 Table 9.10 outlines the noise levels associated with typical construction noise sources assessed in this instance along with typical sound pressure levels from *BS 5228 – 1: 2009+A1:2014* at various distances from these works.

Table 9.10 Indicative Noise Levels from Construction Plant at Various Distances from the cable installation Works

Item (BS 5228 Ref.)	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,1hr}$)			
	20m	40m	60m	100m
Pneumatic breaker (C.8.12)	66	60	56	52
Wheeled loader (C.3.51)*	62	56	52	48
Tracked excavator (C.3.43)*	63	57	53	49
Dozer (C.3.30)*	64	58	54	50
Dump truck (C.3.60)*	60	54	50	46
Asphalt Spread (C.8.24)	70	64	60	56
Compressor (C.7.27)	61	55	51	47
Road Roller (C.3.114)	65	59	55	51
HGV Movements (10 per hour)	53	50	49	46

*Note ** Assume noise control measures as outlined in Table B1 of BS 5228 – 1 (i.e. fit acoustic exhaust).

9.46 Construction works associated with cable works will be the dominant source of noise at the nearest noise sensitive locations when they occur. Other construction activity from the proposed development is at sufficient distance from a significant proportion of the proposed cable works, so that when they occur at the same time, cumulative issues will not be a material issue.

9.47 The noise levels presented in Table 9.10 are within the weekday daytime construction noise limit values shown in Table 9.6, at distances of 20m or greater from the works. At distances greater than 20m from the works, the construction activities are predicted to be below the 70dB $L_{Aeq,1hr}$ construction noise criterion adopted. A significant effect is therefore not predicted in relation to the nearest noise sensitive locations at these distances in terms of this aspect of potential construction noise. The closest

noise sensitive location is in the vicinity of noise monitoring Location B at some 25m distance from the line of the proposed underground line installation.

9.48 The next closest residential noise sensitive property in the vicinity of the proposed works are at a distance of some 115 m to the north on the opposite side of the canal.

9.49 Considering the typical distance from works to noise sensitive locations, it is expected that the day and evening criteria for construction noise outlined here can be satisfied. Additional measures will need to be considered during periods where works are carried out during night-time periods to ensure night-time criterion are not exceeded. Specifically, high impact activities will not be permitted during night-time hours. Various measures that can be considered are outlined in the mitigation section of this chapter.

9.50 In terms of noise associated with the construction activities for the proposed development the associated effect is stated to be ***negative*** and ***minor***.

9.51 In the unlikely event that works are scheduled out of normal hours or at night, the range of calculated noise levels are also below a level that would lead to a significant impact. Given, however, the potential for cumulative noise impacts to occur if multiple items of plant operate at the same time, noise mitigation measures will need to be considered during these periods. As noted above, however, it is not anticipated that any works will be carried out at night-time. Various measures relating to the control of noise from the works are outlined in the mitigation section of this assessment.

Construction traffic

9.52 In terms of the additional construction traffic on local roads that will be generated as a result of this development the following comment is presented. In order to increase traffic noise levels by 1 dB traffic volumes would need to increase by the order of 25% along the local road network. As outlined in the relevant sections of Chapter 12 relating to traffic, additional traffic introduced onto the local road network due to the construction phase of the Proposed Development will not result in a significant noise impact.

Review of Construction Impacts

9.53 In terms of noise associated with these construction activities the associated effect is stated to be:

Quality	***Significance***	***Duration***
Negative	Minor	Temporary

9.54 In terms of vibration, due to the distance of activities from the site to the nearest sensitive locations and controlling vibration levels to those detailed in Table 9.7 the associated effect is stated to be:

Quality	***Significance***	***Duration***
Neutral	Imperceptible	Temporary

Operational phase

Additional vehicular traffic on public roads

9.55 In terms of the additional traffic on local roads that will be generated as a result of this development the following comment is presented: Considering that in order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to this development will not result in a significant noise impact. The resultant noise impact is ***neutral***, ***imperceptible*** and ***long-term***.

Quality	***Significance***	***Duration***
Neutral	*Imperceptible*	*Long Term*

Remedial and mitigation measures

9.56 In order to sufficiently ameliorate the likely noise impact, a schedule of noise control measures has been formulated for both construction and operational phases associated with the proposed development.

Construction phase

9.57 With regard to construction activities, reference has been made to BS5228 Parts 1 and 2, which offer detailed guidance on the control of noise and vibration from demolition and construction activities. Various mitigation measures will be considered and applied during the construction of the proposed development. As an example, the following measures will be implemented on site:

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

9.58 Furthermore, a variety of practicable noise control measures will be employed, such as:

- selection of plant with low inherent potential for generation of noise and / or vibration;
- erection of barriers as necessary around items such as generators or high duty compressors;
- situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

9.59 The vibration from construction activities to off-site residences will be limited to the values set out in Table 9.7. It should be noted that these limits are not absolute rather they provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%.

9.60 Appendix 9.3 presents an indicative construction noise and vibration management plan that will be implemented in terms of the day-to-day operation of the site. This will focus on opening and maintaining lines of communication with the local community to address issues in relation to noise and/or vibration and to advise the community of periods where specific activities take place that have an increased potential in giving rise to issues off site.

Operational phase

Additional vehicular traffic on public roads

9.61 The noise impact assessment outlined previously has demonstrated that mitigation measures are not required.

Cumulative assessment

9.62 The environmental noise survey takes account of noise emissions from existing developments. It was noted that the existing ambient noise levels in the area were dominated primarily by road traffic on the surrounding road network. Background noise levels were influenced by distant traffic and degree of existing plant noise from existing facilities.

9.63 Due to the fact that the Proposed Development is located underground there are no cumulative noise impacts of note.

Predicted impacts of the development

9.64 This section summarises the likely noise and vibration impact associated with the proposed development, taking into account the mitigation measures.

Construction phase

9.65 During the construction phase of the proposed development there will be some impact on nearby noise sensitive properties due to noise emissions from site traffic and other activities. The application of noise limits and hours of operation (i.e. as per Table 9.6), along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum. Also, it is reiterated that any construction noise impacts will be ***minor, negative*** and ***temporary*** in nature.

Operational phase

Additional vehicular traffic on public roads

9.66 Any change in noise levels associated with vehicles at road junctions in the vicinity of the proposed development is expected to be ***imperceptible.*** The resultant noise impact is ***neutral, imperceptible*** and ***long-term.***

Cumulative impacts

9.67 During construction of the Proposed Development it is anticipated that noise and vibration associated with construction work on the proposed cable installation routes, joint and pull bays will typically be lower than those generated by existing traffic movements on the local road network. The noise environments at the nearest noise sensitive locations to the proposed works are and will continue to be dominated by road traffic noise.

9.68 Construction is currently being completed on the permitted substation and at other sites within the wider area. Whilst construction noise from these sites is potentially significant at locations in close proximity to them, the construction noise associated with them will effectively be masked by the existing traffic noise at the nearest noise sensitive locations identified in this assessment. Such works would not be expected to increase ambient noise levels in the vicinity of the noise sensitive locations that are in the proximity of the works under consideration here. All sites will be expected to work within conditioned and or best practice noise and vibration limits such that the associated noise and vibration impacts and managed. Based on this it is reiterated that any construction noise impacts will be ***slight, negative*** and ***temporary*** in nature.

9.69 Once the mitigation measures outlined above are implemented there should be no significant cumulative impact as a result of the construction of the Proposed Development.

9.70 There are no operational noise and/or vibration impacts associated with the Proposed Development, hence cumulative impacts do not arise in this instance.

Residual impacts

9.71 The construction noise assessment has shown that in accordance with the 'significance' thresholds presented in the *British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise* there is not a significant impact at residential locations, subject to the implementation of the mitigation measures outlined in Section 9.56.

9.72 There are no operational noise and/or vibration impacts associated with the Proposed Development. Ambient noise levels are, and will continue to be, dictated by road traffic noise in the area while a low level of plant noise is expected to be audible during lulls in other sources (e.g. distant traffic noise).

9.73 The operational noise assessment of vehicle movements associated with the site has shown that in accordance with the scale in the EPA Draft EIA Report Guidelines 2017 there will be an ***imperceptible, neutral, long-term*** impact off site noise sensitive locations considering existing traffic volumes on the local road network.

9.74 Interactions are addressed in Chapter 16 of this EIA Report.

Monitoring

9.75 It is required that the appointed contractor monitor levels of noise and vibration during the construction phase at nearby sensitive locations and/or development site boundaries.

Do-Nothing Scenario

9.76 The existing noise climate will remain unchanged on site and at nearby noise sensitive locations.

10. AIR QUALITY AND CLIMATE

10.1 This chapter evaluates the impacts which the proposed development may have on Air Quality & Climate as defined in the Environmental Protection Agency (EPA) documents Draft 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2017) and the EPA Draft 'Advice Notes for Preparing Environmental Impact Statements' (2015).

10.2 The proposed development primarily comprises the provision of two no. 110kV transmission lines along with associated and ancillary works, that will connect the permitted Coolderrig 110kV Gas Insulated Switchgear (GIS) substation that includes 2 no. transformers and an MV switch room within an overall compound that was granted permission under SDCC Reg. Ref. SD18A/0298 with the Grange Castle - Kilmahud Circuits. The site of the proposed development has an area of c. 4hectares. These works are described in detail within Chapter 2 (Description of the Proposed Development) of this EIA Report.

Methodology

Criteria for Rating of Impacts

Ambient Air Quality Standards

10.3 In order to reduce the risk to health from poor air quality, National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 10.1).

10.4 Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate European Commission Directive 2008/50/EC which has set limit values for a number of pollutants with the limit values for NO_2, PM_{10}, and $PM_{2.5}$ being relevant to this assessment. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC).

Table 10.1 Ambient Air Quality Standards

Pollutant	Regulation [Note 1]	Limit Type	Value
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 mg/(m^2*day)
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3 PM_{10}
		Annual limit for protection of human health	40 µg/m^3 PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3 $PM_{2.5}$

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Dust Deposition Guidelines

10.5 The concern from a health perspective is focused on particles of dust which are less than 10 microns and the EU ambient air quality standards outlined above have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

10.6 With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

10.7 However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m²*day) averaged over a one year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the Bergerhoff limit of 350 mg/(m²*day) be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the proposed development.

Climate Agreements

10.8 Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

10.9 In order to meet the commitments under the Paris Agreement, the EU enacted Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013 (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

10.10 In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland 'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050' (3.(1) of No. 46 of 2015). This is referred to in the Act as the 'national transition objective'. The Act makes provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

10.11 The Climate Action Plan (CAP) (Government of Ireland, 2019), published in June 2019, outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The CAP has set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

10.12 Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December 2019 (Government of Ireland, 2020a). The

General Scheme was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

10.13 In October 2020, the Climate Action and Low Carbon Development (Amendment) Bill 2020 (Government of Ireland, 2020b) was published in draft format (draft 2020 Climate Act) which amends and enhances the 2015 Climate Act. Once approved, the purpose of the 2020 Climate Act is to provide for the approval of plans 'for the purpose of pursuing the transition to a climate resilient and climate neutral economy by the end of the year 2050'. The 2020 Climate Act will also 'provide for carbon budgets and a decarbonisation target range for certain sectors of the economy'. The 2020 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

Construction phase

Air Quality

10.14 The Institute of Air Quality Management in the UK (IAQM) guidelines (2014) outline an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development in order to predict the likely magnitude of the dust impacts in the absence of mitigation measures.

Climate

10.15 The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the proposed development.

Operational phase

Air Quality & Climate

10.16 Operational phase impacts as a result of the proposed development are not predicted. Once constructed the cables will be buried underground and there will be no emissions to atmosphere once operational. Therefore, there is no potential for impacts to air quality and climate during operation.

Receiving environment

Meteorological Data

10.17 A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

10.18 The nearest representative weather station collating detailed weather records is Casement Aerodrome, which is located approximately 2kms south of the site. Casement Aerodrome met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 10.1). For data collated during five representative years (2015 – 2019) (Met Eireann, 2021), the predominant wind direction is westerly to south-westerly, with generally moderate wind speeds averaging 5.5 m/s for the period 1981 - 2010.

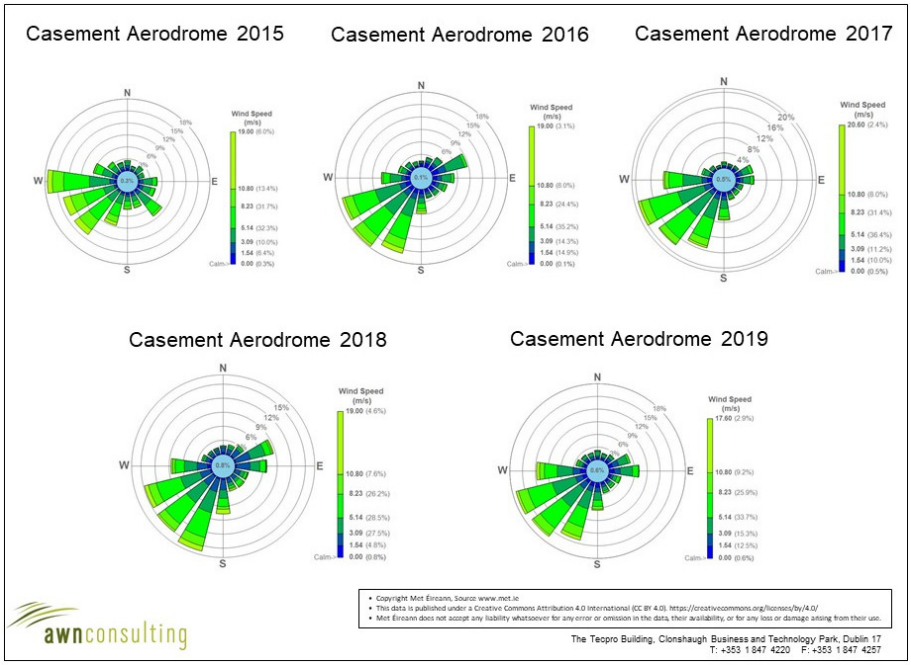

Figure 10.1 Casement Aerodrome Windrose 2015 – 2019 (MET, 2021)

Baseline Air Quality

10.19 Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent EPA published annual report on air quality "Air Quality In Ireland 2019" (EPA 2020a) details the range and scope of monitoring undertaken throughout Ireland. As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes as outlined within the EPA document titled 'Air Quality In Ireland 2019' (EPA 2020a). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, the area of the proposed development in Grange Castle is categorised as Zone A as explained with the EPA document titled '*Air Quality in Ireland 2019'* (EPA 2020a).

NO_2

10.20 With regard to NO_2, continuous monitoring data from the EPA (EPA 2020a), at suburban Zone A background locations in Rathmines, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 15 - 22 µg/m^3 in 2019 (see Table 10.2). Sufficient data is available for the station in Ballyfermot to observe long-term trends since 2015 (EPA 2020a), with annual average results ranging from 16 – 20 µg/m^3. Based on these results, an estimate of the current background NO_2 concentration in the region of the proposed development is 17 µg/m^3.

Table 10.2 Background NO_2 Concentrations In Zone A Locations (□g/m^3)

Station	Averaging Period Notes 1,2	Year				
		2015	2016	2017	2018	2019
Rathmines	Annual Mean NO_2 (µg/m^3)	18	20	17	20	22
	Max 1-hr NO_2 (µg/m^3)	106	102	116	138	183
Swords	Annual Mean NO_2 (µg/m^3)	13	16	14	16	15
	Max 1-hr NO_2 (µg/m^3)	170	206	107	112	108
Ballyfermot	Annual Mean NO_2 (µg/m^3)	16	17	17	17	20
	Max 1-hr NO_2 (µg/m^3)	142	127	148	217	124

PM_{10}

10.21 Continuous PM_{10} monitoring carried out at the Ballyfermot, Rathmines, Tallaght and Phoenix Park Zone A locations in 2015 - 2019 showed annual mean concentrations ranging from 9 to 16 µg/m³, with at most 5 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m³ (35 exceedances are permitted per year) (EPA, 2020a). Based on this EPA data, an estimate of the background PM_{10} concentration in the region of the development is 14 µg/m³.

Table 10.3 Background PM_{10} Concentrations In Zone A Locations (□g/m³)

Station	Averaging Period	Year				
		2015	2016	2017	2018	2019
Ballyfermot	Annual Mean PM_{10} (µg/m³)	12	11	12	16	14
	24-hr Mean > 50 µg/m³ (days)	3	0	1	0	7
Tallaght	Annual Mean PM_{10} (µg/m³)	14	14	12	15	12
	24-hr Mean > 50 µg/m³ (days)	4	0	2	1	3
Rathmines	Annual Mean PM_{10} (µg/m³)	15	15	13	15	15
	24-hr Mean > 50 µg/m³ (days)	5	3	5	2	9
Phoenix Park	Annual Mean PM_{10} (µg/m³)	12	11	9	11	11
	24-hr Mean > 50 µg/m³ (days)	2	0	1	0	2

$PM_{2.5}$

10.22 Continuous $PM_{2.5}$ monitoring at the Zone A location of Rathmines over the period 2015 – 2019 (EPA, 2020a) indicated an average $PM_{2.5}/PM_{10}$ ratio ranging from 0.53 – 0.68. Based on this information, a conservative ratio of 0.70 was used to generate a background $PM_{2.5}$ concentration of 9.8 µg/m³.

Sensitivity of the Receiving Environment

10.23 In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (2014) prior to assessing the impact of dust from a proposed development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time.

10.24 In terms of receptor sensitivity to dust soiling, there is 1 no. high sensitivity residential property close to being 20m of the proposed works area (see Figure 10.2). There are additional properties further from the site, however, the worst-case sensitivity of the area has been used for the purposes of this assessment. Therefore, the overall sensitivity of the area to dust soiling impacts is considered **medium** based on the IAQM criteria outlined in Table 10.4.

Table 10.4 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	**Medium**	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

10.25 In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is estimated to be 14 µg/m³ and there is 1 no. residential property located within c.25m of the proposed construction works (see Figure 10.2). Based on the

IAQM criteria outlined in Table 10.5, the worst case sensitivity of the area to human health is considered to be **low**.

Table 10.5 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	< 24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	**Low**	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low	Low

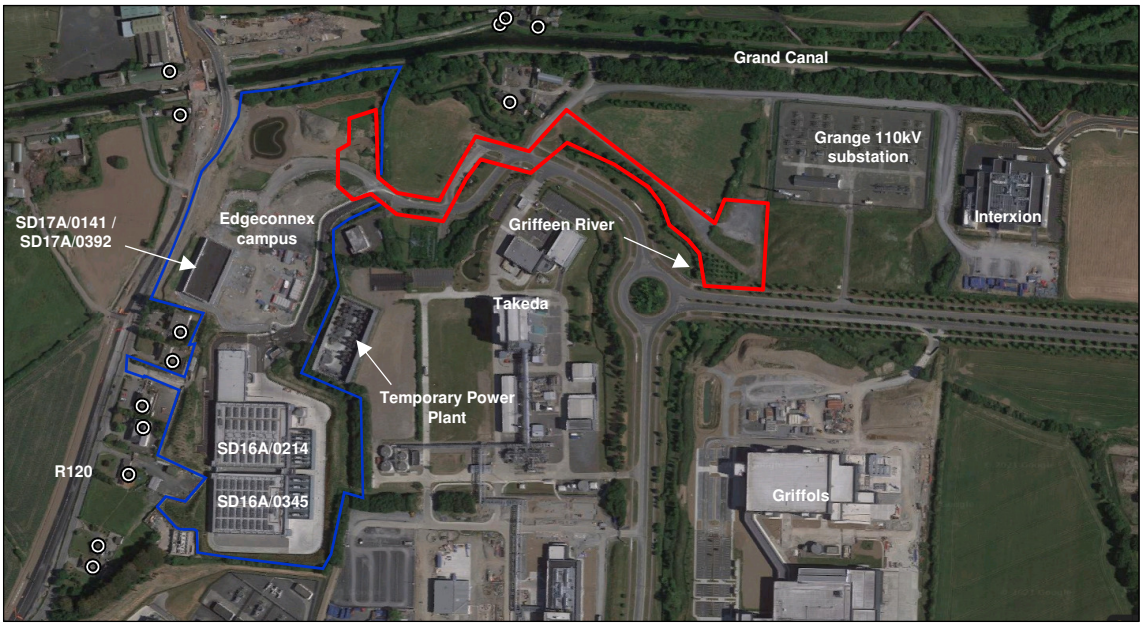

Figure 10.2 Location of Sensitive Receptors

Climate baseline

10.26 Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details provisional emissions up to 2019 (EPA, 2020b). The data published in 2020 states that Ireland will exceed its 2019 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.98 Mt. For 2019, total national greenhouse gas emissions are estimated to be 59.90 million tonnes carbon dioxide equivalent (Mt CO_2eq) with 45.71 MtCO_2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2019 at 35.3% of the total, with the transport sector accounting for 20.3% of emissions of CO_2.

10.27 GHG emissions for 2019 are estimated to be 4.5% lower than those recorded in 2018. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for four years in a row. Emissions from 2016 – 2019 exceeded the annual EU targets by 0.29 MtCO_2eq, 2.94 MtCO_2eq, 5.57 MtCO_2eq and 6.98 MtCO_2eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

10.28 The EPA 2019 GHG Emissions Projections Report for 2018 – 2040 (EPA 2019) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan 2018-2027 (NDP) which was published in 2018. Implementation of these are classed as a "*With Additional Measures*

scenario" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 – 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 10 Mt CO_2eq under the "*With Existing Measures*" scenario and 9 Mt CO_2eq under the "*With Additional Measures*" scenario (EPA, 2019).

Characteristics of the Proposed Development

Construction phase

10.29 The proposed development primarily comprises the provision of two no. 110kV transmission lines along with associated and ancillary works, that will connect the permitted Coolderrig 110kV Gas Insulated Switchgear (GIS) substation that includes 2 no. transformers and an MV switch room within an overall compound that was granted permission under SDCC Reg. Ref. SD18A/0298 with the Grange Castle – Kilmahud Circuit. The site of the proposed development has an area of c. 4.6 hectares. These works are described in detail within Chapter 2 (Description of the Proposed Development) of this EIA Report. The key civil engineering works which will have a potential impact on air quality and climate during construction are summarised below:

(i) During construction, an amount of soil will be generated as part of the site preparation works and during excavation for the installation of ducting for the cable installations.
(ii) Infilling and landscaping will be undertaken.
(iii) Temporary storage of construction materials
(iv) Construction traffic accessing the site will emit air pollutants and greenhouse gases during transport.

10.30 As outlined in the mitigation section of this chapter, a dust minimisation plan will be formulated for the construction phase of the proposed development to ensure no dust nuisance occurs at nearby sensitive receptors.

Operational phase

10.31 As the cables will be buried underground once constructed there will be no emissions to atmosphere and there is no potential for impacts to air quality and climate as a result of the operation of the proposed development.

Potential impacts of the Proposed Development

Construction Phase

Air Quality

10.32 The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

10.33 It is important to note that the potential impacts associated with the construction phase of the proposed development are temporary in nature. When the dust minimisation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will not be significant and will pose no nuisance at nearby receptors.

10.34 In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area. The major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

10.35 There are no demolition activities associated with the proposed development. Therefore, there is no demolition impact predicted as a result of the works.

Earthworks

10.36 Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: Total site area > 10,000 m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved >100,000 tonnes;

Medium: Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes;

Small: Total site area < 2,500 m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

10.37 The dust emission magnitude for the proposed earthwork activities can be classified as small as the total excavated material will be significantly less than 20,000 tonnes.

10.38 The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 10.6, this results in an overall low risk of temporary dust soiling impacts and a negligible risk of temporary human health impacts as a result of the proposed earthworks activities.

Table 10.6 Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

10.39 There will be no construction of buildings as part of the proposed development. Construction works will involve laying of cables in trenches. Therefore, the construction category is not relevant to the proposed development.

Trackout

10.40 Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;

Medium: 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;

Small: < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

10.41 The dust emission magnitude for the proposed trackout can be classified as small as there will be less than 10 outward HGV movements per day associated with the proposed development. As outlined in Table 10.7, this results in an overall low risk of temporary dust soiling impacts and a negligible risk of temporary human health impacts as a result of the proposed trackout activities.

Table 10.7 Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of dust emission risk

10.42 The risk of dust impacts as a result of the proposed development are summarised in Table 10.9 for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

10.43 While there is a low to negligible risk of dust soiling and human health impacts associated with the proposed works, best practice dust mitigation measures will be implemented to ensure there are no impacts at nearby sensitive receptors. When the dust mitigation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

Table 10.8 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	n/a	Low Risk	n/a	Low Risk
Human Health	n/a	Negligible Risk	n/a	Negligible Risk

Climate

10.44 There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, the impact on climate is considered to be imperceptible and temporary.

Operational phase

Air Quality & Climate

10.45 During operation, the cables will be buried underground and therefore there will be no emissions to atmosphere. Therefore, operational stage impacts to air quality and climate are not predicted.

Do Nothing Scenario

10.46 Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from new developments in the surrounding industrial estates, changes in road traffic, etc.). Therefore, this scenario can be considered neutral in terms of both air quality and climate.

Remedial and Mitigation Measures

Construction phase

10.47 The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK and the USA based on the following publications:

- 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014);
- 'Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings' (The Scottish Office, 1996);
- 'Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance' (UK Office of Deputy Prime Minister, 2002);
- 'Controlling Particles, Vapours & Noise Pollution From Construction Sites' (BRE, 2003);
- 'Fugitive Dust Technical Information Document for the Best Available Control Measures' and the USA (USEPA, 1997). ; and
- 'Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated) (USEPA, 1986).

10.48 In advance of work starting on site, the works contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

Site Management

10.49 The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

10.50 At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 10.1 for the wind rose for Casement Aerodrome). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east or north-east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

10.51 Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that

the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein; and
- At all times, the procedures put in place will be strictly monitored and assessed.

10.52 The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed, and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

10.53 Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site will be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering will be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use;
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land clearing / earth moving

10.54 Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering will be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust;
- During periods of very high winds (gales), activities likely to generate significant dust emissions will be postponed until the gale has subsided.

Storage piles

10.55 The location and moisture content of storage piles are important factors which determine their potential for dust emissions.

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles will be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002); and
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will

also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site traffic on public roads

10.56 Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- At the main site traffic exits, a wheel wash facility will be installed. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of dust mitigation measures

10.57 The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

Operational phase

10.58 No mitigation is proposed for the operational phase of the proposed development as there are no predicted impacts to air quality or climate.

10.59 Cumulatively, in relation to climate mitigation, the proposed development has been designed to minimise the impact on climate. The proposed development will allow for the proposed data storage facility development (SDCC Reg. Ref. SD18A/0298) to source electricity from the national grid.

10.60 Data centres are typically 84% more efficient than on-premises servers. In addition, in terms of total forecasted capacity, it is predicted that 1,700MW of data centres capacity will be operational by 2025. However, the carbon intensity of electricity is predicted to decrease from 331 gCO_2/kWh in 2019 to 100 gCO_2/kWh in 2030 as a result of the increase in renewables to 70% of the electricity market by 2030. Overall, it is predicted that data centres will peak at 2.2% of total GHG emissions in 2024 and will fall or level off after this date (Host In Ireland, 2020).

Residual Impacts

Construction Phase

Air Quality

10.61 When the dust mitigation measures detailed in the mitigation section of this report are implemented, fugitive emissions of dust and particulate matter from the site will be ***temporary*** and ***imperceptible*** in nature, posing no nuisance at nearby receptors.

Climate

10.62 Based on the scale and temporary nature of the construction works and the intermittent use of equipment, the potential impact on climate change and transboundary pollution from the proposed development is deemed to be ***temporary*** and ***imperceptible*** in relation to Ireland's obligations under the EU 2030 target.

Human Health

10.63 Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed Development is likely to be ***temporary*** and ***imperceptible*** with respect to human health.

Operational Phase

Air Quality & Climate

10.64 Operational phase impacts associated with the proposed development are not predicted as the cables will be buried underground once constructed with no emissions to atmosphere.

Cumulative impacts

Construction phase

10.65 According to the IAQM guidance (2014), there is the potential for cumulative dust impacts to any nearby sensitive receptors should the construction phase of the proposed development coincide with the construction phase of other permitted developments within 350m of the site. There is the potential for cumulative construction dust impacts associated with construction works associated with the permitted data centre (SDCC Reg. Ref. SD18A/0298) on the wider site should these works coincide with the construction of the proposed development.

10.66 There is a low risk of dust soiling impacts and a negligible risk of human health impacts associated with the proposed development. The dust mitigation measures outlined in this chapter will be applied during the construction phase which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development and the permitted developments on the site and / or simultaneous construction of any other developments within 350m of the site are deemed ***temporary*** and ***imperceptible***.

10.67 Due to the relatively small scale of the proposed development and the temporary construction stage significant cumulative impacts to climate are not predicted.

10.68 With appropriate mitigation measures in place, the predicted cumulative impacts on air quality and climate associated with the construction phase of the proposed development are deemed short-term and imperceptible.

Operational phase

10.69 Operational phase direct impacts on air quality associated with the proposed development are not predicted as there are no emissions to atmosphere associated with the cables once constructed as they will be buried underground.

10.70 The proposed development was considered within the cumulative air dispersion modelling assessment for the permitted data centre development. The results indicated emissions of NO_2 associated with the back-up diesel generators are not significant and are predicted to be in compliance with the ambient air quality standards.

10.71 In relation to climate, there will be no direct operational CO_2 emissions as electricity will be sourced from the national grid. The indirect CO_2 emissions associated with the electricity to operate the data storage facility development (SDCC Reg. Ref. SD18A/0298) were determined within the EIAR for the development and were found to be insignificant in relation to climate.

10.72 As the data centre development is over 20 MW, a greenhouse gas emission permit will be required for the facility which will be regulated under the EU-wide Emission Trading Scheme (ETS). Electricity providers form part of the ETS and thus greenhouse gas emissions from these electricity generators

are not included when determining compliance with the targeted 30% reduction in the non-ETS sector i.e. electricity associated greenhouse gas emissions will not count towards the Effort Sharing Decision target. Thus, any necessary increase in electricity generation due to data centre demand will have no impact on Ireland's obligation to meet the EU Effort Sharing Decision. On an EU-wide basis, where the ETS market in 2018 is approximately 1,655 million tonnes CO_2eq, the impact of the emissions associated with the permitted data centre development will be less than 0.01% of the total EU-wide ETS market which is imperceptible.

10.73 Overall, the impact to air quality and climate as a result of the proposed cumulative development will be ***negative***, ***long-term*** and ***imperceptible***.

Monitoring

10.74 Monitoring is not proposed for the construction phase of the proposed development as impacts are predicted to be imperceptible. There is a low to negligible risk of dust soiling and human health impacts as a result of the construction phase. Once the dust mitigation measures outlined in the mitigation section are implemented construction dust emissions will be imperceptible.

10.75 There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are not predicted.

11. LANDSCAPE AND VISUAL IMPACT

11.1 This Landscape and Visual Assessment (LVIA) has been prepared by Kevin Fitzpatrick Landscape Architecture Ltd. The purpose of this assessment was to analyse the existing landscape and to assess the likely potential visual impacts arising from the Proposed Development on the existing landscape and any mitigation measures proposed. The LVIA is part of the Environmental Impact Assessment Report (EIA Report) that will accompany the application for permission.

11.2 The criteria as set out in the current EPA Guidelines on Information to be contained in Environmental Impact Assessment Reports (2017, Draft) are used in the assessment of the likely impacts. The criteria for rating the significance of impacts are as defined in table 11.1 below:

Table 11.1 Criteria for significance of effects under EPA Guidelines

EPA Rating	
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment 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 the existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

11.3 The ratings may have negative, neutral or positive application where:

- Positive impact - a change which improves the quality of the environment.
- Neutral impact – No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
- Negative impact - a change which reduces the quality of the environment.

11.4 Terms relating to the duration of impacts are as described in the EPA Guidelines as:

- 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 fifteen years;
- Long-term Effects - lasting fifteen to sixty years; and
- Permanent Effects - lasting over sixty years.

11.5 The significance of impacts on the perceived landscape will depend partly on the number of people affected, but also on judgments about how much the changes will matter and in relation to other senses i.e. sound, feeling, etc., experienced by those concerned.

Methodology

11.6 The assessment was carried out by analysis of the proposals through plans, aerial photographs, landscape survey and plan by 'Austen Associates Ltd.', historic maps and by reference to the 'South County Dublin Development Plan 2016-2020' and the 'Landscape Character Assessment of South Dublin County (June 2016 Updated)'

11.7 This chapter has been prepared having regard to the following guidelines:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017); and
- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (Landscape Inst. + IEMA 2013).

11.8 A study of the environmental impact on the biodiversity of the site will be covered in Chapter 6 of the EIA Report.

Receiving environment

11.9 The Proposed Development site is primarily situated within the western edge of the Grange Castle Business Park and the north-eastern part of the Edgeconnex campus. The Proposed Development is located between the Grand Canal towpath and various industrial developments to the south, some which are built and some which are under construction. Developments to the immediate south of the site boundary include Takeda Ireland Ltd.; EdgeConnex Data Centres and infrastructural developments including a pump station and cable compound. To the immediate north of the site boundary is an existing green buffer between the industrial lands of Grange Castle Business Park and the Grand Canal as well as a farmhouse and associated buildings. This area is characterised by existing fields with traditional hedgerow boundaries, newly designed native woodland, wetland and meadow associated with adjacent developments, and landscape features installed as part of the original Grange Castle Business Park landscape scheme, predominantly large parkland and woodland trees.

11.10 Due to the nature of the proposed development, the site boundary is irregular in shape, stretching approximately 559m-574m in distance from the permitted and under construction Coolderrig Substation within the north-east part of the Edgeconnex campus to a location to the immediate north of the main tree lined avenue through Grange Castle Business Park, and to the south of the Grange 110kV substation. For a detailed description of the proposed 110kV transmission route, refer to Chapter 2 of this EIA Report.

11.11 The land use of the subject lands can be described on a high level as industrial as it is located within Grange Castle Business Park which is characterised by large industrial built developments. Parts of the lands were landscaped as part of the original construction of Grange Castle Business Park and would be considered as intermediate green buffers and green infrastructure links.

11.12 In the wider landscape the site is within in a generally flat area. The site is located between three landscape typologies. North of the site, and to the north of the Grand Canal, development is predominantly residential, typified by areas such as Adamstown, Grange Manor and Lucan. To the south and east of the site (to west of R136) is an area that has been developed both industrially and commercially at quite an intensive level in recent years. This landscape is characterised by very large built developments and new tree lined roads, with many developments being under construction at present. Another contrasting landscape typology can be identified to the west of the site and R120, where the landscape is characterised by traditional hedgerow boundaries associated with agricultural land which are typical of the local area. Here, both medium-large sized field patterns can be found. A rural and scattered residential distribution can be found here along with farm structures associated with farmland in the area. In summary, the landscape in its entirety could be described as a transitional landscape, where traditional land uses are being transformed to accommodate new development.

11.13 A landscape survey has been undertaken by Austen Associated Ltd. which forms part of this application. All of the existing vegetation within the Proposed Development site is located in the eastern half of the site. Vegetation includes some water tolerant trees along the existing river bank, that include Alder, Birch and Willow. There is also a belt of tree planting to the north of the river which is characterised by semi-mature parkland and woodland tree species such as Ash, Birch, Horse Chestnut, Maple, Rowan and so on. Some block planting of Dogwood can also be found between the river and the main avenue within the Business Park. (Please refer to Austen Associates Ltd. drawings and documentation for further details)

Characteristics of the Proposed Development site

11.14 The character of the site and its environs has largely been determined by the following:

- the flat topography of the subject site and its surrounding environs;
- the number of large-scale industrial buildings in the local area;
- local roads and tree-lined avenues/internal roads in the business park; and
- Landscape features installed as part of the original Grange Castle Business Park Development.

11.15 The Proposed Development site has the character of a business park with grass verged, hedged, wooded and tree lined roads. The wider surrounding environment with its contrast of new built structures and historic field patterns would be considered a 'transitional landscape'.

11.16 From a study and analysis of various historical map series; OSI 6-inch maps (1837-42) and OSI 25-inch maps (1888-1913), conclusions can be drawn on the landscape history of the local lands. The main features in the local area that can be traced back by the historic maps are the Grand Canal, the original and now realigned Adamstown Road (now the R120) and some of the local hedgerow boundaries, some of which remain unchanged. Many of the historic hedgerow boundaries have been removed due to the extent of development in the local area in recent years. There are no historic features of note which relate specifically to the Proposed Development site.

11.17 The landscape of the subject lands has no inherent aesthetic qualities of note.

Landscape planning

11.18 Within the South Dublin County Development Plan 2016-2022 there are no specific landscape objectives that apply to the subject lands. There are a number of objectives that apply to the general environs of the site.

<u>Green infrastructure objectives</u>

- G2 Objective 1 states: *'To reduce fragmentation of the Green Infrastructure network and strengthen ecological links between urban areas, Natura 2000 sites, proposed Natural Heritage Areas, parks and open spaces and the wider regional Green Infrastructure network.'*
- G2 Objective 2 states: *'To protect and enhance the biodiversity value and ecological function of the Green Infrastructure network.'*
- G2 Objective 6 states: *'To protect and enhance the County's hedgerow network, in particular hedgerows that form townland, parish and barony boundaries, and increase hedgerow coverage using locally native species.'*
- G2 Objective 9 states: *'To preserve, protect and augment trees, groups of trees, woodlands and hedgerows within the County by increasing tree canopy coverage using locally native species and by incorporating them within design proposals and supporting their integration into the Green Infrastructure network.'*
- G3 Objective 3 states: *'To ensure the protection, improvement or restoration of riverine floodplains and to promote strategic measures to accommodate flooding at appropriate locations, to protect ground and surface water quality and build resilience to climate change.'*

<u>Heritage Conservation & Landscape Objectives</u>

- HCL15 Objective 3 states: *'To protect existing trees, hedgerows, and woodlands which are of amenity or biodiversity value and/ or contribute to landscape character and ensure that proper provision is made for their protection and management in accordance with Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020.'*

11.19 There are no protected trees or tree groups within the subject lands listed in the South Dublin County Development Plan 2016-2022.

11.20 There are no views or prospects that include the subject lands listed in the South Dublin County Development Plan 2016-2022.

11.21 In the Landscape Character Assessment of South Dublin County (June 2016 updated), the subject lands are designated as being in the '*Newcastle Lowlands Character Area'*. This area is listed as having a medium landscape sensitivity, due to the vulnerability of the agricultural landscape to urban pressures. The subject lands are located in the east of the area within the border area between the Urban Fringe character type and the Limestone Farmland Character type.

Existing Views and Visibility

11.22 The only visible elements of any relevance on the subject lands are the existing trees, shrubs and riverside vegetation in the eastern half of the site which are visible from the Grange Castle Business Park access road and the roundabout and internal road beside Takeda Ireland Ltd.. All other views of the subject lands are short-ranged and localised, characterised by a lack of vertical features and comprising of only internal roads, footpaths, verges, etc.

Characteristics of the Proposed Development

11.23 The details of the Proposed Development are fully detailed in Chapter 2 of this EIA Report. The Proposed Development involves the following works that have the potential to impact on the landscape. The characteristics listed below are in accordance with the proposed plans outlined as part of the drawings submitted as part of the planning application and can be summarised as:

- two no. underground single circuit 110kV transmission lines from the permitted and under construction Coolderrig 110kV GIS substation compound to the existing Grange Castle-Kilmahud Circuits to the east. The proposed transmission lines exact route will pass along and under the internal road infrastructure within the Edgeconnex campus and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the proposed joint bays where it will connect into the Grange Castle-Kilmahud Circuits.
- reinstatement of a number of semi-mature parkland and woodland trees which need removal to accommodate the underground cables.
- all associated construction and ancillary works.

Potential Impacts of the Proposed Development

Construction phase

11.24 The change of use of the site from its current state to that of a construction site has the potential to result in the following impacts:

- Visual impacts due to the introduction of trenching, stockpiling, temporary structures, machinery, materials storage, associated earthworks, car parking, lighting and hoarding; and
- Visual impacts due to removal of existing trees and vegetation.

Operational phase

11.25 The proposed works as described in the 'Characteristics of the Proposed Development' has the potential to result in the following impacts:

- Visual impacts due to the removal, and subsequent reinstatement, of existing parkland and woodland trees, shrubs, riverside vegetation and grass verges.

Remedial and mitigation measures

11.26 The landscape proposals for this development have been produced by Austen Associates Ltd.. The mitigation of potential negative landscape and visual impacts has influenced the design and layout of the scheme from the start of the design process. As a result of this, the following landscape design mitigation measures have been proposed.

Construction phase

11.27 The retention of a number of existing trees protected by appropriate tree protection fencing. It is also proposed to reinstate existing parkland and woodland trees, shrubs, riverside vegetation which has to

be removed to accommodate the cable lines. As construction works of the alignment progress it is also proposed to reinstate grass verges, green buffers and roadways which are disturbed due to construction works.

Operational phase

11.28 There are no mitigation measures associated with the proposed operational phase. However, the maturing of the reinstatement planting of semi-mature parkland and woodland trees, shrub planting and re-seeding of any disturbed ground with amenity grass lawn will aid the visual integration of the proposed alignment into the Business Park.

Predicted impacts of the Proposed Development

Construction phase

Impact on landscape character

11.29 The construction of the underground transmission lines will require trenching and stockpiling of material along its route. The temporary works required to install the cables would be similar to works that have been undertaken in this area recently. The initial construction operations associated with this will give rise to temporary impacts on the landscape character, through the introduction of new temporary structures, machinery, ancillary works etc., along with the removal of any existing vegetation, grassland or scrub.

11.30 The construction compounds, temporary car parking and storage facilities etc. will be located sensitively to avoid any local visual sensitivities. Furthermore, the Proposed Development site is located within the existing Edgeconnex campus and the Grange Castle Business Park that includes a number of recent built developments, including a large amount of similar scale cabling work, sub-stations, data centres and a range of other industrial scale developments in close proximity to the subject lands.

11.31 The Proposed Development will require a number of semi-mature parkland and woodland trees to the north of the Griffeen River and the main internal Business Park access road to be removed. Trees to be removed include Ash, Birch, Horse Chestnut, Maple, Rowan etc.. (Please refer to Austen Associates Ltd. drawings and documentation for further details)

11.32 With the above considered the predicted impact on the landscape character during construction would be ***negative*** and considered ***slight*** in magnitude and ***temporary*** in its duration.

Visual impacts

11.33 The construction process will only be visible on the existing road infrastructure in very close proximity to and on the subject lands. Visibility from the surrounding landscape will be limited by the existing built developments within Grange Castle Business Park. Views from the Grand Canal towpath will be blocked by vegetation along the canal. The removal of semi-mature trees and other vegetation in the eastern half of the site will be visible from the main access road within the Grange Castle Business Park.

11.34 The construction of the underground transmission lines will require trenching and stockpiling of material along its route. The temporary works required to install the cables would be similar to works that have recently been undertaken in this area. The initial construction operations associated with this will give rise to temporary visual impacts, through the introduction of new temporary structures, machinery, ancillary works etc., along with the removal of any existing vegetation or grass verges.

11.35 With the above considered the visual impacts during construction would be ***negative*** and considered ***slight*** in magnitude and ***temporary*** in duration.

Operational phase

Impact on Landscape Character

11.36 The operational phase will not give rise to any noticeable change in the landscape character. The cables will be underground and will therefore cause no impact on landscape character.

11.37 The Proposed Development will include the removal of a large number of semi-mature parkland and woodland trees within the eastern half of the site. The landscape proposals as part of the proposed development include the reinstatement of a large number of trees which will be planted as semi-mature specimens at heights of 5-6m on day 1 of operations. Any shrub planting which is removed will also be compensated through the planting of the same or similar species and any roadside verges or green buffers where ground is disturbed by construction works will be re-seeded appropriately with amenity grass. The retention of a number of existing trees in this area will also retain some of the original landscape character.

11.38 The overall impact on the landscape character would therefore be considered ***neutral***, ***long-term*** and ***not significant*** due to the lack of above ground physical features associated with the cabling works and due to the proposed planting scheme which, as it matures, will compensate for the removal of the existing business park planting.

Visual Impacts

11.39 Visibility of the proposal once in operation from the surrounding landscape will be limited by the existing built developments within Grange Castle Business Park and Edgeconnex campus. Views from the Grand Canal towpath will be generally blocked by vegetation along the canal. The proposed planting scheme is the only feature of the proposed development which will be visible during this phase, and only from very specific locations, notably along the main Grange Castle Business Park access road and the roundabout and minor internal road beside Takeda Ireland Ltd., bus stop and access to the Edgeconnex campus.

11.40 The overall visual impact of the proposed development would therefore be considered ***neutral***, ***short-term*** and ***not significant*** due to the lack of above ground physical features associated with the development and due to the proposed planting scheme which, once matured, will compensate for the removal of the original vegetation.

Impact on landscape planning

11.41 The Green Infrastructure objectives that apply to the Proposed Development site and its environs, are mostly general objectives aimed at the protection of the existing green infrastructure network and strengthening ecological links in the wider landscape. The proposed landscape treatment will reinstate any vegetation that is required to be removed to accommodate the development, with an emphasis on installing semi-mature trees which will have a rapid impact both visually and ecologically. Some of the existing trees will be retained and enhanced. These reinstatement works will restore any ecological function that the original landscape scheme had and integrate it into the wider green infrastructure system within the business park and local area.

Do nothing scenario

11.42 In the event of this scenario the lands would continue to be left as they are currently. The internal roads would continue to function and the roadside verges and associated tree planting would continue to mature.

Monitoring

11.43 Contracts will ensure good working practices to reduce any negative impacts arising from construction to the lowest possible level and to ensure that all machinery operates within clearly defined construction areas. Storage areas will be located to avoid impacting on sensitive views, trees, hedgerows, drainage patterns etc. and such areas will be fully re-instated prior to, and at the end of the construction contract. The works will also have continuous monitoring to ensure adequate protection of areas outside of the construction works.

Cumulative impacts

11.44 Cumulative effects were considered with regard to the Proposed and already permitted developments within the Edgeconnex campus to the west and wider Grange Castle area. The Proposed Development will not extend the overall duration of construction activity within the area as it will be undertaken at the same time as the construction phases of the Edgeconnex development as well as other development.

11.45 Construction activity will move as different developments are completed in advance of others commencing. Cumulative effects will also intensify the change in character of the landscape from greenfield land to high-tech developments. Cumulative landscape and visual impacts for the construction phase will be ***significant/moderate*** and ***negative*** as the existing land use changes to that anticipated by the land use zoning and permissions that have been granted upon it. However, these impacts will reduce to ***moderate*** and ***neutral*** as developments are completed and landscape mitigation measures establish.

11.46 The landscape plan of the permitted Edgeconnex development will create significant belts of native woodland linking the existing hedgerows and trees into a much larger ecological habitat, including a native wetland to the west of the site. Similar treatment has been permitted, including a wetland area associated with the UBC Properties Development.

11.47 Cumulative effects during operation will gradually intensify the high-tech character of the development area and will introduce additional structures that will become visible to a greater or lesser extent depending on their location and the location of the viewer. Cumulative landscape and visual effects for the operational phase are likely to be perceived initially as significant/moderate and negative as the existing land use changes to that anticipated by the land use zoning and permissions. However, these will reduce to moderate and neutral as developments are completed and landscape mitigation measures establish.

11.48 The overall impact on the landscape character would therefore be considered ***neutral***, ***long-term*** and ***not significant*** due to the lack of above ground physical features associated with the cabling works and due to the proposed planting scheme within the Edgeconnex site and to the north of the Griffeen River, which, as it matures, will compensate for the removal of the existing business park planting.

12. TRAFFIC AND TRANSPORTION

12.1 This chapter of the EIA Report assesses the likely effects of the proposed development in terms of vehicular, pedestrian and cycle access during the construction and operational phases of the proposed development. This Chapter of the EIAR has been prepared by Ronan Kearns of Pinnacle Engineering (see chapter 1 for full qualificiations and experience)

12.2 The chapter describes: the methodology; the receiving environment at the application site and surroundings; the characteristics of the proposal in terms of physical infrastructure; the potential impact that proposals of this kind would be likely to produce; the predicted impact of the proposal examining the effects of the proposed development on the local road network; and the remedial or reductive measures required to prevent, reduce or offset any significant adverse effects.

Methodology

12.3 The approach to this assessment accords with policy and guidance both at a national and local level. Accordingly, the adopted methodology responds to best practices, current and emerging guidance, exemplified by a series of publications, all of which advocate this method of analysis. The following methodology has been adopted for this assessment:

- Environmental Protection Agency (EPA) Guidelines on the information to be contained in the EIAR;
- Transport Infrastructure Ireland (TII) (Formerly National Roads Authority) Traffic and Transportation Assessment Guidelines.
- 'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003);
- 'Guidelines for Traffic Impact Assessments' The Institution of Highways and Transportation;
- The Traffic Management Guidelines;
- Design Manual for Urban Road and Streets;
- South Dublin County Development Plan 2016 - 2022;
- GDA Cycle Network Plan - National Transport Authority;
- Review of relevant available information including where available Development Plans, existing traffic information and other relevant studies;
- Site visit to gain an understanding of the site access and observe the existing traffic situation;
- Detailed estimation of the transport demand that will be generated by the development. The morning and evening peak times will be addressed as well as an estimation of the construction stage traffic; and
- Assessment of the percentage impact of traffic on local junctions, car parking requirements and accessibility of the site by sustainable modes including walking, cycling and public transport.

Receiving environment

12.4 This section considers the baseline conditions, providing background information for the site in order to determine the significance of any traffic implications. This section also considers the existing accessibility of the site by sustainable modes of transport.

Site location

12.5 The application site is located within South Dublin County Council approximately 12km west of Dublin City Centre, and around 4km west of Clondalkin Village, immediately south of the Grand Canal. The site is within and to the immediate west of the Grange Castle Business Park and is bounded to the north by planting and the Grand Canal; Grange Castle Business Park to the south, east and west. The Proposed Development site covers an area of 1.49hectares. (Please refer to Chapter 2 for a detailed description of the Proposed Development site in context

Local road network

12.6 The main entrance into the Grange Castle Business Park is from a roundabout junction on the R136 some 930m to the east of the eastern part of the Proposed Development site. Access to the business park from this junction consists of a wide dual carriageway road, with a 1.5m cycle track and 1.5m footpath set back from the carriageway on either side. The business park is also accessed via a 9m

wide single carriageway road which forms a roundabout junction with the R134 Nangor Road. The roads and services of the business park were constructed in the late 1990's.

12.7 The R136 forms a grade separated junction with the N4 approximately 3km north of its roundabout junction with Grange Castle Business Park, as well as the N7 approximately 3km to the south. The site is also well served by the R120 and R134 regional roads, forming the primary routes from Grange Castle to Adamstown and Clondalkin respectively.

12.8 The M50 is located approximately 5km to the east of the site, and forms an orbital motorway ring road around Dublin. The M50 is intersected by the principal radial routes, including the N4 at Junction 7, and the N7 at Junction 9, also known as the Red Cow Interchange. It is concluded that the site is strategically situated to facilitate trips by vehicle, with road infrastructure in place and built to a high standard.

Baseline traffic data

12.9 Given the ongoing Covid 19 Pandemic, it has not been possible to collect representative traffic flow data. Accordingly, an assessment of the roads network performances is done by way of historic sources of traffic data which include nearby relevant planning applications accompanied with traffic and transport assessments.

12.10 A planning search was undertaken for recent applications that would include baseline traffic data for the site. South Dublin County Reg. Ref. SD18A/0323, construction of a two storey data centre on behalf of Interxion Ireland DAC, includes traffic data at a site located c. 200m east from the eastern end of the proposed development, and accessed off the same internal business park road that abounds the eastern of the site. The EIA Report for that application included an assessment of local planning applications and traffic surveys. The resultant data analysis has been taken from the Traffic Chapter of the relevant EIA Report.

12.11 A summary of the survey results is presented below in Table 12.1 for the R136 roundabout and Table 12.2 for the R134 roundabout. On site observations indicate that both junctions are working well within capacity with minimal queuing and delay.

Table 12.1 Existing traffic flows at R136 / Grange Castle Business Park roundabout

	Total Junction Flow (PCUs)
AM Peak Hour (08:00 - 09:00)	4216
PM Peak Hour (17:00 - 18:00)	4914

Table 12.2 Existing traffic flows at R134 Nangor Road / Grange Castle Business Park roundabout

	Total Junction Flow (PCUs)
AM Peak Hour (08:00 - 09:00)	4508
PM Peak Hour (17:00 - 18:00)	4122

Pedestrian and cycling facilities

12.12 Footway and cycleways are available on all internal roads within Grange Castle Business Park, including on the road which is to be used for access to the site during both the construction and operational phases of the Proposed Development. These routes are approximately 1.5m wide for pedestrians and 1.5m wide for cyclists, separated from the road by a verge of around 2m.

12.13 Segregated cycle and pedestrian routes are also available on the R136 Outer Ring Road. East of the R136/R134 junction, cyclists are permitted to use the bus lane on New Nangor Road, towards Clondalkin and Dublin city centre. The realignment of the Nangor and Newcastle/Lucan Road includes the provision of new footpaths and cycle tracks in both directions. Existing cycle routes identified by the National Transport Authority (NTA) in the vicinity of Grange Castle Business Park are indicated in Figure 12.1 below.

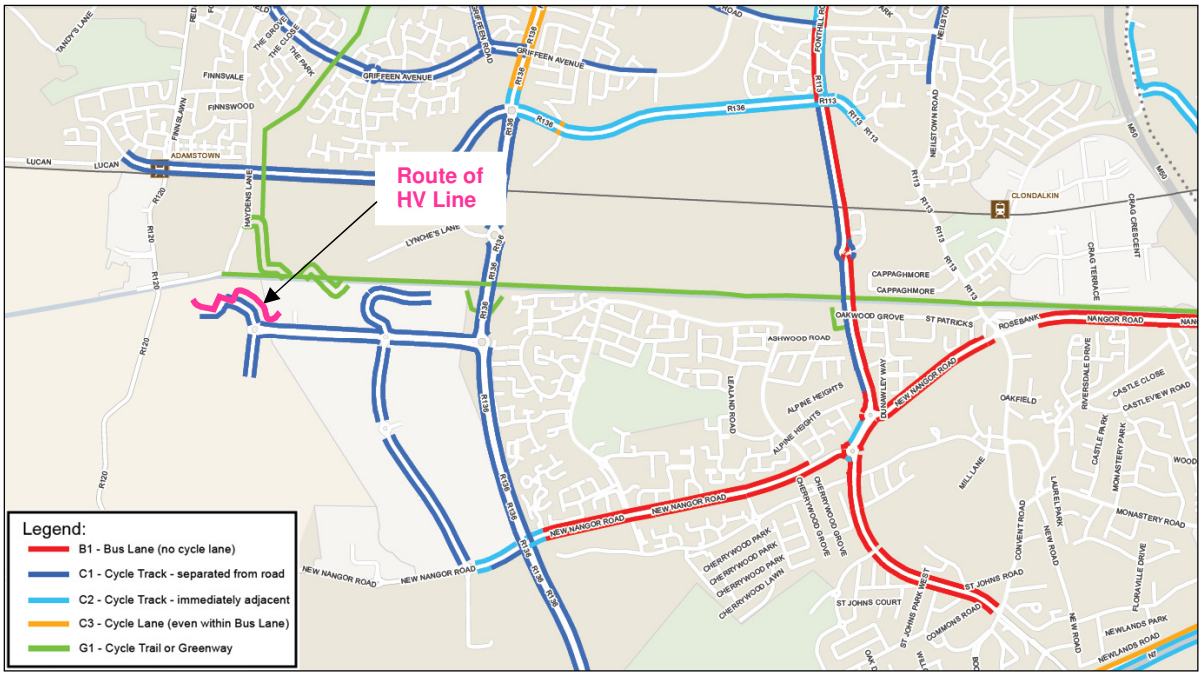

Figure 12.1 Existing cycle routes (Source: NTA)

12.14 The Grand Canal Greenway runs from east to west immediately north of the site. This pedestrian and cycle route provides an 8.5km off-road route from 12th Lock, Newcastle Road to Davitt Road, Inchicore. The route also links north to Adamstown and Lucan, via a walking and cycling bridge over the Grand Canal. The route can be accessed from the R136, approximately 900m from the site.

Proposed cycle improvements

12.15 Under the National Transport Authority's Cycle Network Plan for the Greater Dublin Area, the Dublin South West Sector extends outward from the twin corridors of Camden Street and Clanbrassil Street in the city centre, through the inner suburbs of Rathmines and Harold's Cross, to serve the areas of Terenure, Kimmage, Walkinstown, Tallaght, Firhouse and Rathfarnham. There is considerable overlap between the West and South West sectors, with interconnecting routes between the two. Some radial cycle routes originate in one sector at the city centre but end up in the neighbouring sector

12.16 In accordance with the National Transport Authority's Cycle Network Plan for the Greater Dublin area the following improvements to the local cycle networks are proposed:

- Route 7C: Camac River Greenway branch from the Grand Canal through Clondalkin Village to Corkagh Park and City West;
- Route 8A follows Crumlin Road past the Children's Hospital, Bunting Road to Walkinstown, through Ballymount to cross the M50 at Junction 10 and out to Citywest / Fortunestown via Belgard;
- Route 9C is an alternative to the Harold's Cross route from Route 8C at Clogher Road via Stannaway Road west of Kimmage and then along Wellington Lane to join Route 9A at Spawell to connect to Tallaght. It also provides a continuation from Route 9A west of Tallaght via Fortunestown and Citywest to Saggart;
- Route 9D would provide a traffic-free option branching off Route 9A at Kimmage Cross Roads and following the River Poddle Greenway to Tymon Park where a new bridge is required over the M50 in the centre of the park to connect with Castletymon Road and rejoin Route 9A. West of Tallaght it provides a loop through Jobstown along the N81 and then northward into Citywest;
- The Dublin South West Sector extends outward from the twin corridors of Camden Street and Clanbrassil Street in the city centre, through the inner suburbs of Rathmines and Harold's Cross, to serve the areas of Terenure, Kimmage, Walkinstown, Tallaght, Firhouse and Rathfarnham. There is considerable overlap between the West and South West sectors, with interconnecting routes between the two. Some radial cycle routes originate in one sector at the city centre but end up in the neighbouring sector.

- Orbital Route SO6 (Dun Laoghaire to Tallaght via Ballycullen and Old Bawn) is part of the Orbital Routes in the Dublin South West Central Sector. There are six orbital routes proposed under the National Transport Authority's Cycle Network Plan for the Greater Dublin area in the Dublin West South Central Sector providing cross-links between the radial routes and give access to destinations such as Camden Street and Clanbrassil Street in the city centre, through the inner suburbs of Rathmines and Harold's Cross, to serve the areas of Terenure, Kimmage, Walkinstown, Tallaght, Firhouse and Rathfarnham within this sector.

12.17 The proposed cycle routes iin the context of the Proposed Development site are illustrated in Figure 12.2 below.

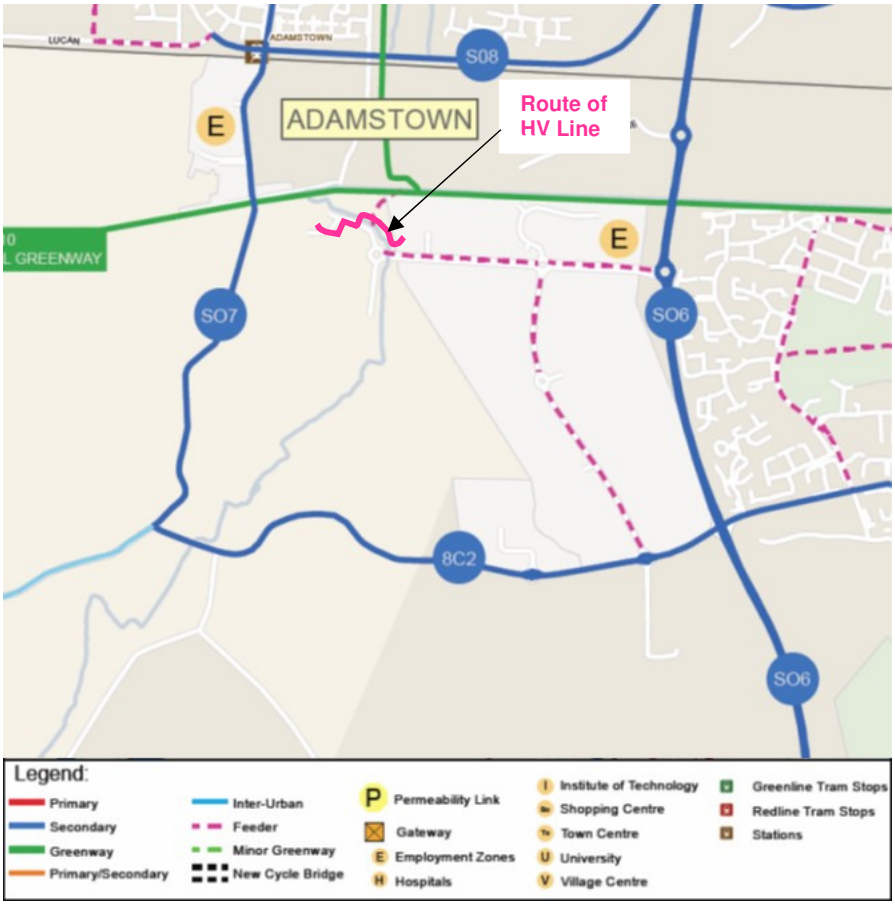

Figure 12.2 Proposed cycle routes (Source: NTA)

Public transport accessibility

12.18 The bus stops within the Grange Castle Business Park, such as those serving the no. 13 and 151 buses also have the ability to serve the site and contain stops of between 100m and 800m of the site. The following table illustrates that there are regular services on all days which route to the existing bus stops on routes 13 and 151. Table 12.3 illustrates local bus routes.

Table 12.3 Local Bus Route

No.	Route	Service		Mon-Fri	Sat	Sun
13	Harristown – Dublin City Centre – Clondalkin Village – Grange Castle	Harristown	First	05:30	06:05	08:00
			Last	23:15	23:15	23:30
		Grange Castle	First	06:00	06:00	08:00
			Last	23:30	23:30	23:30
		Frequency		15min	15min	15min
151	Docklands – Dublin City Centre – Clondalkin – Grange Castle Business Park – Lucan	Docklands	First	06:30	07:10	08:30
			Last	23:20	23:20	23:20
		Grange Castle	First	06:00	06:30	07:30
			Last	23:30	23:30	23:30
		Frequency		20min	20min	30min

12.19 Dedicated bus lanes are provided in both directions on the R136 Outer Ring Road and the R134 Nangor Road east of the Grange Castle Business Park roundabout. These routes are part of Dublin's Quality Bus Corridor (QBC) network.

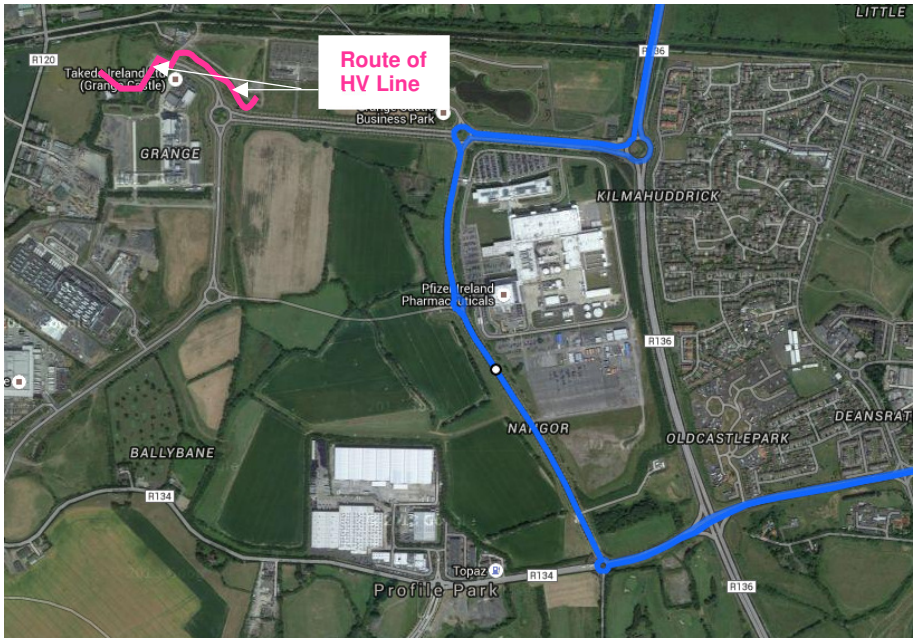

Figure 12.3 No. 151 Service (Source: Google Earth)

12.20 Dedicated bus lanes are provided in both directions on the R136 Outer Ring Road and the R134 Nangor Road east of the Grange Castle Business Park roundabout. These routes are part of Dublin's Quality Bus Corridor (QBC) network.

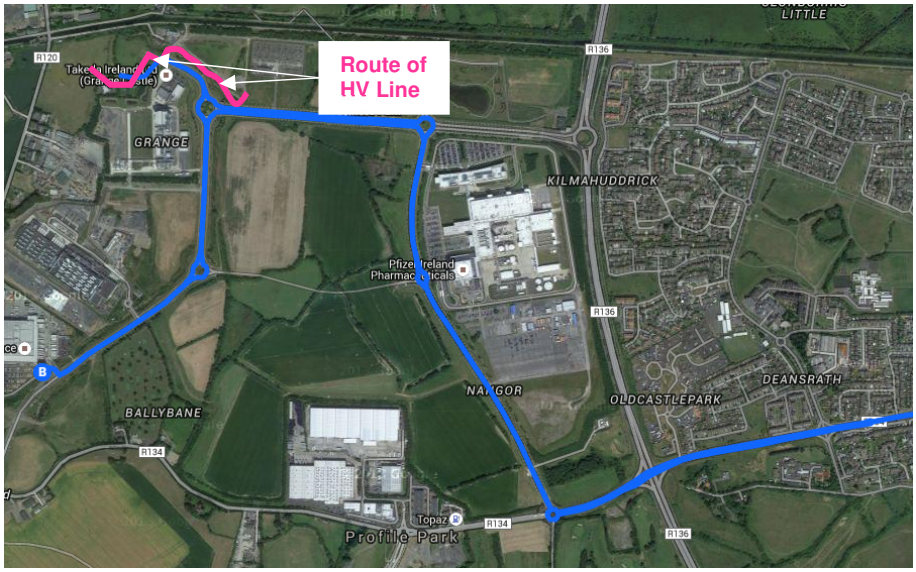

Figure 12.4 No. 13 Service (Source: Google Earth)

Rail

12.21 The nearest railway line runs east-west approximately 600m north of the site. Intercity services to Cork and Limerick run on this line, as well as commuter railway services to Portlaoise and other commuter stations. The nearest stations are Adamstown, approximately 2km to the north-west of the site and Clondalkin-Fonthill approximately 6km to the east of the site. These stations are served by around 20 suburban commuter trains in each direction during weekdays.

12.22 A new railway station has been constructed at Kishogue, approximately 1km north east of the site. However, although Kishogue Station was completed in 2009 it is not operational, and additional infrastructure is required at the station.

Characteristics of the Proposed Development

12.23 A full description of the Proposed Development is provided within Chapter 2 of this EIA Report. The proposed development primarily comprises the provision of two no. 110kV transmission lines along with associated and ancillary works. The two no. 110kV transmission lines will be connect into the permitted Coolderrig 110kV Gas Insulated Switchgear (GIS) substation and the MV switch room compound that was granted permission under SDCC Reg. Ref. SD18A/0298 to the west; and the Grange Castle – Kilmahud Circuits to the east.

12.24 It is not expected that the development will generate any trips during the AM and PM peak on a regular basis. The two no. 110kV transmission lines may require periodic maintenance which will have limited, if any, impact on the local road network.

Potential impacts of the Proposed Development

Construction phase

12.25 The impact of the construction works will be temporary in nature. The number of staff on site will fluctuate over the implementation of the proposed works. The construction phase of the project is expected to last 2 months.

12.26 At the peak of construction, it is anticipated that there will be a requirement for approximately c.10 construction workers arriving and departing the site per day. This will vary over the lifetime of the project.

12.27 Where possible, construction workers will use shared transport. On-site employees will generally arrive before 07:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 16:00. A number of the construction traffic movements will be undertaken by heavy goods vehicles.

12.28 A trench will be excavated along each of the 110kV lines. Excavated soil will be stockpiled, where possible, onsite to be reused later when reinstating the trench. The site is not expected to generate any excess cut or the required for additional fill to be imported onto the site. Some material will be required to be removed off-site, particularly where the transmission lines are proposed to be placed under existing roads.

12.29 The 110kV transmission line will pass outside of the site and along and under the internal road infrastructure within the Edgeconnex site and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Kilmahud Circuit. This will involve opening up of c. 250m of road. The rest of the alignment will require opening up grassland. It is estimated that c. 1,213cum of waste will be generated by the proposed development. Where possible this cut material will be reused on site to reduce the need to export it off site.

12.30 Therefore, over the lifetime of the proposed development there will be maximum of 40 trips related to the removal of waste. This will be spread out over the construction period averaging out at 2 trips (4 two way trips in total) over a 4 week period allocated in the overall 2-month construction period. In additional to the waste from the transmission lines, it is expected that the development will generate construction waste also. For the purpose of this assessment, it is assumed that there will be 1 trip per day (2 two-way trips in total) per day.

12.31 Whilst it is not possible at this stage to accurately identify the day-to-day traffic movements associated with the removal of waste, based on experience of similar sites it is considered that the number of construction related heavy goods vehicle movements to and from the Proposed Development site will be on average 3 arrivals/departures per day over a 2 month construction period.

12.32 This assumes that all materials excavated will not be able to be reused and represents the worse-case scenario. Where materials can be recycled or reused it is expected that the final number of trips associated with the removal of demolition and construction waste will be less.

12.33 Materials such as cable, ducting and road construction materials required in the construction of the proposed development are likely to be sourced from manufacturers that are not situated within the immediate vicinity of the proposed development. Accordingly, a temporary construction material storage yard will be the source destination from which construction traffic, particularly for steel deliveries, will be generated. This is proposed to be located within the north-east corner of the site.

12.34 Vehicles will access the public road network to/from the construction site using the internal business park road network and the R136, N4, N7/M7 and M50. Return trips will be via the same route. The construction traffic impacts of the proposed development are dependent on the capacity of the local road network to facilitate access to the development by HGV's and heavy construction machinery associated with the construction phase. The ability to accommodate temporary parking for contractors and storage of materials on site is another key consideration.

12.35 A road marshal will be appointed who will be responsible to ensure that there is no disruption to traffic or pedestrians and that roadways and paths are kept clean and free of debris. The potential impact during the construction phase with all the above considered would have a temporary effect on the surrounding road network. Arrivals and departures to the site compound are to be carried out in as few vehicle movements as possible in order to minimise potential impacts on the road network.

Operational phase

Traffic capacity

12.36 The existing background traffic flows and predicted operational phase vehicular trip generation have been set out in earlier sections of this chapter. Table 12.4 below indicates the percentage impact of the additional traffic at the R136 / Grange Castle Business Park roundabout junction.

Table 12.4 Percentage impact of development traffic at R136/Grange Castle Business Park roundabout

	Development Traffic	Baseline Traffic	Percentage increase
AM Peak Hour (08:00 - 09:00)	0	4216	0%
PM Peak Hour (17:00 - 18:00)	0	4914	0%

12.37 The table above indicates that the proposed development would have no impact on the operation o the R136 roundabout in each of the peak hours. The percentage impact results for the R134 Nangor Road roundabout junction are shown in Table 12.5 below.

Table 12.5 Percentage Impact of development Traffic at R134 Nangor Road Roundabout

	Development Traffic	Baseline Traffic	Percentage increase
AM Peak Hour (08:00 - 09:00)	0	4508	0%
PM Peak Hour (17:00 - 18:00)	0	4122	0%

12.38 The development will have no operational impact on the local road networks.

12.39 As a result of the above, it is concluded that the proposed development will have no impact on junctions in the vicinity of the site. As a result, it is not considered necessary to undertake any further junction assessment.

Car parking provision

12.40 Parking will be provided within the permitted Coolderrig 110kV Gas Insulated Switchgear (GIS) substation and the MV switch room compound to facilitate maintenance access. Temporary parking will be provided within the site compound for construction workers.

Walking, cycling and public transport

12.41 As set out earlier, the proposed development will provide suitable infrastructure to ensure the site is accessible by sustainable modes including walking and cycling. Additionally, the existing provision of public transport services at Grange Castle Business Park is sufficient to make this mode a viable alternative for construction workers.

12.42 During the operational phase, it is not anticipated that there will be any demand of access facilities for pedestrians, cyclists and public transport users as the development is not a destination and other than periodic maintenance will not attract any trips, by any sustainable mode, to the site.

"Do-nothing" scenario

12.43 Should the proposed development not take place, the access roads and infrastructure will remain in their current state and there will be no change. Background traffic would be expected to grow over time. Given the location and zoning of sites locally, it is reasonable to assume that a similar development, would be required at some stage in the future.

Remedial and mitigation measures

Construction phase

12.44 To minimise disruption to the surrounding environment, the following mitigation measures will be implemented:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
- A dedicated 'construction' site access / egress junction will be provided during all construction phases.
- Provision of sufficient on-site parking and compounding to ensure no potential overflow of construction generated traffic onto the local network.
- Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hardstanding areas.
- A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities.
- A series of 'way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas.
- Dedicated construction haul routes will be identified and agreed with the local authority prior to the commencement of constructions activities on-site.
- Truck wheel washes will be installed at construction entrances if deemed necessary and any specific recommendations with regard to construction traffic management made by the Local Authority will be adhered to.
- On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works.

12.45 All construction related parking will be provided on site. Construction traffic will consist of the following two principal categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff; and
- Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, ducting, access chambers, ready mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

12.46 It is anticipated that the generation of HGV's during the construction period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods.

12.47 A Construction Traffic Management Plan (CTMP) would be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road.

Operational phase

12.48 No remedial or reductive measures required for this phase.

Predicted impacts of the Proposed Development

12.49 When considering a development of this nature, the potential traffic impact on the surrounding area must be considered for each of two stages; the construction phase and operational phase. These two distinct stages are considered separately within this section.

Construction phase

12.50 All construction activities will be governed by the Construction Traffic Management Plan to be prepared by the appointed Main Contractor. This document addresses a number of potential issues including the working hours of site staff, the traffic management for the site, the waste management, noise and vibration impacts as well as other issues to be addressed.

12.51 The contractor will be contractually required to ensure that the elements of this outline CTMP shall be incorporated into the final CTMP. The contractor shall also agree and implement monitoring measures to confirm the effectiveness of the mitigation measures outlined in the CTMP. On finalisation of the CTMP, the contractor shall adopt the plan and associated monitoring measures. The final CTMP shall address the following issues (including all aspects identified in this outline CTMP):

- Site Access & Egress;
- Traffic Management Signage;
- Routing of Construction Traffic / Road Closures;
- Timings of Material Deliveries to Site;
- Traffic Management Speed Limits;
- Road Cleaning;
- Road Condition;
- Road Closures;
- Enforcement of Construction Traffic Management Plan
- Details of Working Hours and Days;
- Details of Emergency plan;
- Communication;
- Construction Methodologies; and
- Particular Construction Impacts

12.52 A number of the construction traffic movements will be undertaken by heavy goods vehicles, though there will also be vehicle movements associated with the appointed contractors and their staff. Whilst it is not possible at this stage to accurately identify the day to day traffic movements associated with the construction activities, based on experience of similar sites it is considered that the number of construction related heavy goods vehicle movements to and from the application site will be approximately 3 arrivals and departures per day during the estimated 2 month construction phase.

12.53 Similarly, the general workforce is unlikely to exceed c.10 construction workers per day. This will vary over the lifetime of the project.

12.54 This number of construction vehicle movements is considered to be low compared to the capacity of the wider road network. It should be noted that the majority of such vehicle movements would be undertaken outside of the traditional peak hours, and it is not considered this level of traffic would result in any road capacity problems.

12.55 A construction car park will be created on the start of works within the application site to the east of the Proposed Development site. Care will be taken to ensure existing bus, pedestrian and cycling routes are suitably maintained or appropriately diverted as necessary during the construction period,

and temporary car parking is provided within the site for contractor's vehicles. It is likely that construction will have a negligible impact on pedestrian and cycle infrastructure.

Operational phase

12.56 The potential traffic impact associated with the operational phase of the Proposed Development will be ***long-term, neutral*** and ***imperceptible***. The traffic impact assessment for the operational phase are significantly below the thresholds stated in the TII Guidelines for Traffic and Transport Assessments, 2014 for junction analysis. Therefore, no mitigation measures in the form of junction modifications are proposed on the public road or within the Business Park to facilitate the Proposed Development.

Monitoring

12.57 During the construction stage, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices,
- Compliance with construction vehicle parking practices,
- Internal and External road conditions,
- Timings of construction activities.

Reinstatement

12.58 All trenches required to lay the 2 No. 110kv transmission lines will be reinstated to the Local Authority requirements within the Business Park, and to the applicant's requirements within their campus.

Cumulative Impacts

12.59 Potential cumulative impacts have been assessed in relation to the existing and permitted transportation schemes. If required the traffic modelling undertaken includes growth in background traffic flows which accounts for other developments in the area. A desktop study was conducted of planning applications in the vicinity of the subject development on the SDCC planning database to assess any cumulative impacts from granted or committed applications close to the subject scheme.

12.60 The proposed development will not generate any peak time trips outside of periodic maintenance. Table 12.6 below indicates that the previously permitted facilities under Reg. Ref. SD16A/0214, SD16A/0345, SD17A/0141 and SD17A/0392 and SD18A/0298 are forecast to generate 97 two-way vehicular trips in the AM peak hour and 82 in the PM peak hour as illustrated in the table below.

Table 12.6 Predicted traffic generation for previously permitted Edgeconnex Data Centre Schemes

	AM Peak Hour (08:00 - 09:00)			PM Peak Hour (17:00 - 18:00)		
	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total	68	39	97	33	59	82

Table 12.7 Net predicted traffic generation Edgeconnex Data Centre Schemes and the two no. 110kV transmission lines

	AM Peak Hour (08:00 - 09:00)			PM Peak Hour (17:00 - 18:00)		
	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Previously permitted Data Centre Applications	68	39	97	33	59	82
Two no. 110kV transmission lines	0	0	0	0	0	0
Total	68	39	97	33	59	82

12.61 There will be no increase in AM or PM peak traffic as a result of the proposed development. It is expected that the origins and destinations of traffic to/from the proposed development will be similar to the distribution of traffic currently accessing Grange Castle Business Park. The assumed distribution is summarised as follows:

- 40% to and from R136 Outer Ring Road (North);
- 20% to and from R136 Outer Ring Road (South);
- 25% to and from R134 Nangor Road (East); and
- 15% to and from R134 Nangor Road (West).

12.62 The existing background traffic flows and predicted operational phase vehicular trip generation have been set out in earlier sections of this chapter. Table 12.8 below indicates the percentage impact of the additional traffic at the R136 / Grange Castle Business Park roundabout junction.

Table 12.8 Cumulative Impact at R136/Grange Castle Business Park roundabout

	Development Traffic	Baseline Traffic	Percentage increase
AM Peak Hour (08:00 - 09:00)	59	4216	1.4%
PM Peak Hour (17:00 - 18:00)	50	4914	1.0%

12.63 The impact of traffic associated with the proposed overall development is approximately 1.4% of the existing background flows at the junction of the R136 Grange Castle Business Park Roundabout. The percentage impact results for the R134 Nangor Road roundabout junction are shown in Table 12.9 below.

Table 12.9 Cumulative Impact at R134 Nangor Road Roundabout

	Development Traffic	Baseline Traffic	Percentage increase
AM Peak Hour (08:00 - 09:00)	39	4508	0.9%
PM Peak Hour (17:00 - 18:00)	33	4122	0.8%

12.64 The cumulative impact of traffic associated with the proposed development and EdgeConnex Data Centre Schemes is approximately 1.4% of the existing background flows at the junction of the R134 Nangor Road Roundabout. In relation to the capacity of the road network, and increases in the number of vehicles using the network, the National Roads Authority (NRA) suggests the following thresholds for Traffic and Transport Assessments:

- traffic to and from the development exceeds 10% of the traffic flow on the adjoining road;
- traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists or the location is sensitive;
- industrial development in excess of 5,000m^2;
- distribution and warehousing in excess of 10,000m^2; and
- 100 trips in / out combined in the peak hours for the proposed development.

12.65 These criteria are widely considered to be best practice in determining the scope for road capacity impacts. At a maximum of 97 two-way trips in each of the peak hours, the cumulative impact of the proposed development has a traffic generation significantly less than the first criterion of 10% set out above. Additionally, the proposed development is forecast to have a maximum percentage impact of around 1.4% at junctions in the vicinity of Grange Castle Business Park, which is again significantly less than the criteria set out by the NRA. As a result, it is not considered necessary to undertake any further junction assessment.

13. CULTURAL HERITAGE

13.1 The following assessment was undertaken by CRDS Ltd. on behalf of EdgeConnex Limited. It assesses the archaeological, architectural and cultural heritage impacts of a proposed data centre development on lands to the in the townlands of Ballymakaily and Grange, Dublin 22 (DUB99). The site is located is located on the east side of the R120 road, within and to the west of Grange Castle Business Park and to the south of the Grand Canal.

Methodology

13.2 For the purpose of setting the site within its wider archaeological, architectural and cultural heritage landscape, a desk-based assessment utilising sources including the Record of Monuments and Places, the National Museum of Ireland topographical files, the database of licensed excavations, the Record of Protected Structures included in the South Dublin County Council Development Plan 2016-2022, the National Inventory of Architectural Heritage, documentary and cartographic sources was undertaken.

Recorded Archaeological Monuments and Places

13.3 The Record of Monuments and Places was consulted for the relevant part of the county. This is a list of archaeological sites known to the National Monuments Service (see www.archaeology.ie). The relevant files for these sites contain details of documentary sources and aerial photographs, early maps, OS memoirs, OPW Archaeological Survey notes and other relevant publications. The list of National Monuments in State Ownership or State Guardianship, the Register of Historic Monuments, the Sites and Monuments Record and monuments covered by Preservations Orders were also assessed. All sites within c. 1km of the development were identified and are listed in Appendix 13.1 (see Figure 1, Appendix 13.5 for locations).

Recorded archaeological finds

13.4 The topographical files in the National Museum of Ireland were consulted to determine if any archaeological artefacts had been recorded from the area. This is the national archive of all known finds recorded by the National Museum. It relates primarily to artefacts but also includes references to monuments and has a unique archive of records of previous excavations. Other published catalogues of prehistoric material were also studied: Raftery (1983 - Iron Age antiquities), Eogan (1965; 1993; 1994 - bronze swords, Bronze Age hoards and goldwork), Harbison (1968; 1969a; 1969b - bronze axes, halberds and daggers) and the Irish Stone Axe Project Database (School of Archaeology, U.C.D.). Finds from townlands in the study area are listed in Appendix 13.2.

Previous excavations

13.5 The Excavations bulletin website (www.excavations.ie) was consulted to identify excavations that may have been carried out within or in the vicinity of the development. This database contains summary accounts of excavations carried out in Ireland from 1970 to 2018. The study area has been subject to a number of licensed excavations during the development of the Grange Castle Business Park, Edgeconnex site and during improvements to the R120 Adamstown Road and summaries of these are listed in Appendix 13.3.

Cartographic sources

13.6 Reference to cartographic sources provides information on the development of the area. Manuscript maps consulted included the Down Survey Barony map of Newcastle and Uppercross, c. 1656 (see Figure 2, Appendix 13.5), Rocque's map of 1760 and Taylor's map of Dublin 1816. Ordnance Survey maps consulted included 6" maps, first editions (see Figure 3) and the Ordnance Survey 25" maps (see Figure 4).

Architectural Heritage

13.7 The National Inventory of Architectural Heritage (NIAH) is a systematic programme of identification, classification and evaluation of the architectural heritage of the State. The Minister for the Culture,

Heritage and the Gaeltacht is currently using the Inventory as the basis for making recommendations for the inclusion of structures in the Record of Protected Structures (RPS). The South County Dublin Development Plan 2016 – 2022 consulted. The plan includes policy objectives for the protection of the county's architectural heritage through their inclusion in the Record of Protected Structures (RPS) or in Architectural Conservation Areas (ACA). The RPS is a list of every structure which is of special architectural, archaeological, artistic, cultural, scientific, social or technical interest within the council's functional area. No structures included in the NIAH or in the RPS are located within the site. All sites within c. 1km of the development were identified and are listed in Appendix 13.4 (see Figure 1, Appendix 13.5 for locations).

Aerial Photography

13.8 Available online sources for aerial photography were consulted, including the Ordnance Survey, Geological Survey and National Monuments Service collections (see Figure 5, Appendix 13.5).

Previous Geophysical Survey

13.9 A licensed archaeo-geophysical survey of the northern half of the Edgeconnex site was undertaken by Joanna Leigh of JML Surveys in June 2016 (Licence no. 16R0070, see Figure 6, Appendix 13.5). The survey area totalled 3.9 hectares to the east of the R120 and includes the western portion of the site.

Previous Archaeological Testing and Monitoring

13.10 Archaeological testing and monitoring were undertaken in the area shown in Figures (Appendix 13.5) as Property Boundary, as a condition of planning (Planning Ref. No. SD16A/0345; South Dublin County Council - Condition 12). This was undertaken in two phases by Finola O'Carroll of CRDS Ltd in 2016 (License No 16E0471) and Dr Denis Shine of CRDS Ltd in 2017 (Licence No: 16E0471ext) (see Figure 7, Appendix 13.5)

Receiving environment

13.11 The study area, which comprises a buffer of approximately 1km from the proposed development, is characterised by upstanding archaeological monuments dating to the medieval period. Archaeological excavations in the area have also uncovered a number of prehistoric sites. All recorded archaeological monuments and features noted below are located outside the site boundary.

13.12 The earliest evidence for settlement consists of the remains of a Neolithic house excavated in the townland of Kishoge to the north-east of the site. The house was roughly rectangular in shape and measured 6.05m in length by 4.5m in width. The walls comprised a foundation trench supporting oak posts and planking and it may have been subdivided internally. Domestic activity in the vicinity of the dwelling comprised pits and charcoal and a number of artefacts were recovered from these features including scrapers, waste flint and a single sherd of prehistoric pottery. Radiocarbon dates from the site indicate a Neolithic date between 3941 and 3659 BC (Excavation ref. no. 01E0061, see Appendix 13.3). A stone axehead, made from porcellanite, also of Neolithic date, was found during the excavations at the site (License No. 19E0038; see below).

13.13 Excavations in the townland of Kilmahuddrick to the south-east of the proposed development revealed the remains of a ploughed-out ring-barrow. Ring-barrows are generally characterised by a low, artificial mound, sometimes with an encircling ditch and bank. The excavation at Kilmahuddrick revealed a large ditch and a series of cremated bone deposits at its centre (Doyle 2005, 43; see DU017-080, Appendix 13.1). The site had been intensively ploughed in the past and no trace of the raised central mound was present. Radiocarbon dates indicated that the site originated in the early Bronze Age but its use continued into the later Bronze Age and Iron Age (Doyle 2001, 17). The site was later enclosed within a field system of early medieval date (see below). A series of cremated human deposits were uncovered within the interior of the barrow ditch associated with finds including undecorated pottery and a small black glass bead (Doyle 2001, 18).

13.14 A number of fulacht fiadh have also been revealed within the townlands of Nangor and Grange. Fulacht fiadh or burnt mounds comprise mounds of charcoal rich soil, heat-fractured stones accompanied by a trough sometimes lined with wooden planks, stone slabs or even clay (Waddell 2000). They are

generally located close to water sources including streams, rivers, lakes or marshy ground. The exact use of these sites is still somewhat ambiguous with their traditional interpretation as cooking places coming into question in recent years. They date predominantly to the Bronze Age but date ranges from the Mesolithic period to the medieval period have been returned. Limited evidence for potential pre-enclosure (prehistoric) was recorded during archaeological excavation to the immediate west of the proposed site in Ballymakaily (License No. 19E0038; see Appendix 13.3), where a series of pits containing charcoal-rich soil and burnt stone were identified. These features may be indicative of cooking and/or other related activities.

13.15 The remains of a field system were found enclosing a prehistoric ring-barrow in the townland of Kilmahuddrick (Doyle 2005, 43). The field system was represented by a series of linear features on the western and southern sides of the ring-barrow. Radiocarbon dates from deposits of animal bone indicated that the field system dated to the early medieval period (Doyle 2005, 52). A further series of pits and ditches of early and later medieval date were revealed during excavations in the townland of Nangor (Doyle 2002).

13.16 The place name Kilmahuddrick provides an additional indicator of early medieval activity in the vicinity of the proposed development. The place name contains the element 'Kil' an Anglicisation of Cell or Cill generally signifying an early medieval church (Doyle 2005, 45). The church of Kilmahuddrick was dedicated to St. Cuthbert and consists of a nave-and-chancel church situated in a disused burial ground (Ní Mharcaigh 1997, 270).

13.17 Ringforts, the characteristic settlement site of the early medieval period, generally consist of a circular area surrounded by a bank or fosse, or simply by a rampart of stone. Ringforts are usually interpreted as being defended farmsteads. Many ringforts have been partially or completely destroyed since the 1960s and often the only indication of the former presence of a ringfort is preserved in townland name elements such as Dún, Rath, Cashel or Lios. However, monuments which have experienced above-ground disturbance continue to be of archaeological interest due to the potential for subsurface remains to exist at their locations. The term 'enclosure' is applied to monuments that cannot be classified more accurately without archaeological assessment but were identified as enclosures during fieldwork or through the study of aerial photography or other sources. There are four enclosures within the study area including one in the townland of Gollierstown (DU017-093----), one in the townland of Kilmactalway (DU021-112----) and two in the townland of Ballybane (DU021-108---- and DU021-109----). The sites of the two enclosures in Ballybane were subject to archaeological test excavation in 2016 (Excavation ref. no. 16E0531, see Appendix 13.3). AH1 (DU021-108----) comprised internal and external ditched enclosures with internal linear features and pits, likely representing an early medieval settlement site. AH5 (DU021-109----) measured c. 44m in diameter and comprised a single-ditched circular enclosure, a possible ringfort. a large, circular enclosure, possibly defined by two, widely-spaced concentric ditches (Area 3).

13.18 Archaeological excavations following geophysical survey and testing undertaken in the adjacent land to the west of the site (License No 19E0038; see Appendix 13.3) revealed an impressive array of features associated with multi-phase settlement and agricultural activity. The principal remains were identified in Area 3 and comprised two successive phases of enclosure. Potentially the earliest was a large, roughly circular enclosure seemingly defined by two widely-spaced ditches, set c.15–20m apart. It had an overall (north–south) diameter of about 70m, with the inner boundary reaching a maximum diameter of c.30m. The area between the enclosing elements was traversed by a number of possible radial ditches that may delineate the footprint of several small fields or paddocks. This phase of enclosure appears to have been followed by the construction at the same location of a large, sub-circular ditched enclosure, with maximum overall dimensions of 50m north–south by 52m. It overlapped with the Phase 1 inner enclosure ditch on the south and east, and the Phase 1 outer enclosure ditch on the north and west, thereby erasing all trace of the earlier cuts and deposits. Both phases of enclosures produced evidence for internal occupation in the form of several possible circular structures/buildings, as well as pits, post-holes, spreads, etc., while their defining ditches were likely originally accompanied by internal earthen banks.

13.19 There is extensive archaeological and documentary evidence for the later medieval settlement of the study area. Records show that the Cistercian abbey of St. Mary's held lands in the vicinity of Clondalkin, including the townlands of Ballymacheilmer and Kilmacuddrick (now Kilmahuddrick) from the 12th century. The name Kilmahuddrick is derived from Cell Mo-Chudric or the church of St. Cuthbert. The

lands may have come into the abbey's possession before the arrival of the Normans but the possession of Ballymacheilmer was confirmed to the abbey in two charters of Henry II dating to 1174 and 1197. John Comyn, Archbishop of Dublin confirmed the lands, chapel and titles in 1186.

13.20 At the time of the dissolution the 'Grange of Balichelmer' and the 'vil of Kilmacodryke' were still listed as part of the abbey's landholdings. The Grange of Balichelmer is likely to correspond with the modern townland of Grange. One hundred and fifty-two acres at Grange were listed in the monastic possession at the time of the dissolution of the monasteries c. 1540-41. In 1641 Grange was in the hands of the Fagan of Feltrim, an Irish Papist (Simington 1945, 304). In 1650 Grange was occupied by a farmer called Nicholas Wolverston and twenty other persons, including a weaver and a 'greymerchant'. The 'vil of kilmacodryke' corresponds with the townland of Kilmahuddrick to the immediate south-east of the proposed development. At the time of the dissolution the holding at Kilmahuddrick comprised 51 acres. In 1641 Kilmacuddrick was held by Mr Aylmer an Irish Papist (Simington 1945, 304). In 1666, the lands of Kilmahuddrick were held by Patrick Thunder (Ball 1906, 71).

13.21 Several tower houses were constructed in the study area in the later medieval period including one in the townland of Grange (DU017-034----) and one in the townland of Adamstown (DU017-029----). Tower houses are small, fortified residences which were constructed following a period of unrest in the fourteenth century. Tower houses have various defensive features including thick walls, battlements and narrow windows. As time progressed and the requirement for defence lessened tower houses were replaced by hall houses and fortified residential houses. Residential extensions were also added to existing tower houses to provide more comfortable accommodation for the occupiers.

13.22 The upstanding remains of Grange Castle (DU017-034----) are located c. 1km to the east of the proposed development and consist of a rectangular, three-storey structure with plastered walls. Grange Castle is shown on the Down Survey map (see Figure 2, Appendix 13.5). An early description by Cooper in 1780 describes the castle as a 'neat well built castle inhabited by a farmer and kept in very good repair'. The castle is uninhabited and had fallen into disrepair but is currently subject to a programme of conservation by South Dublin County Council. Archaeological excavation undertaken adjacent to the castle in 1997 revealed a curving ditch containing charcoal, mortar, flint and animal bones. Finds including a decorated bone comb, stick-pin and knife provided a twelfth to thirteenth century date. Preliminary works undertaken in 2016 in advance of planned conservation works revealed that the tower house and later Georgian house possess shallow foundations. (Excavation ref. no. 97E0116ext and 16E0510 see Appendix 13.3).

13.23 In the mid-eighteenth century a group of noblemen and merchants decided to form a company to undertake the construction of a canal aimed initially at providing fresh water for Dublin City and a water-borne transport system to the countryside west of Dublin. Work began on the Grand Canal and the canal was opened for traffic in February 1779 (Delaney 1995, 21). The Grand Canal runs to the north of the proposed site.

13.24 The area is depicted as farmland on the 1st and 2nd edition Ordnace Survey Maps (see Figures 3 and 4, Appendix 13.5). The townland boundary between Ballymakaily and Grange runs northeast to southwest, forming the eastern boundary of the northern half and bisecting the southern half of the area defined as the Property Boundary. It also forms the eastern boundary of the western portion of the area and separates this from the eastern linear portion of the area defined as Planning Boundary.

13.25 Grange Cottage (NIAH Reg No 11204057), a detached six-bay single-storey farm house, c.1810, and a Detached multiple-bay single-storey farm buildings set around a courtyard, c.1820 (NIAH Reg No 11204058), occur to the immediate north of the proposed site; these are depicted on the 1st and 2nd edition Ordnance Survey maps. There is no remining evidence of the Mill and mill pond as depicted on the 1st edition Ordnance Survey Map by the time of the issue of the 2nd edition map (see Figures 1, 3 and 4, Appendix 13.5).

Results of geophysical survey

13.26 A licensed archaeo-geophysical survey of a portion of the area defined as Planning Boundary, incorporating the western portion of the site, was undertaken by Joanna Leigh of JML Surveys in June 2016 (Licence no. 16R0070, see Figure 6, Appendix 13.5). The survey area totalled 3.9 hectares and was contained within a single field to the east of the R120. Modern magnetic disturbance (1) was

evident at the boundary edges of the field and also surrounding an electricity pylon in the centre of the field. In addition, numerous bore-holes were located throughout the field.

13.27 At the northern extent of the surveyed area there was a curvilinear response (2) and trend. The response was obscured by the presence of a bore-hole. However, it was speculated that the response is of archaeological potential and that the remains of a small circular enclosure c.17m diameter may be represented here. To the east of the possible enclosure a series of responses (3) typical of a spread of burnt material was noted. The responses extend over an area 10m x 17m, and it was noted that this was possibly modern activity. Also in the north of the data set there are were series of responses (4) forming a linear pattern. These were interpreted as most likely represent a former field boundary division or possible trackway. Further linear trends and responses (5) and (6) were less well defined but were interpreted as also representing former field divisions. A negative trend (7) in the south of the data most likely represents a drainage feature. Overall, the survey concluded that archaeological potential was limited.

Results of Archaeological Testing and Monitoring

13.28 Archaeological testing of the site was undertaken by mechanical digger in 2016 (License No. 16E0471), but was logistically difficult in the areas under yards and former buildings, due to the on-going enabling works. No substantive features of archaeological significance were uncovered during testing of either the areas under yard or in greenfield. A number of modern drainage features were encountered and examined during the course of testing to confirm their nature (see Figure 7, Appendix 13.5).

13.29 Further archaeological testing of the site was undertaken by mechanical digger in February 2017 (License No. 16E0471ext, see Appendix 13.3), to determine if archaeological finds or features are present, and if so, to determine their nature and extent. The trenches were located to determine if the anomalies identified during a geophysical survey of the site were archaeological in nature. Archaeological monitoring of the topsoil strip in advance of the excavation of an attenuation pond was undertaken in April 2017. No substantive features of archaeological significance were uncovered during testing or archaeological monitoring (see Figure 7, Appendix 13.5).

Modern Development

13.30 Previous modern development in the form of industrial buildings, roads and services have been undertaken in the majority of the site, as evidenced by recent aerial photography. Only small areas of greenfield within the are defined as Planning Boundary (see Figure 5, Appendix 13.5).

Characteristics of the Proposed Development

13.31 The proposed development primarily comprises the provision of two no. underground 110kV transmission lines along with associated and ancillary works. The proposed transmission lines will connect the permitted and under construction Coolderrig 110kV Gas Insulated Switchgear (GIS) substation compound that was granted permission under SDCC Reg. Ref. SD18A/0298 with the existing Grange Castle – Kilmahud Circuits. The site of the proposed development has an area of c. 1.49 hectares.

13.32 The two proposed underground single circuit 110kV transmission lines will connect the permitted Coolderrig 110kV GIS Substation, within the existing Edgeconnex landholding, to the existing Grange Castle - Kilmahud Circuits to the east. The proposed transmission lines cover a distance of approximately 559m and 574m within the townland of Grange, Dublin 22. The route of the transmission lines will pass along and under the internal road infrastructure within the Edgeconnex site and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Grange Castle – Kilmahud Circuits.

Potential impacts of the proposed development

Construction phase

13.33 The western portion of the proposed development site has been subject to previous archaeological investigation, including desk-based research, a site walkover, geophysical survey and archaeological testing, which did not identify any substantive archaeological features. The majority of the proposed development lands have been subject to previous development.

13.34 As substantial previously unrecorded sub-surface archaeological remains have been encountered during archaeological investigations in advance of construction works in the immediate vicinity of the proposed development, should groundworks be undertaken in previously undisturbed areas, there is the potential to impact on previously unrecorded archaeological features.

Operational phase

13.35 The operational phase of the project will have no impact on archaeological, architectural and cultural heritage.

'Do-nothing' scenario

13.36 The 'do-nothing' scenario will have no impact on archaeological, architectural and cultural heritage.

Remedial and mitigation measures

Construction phase

13.37 A programme of licensed archaeological monitoring will be agreed with the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht, for areas not previously subjected to archaeological testing.

13.38 A report outlining the results of the programme of archaeological monitoring will be prepared and will include a detailed method statement for any archaeological excavation of features identified, agreed in advance with the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht. The report will include a schedule of works detailing timeframes, personnel and logistical requirements.

13.39 Any areas that require archaeological excavation will be cordoned off to facilitate the archaeological team to carry out the excavations. A buffer zone will be agreed with National Monuments Service and no construction works will be undertaken in these areas until archaeological excavations have been completed.

13.40 Provision has been made for all costs associated with archaeological testing, any required excavations and reporting of the results to the standards required by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht.

13.41 The remedial or reductive mitigation measures outlined here are subject to the approval of the National Monuments Service of the Department of Culture, Heritage and the Gealtacht.

Operational phase

13.42 No remedial or reductive measures are considered necessary during the operational phase of the proposed development, as the operational phase will not give rise to any adverse impacts.

Predicted impact of the proposed development

Construction phase

13.43 The construction phase of the proposed development will not impact directly on any sites included in the Record of Monuments and Places. Geophysical survey and testing in the western portion of the proposed site did not identified any substantive archaeological features. Significant development has

already occurred across the majority of the site. Should any further sub-surface archaeological features survive in areas not already subjected to testing, monitoring or development, the ground disturbance phase of the proposed development would impact negatively on them.

Operational phase

13.44 The operational phase of the proposed development is not predicted to have any impact on archaeological, architectural and cultural heritage.

Do-nothing scenario

13.45 In a do-nothing scenario development will not occur on the site and no potential subsurface archaeological features will be impacted.

Monitoring

13.46 No further archaeological monitoring will be required once construction is completed.

Reinstatement

13.47 Not applicable in respect of archaeological, architectural and cultural heritage.

Cumulative impacts

13.48 The full development context of the Proposed Development is provided in Chapter 2 of this EIA Report.

Construction phase

13.49 Previous developments in the area have identified unrecorded archaeological features. These sub-surface features would not have been known had development not occurred and the excavation of these features, although resulting in their removal, has added to the academic understanding of the history of the area through archaeological research and reporting.

13.50 As archaeological assessment will be completed in advance of development and there are no operational impacts, the cumulative impact of the proposed development and surrounding developments is deemed to be neutral and not significant.

Operational phase

13.51 No cumulative impacts on archaeological, architectural and cultural heritage are expected as a result of the operational phase of the proposed development.

14. WASTE MANAGEMENT

14.1 This Chapter of the EIA Report was undertaken by AWN Consulting Limited (AWN) to evaluate potential environmental impacts associated with waste generation and management during the construction and operational phases of the two proposed underground single circuit 110kV transmission lines that will connect the permitted and under construction Coolderrig 110kV GIS Substation to the existing Grange Castle - Kilmahud Circuit to the east within the townland of Grange, Dublin 22.

14.2 A site-specific outline Construction & Demolition Waste Management Plan (C&D WMP) has been prepared to deal with waste generation during the construction phase of the proposed development and is included as Appendix 14.1 in the Appendix document.

14.3 The C&D WMP along with the mitigation measures in Section 14.52 -14.58 will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

Methodology

14.4 The assessment of the impacts of the Proposed Development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents (as set out in Sections 14.9 – 14.12, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in Appendix 14.1 of the Appendix document.

14.5 This Chapter is based on the proposed development, as described in Chapter 2 (Description of the Proposed Development) and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation, excavation and levelling); and
- Operational phase.

14.6 A desktop study was carried out which includes the following tasks:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the construction and operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

14.7 Estimates of construction waste generation during the construction phase of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in National Waste Reports, data recorded from similar previous developments, Irish and US EPA waste generation research, other available research sources.

14.8 Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal.

14.9 A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 7 Land, Soils, Geology and Hydrogeology. Chapter 7 of the EIA Report also discusses the environmental quality of soils which will have to be excavated to facilitate construction of the proposed development.

Legislation and Guidance

14.10 Waste management in Ireland is subject to EU, National and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

14.11 In addition, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, "A Resource Opportunity" in 2012. The need to embed climate action in all strands of public policy aligns with the goals of the European Green Deal.

14.12 The strategy for the management of waste from the construction phase is carried out in line with the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects published by the Department of Environment, Heritage and Local Government (DoEHLG) in 2006. The guidance document published by FAS and the Construction Industry Federation (CIF) "*Construction and Demolition Waste Management: A handbook for Contractors and Site Managers*" were also consulted in the preparation of this assessment.

14.13 There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, British Standards and other relevant studies and reports including BS 5906:2005 Waste Management in Buildings – Code of Practice, the Eastern-Midland Region Waste Management Plan 2015 – 2021, the EPA National Waste Database Reports 1998 – 2012 and the EPA National Waste Statistics Web Resource.

Receiving environment

14.14 In terms of waste management, the receiving environment is largely defined by South Dublin County Council (SDCC) as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021.

14.15 The waste management plan sets the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

14.16 The National Waste Statistics update published by the EPA in August 2020 identifies that Ireland's current progress against this C&D waste target is at 77% and our progress against '*Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)*' is at 51%. Both of these targets are required to be met by 12th December 2020 in accordance with the requirements of the Waste Framework Directive, however the EPA are yet to confirm that these were met.

14.17 The *South Dublin County Development Plan 2016 – 2022* sets out a number of objectives and actions for the South Dublin area in line with the objectives of the waste management plan.

14.18 In terms of physical waste infrastructure, SDCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

Characteristics of the Proposed Development

14.19 The proposed development is described in detail in Chapter 2 (Description of the Proposed Development) of this EIA Report. The aspects relevant to this chapter are described in the following sections.

14.20 The two proposed underground single circuit 110kV transmission lines will connect the permitted Coolderrig 110kV GIS Substation to the existing Grange Castle - Kilmahud Circuits to the east. The proposed parallel transmission lines cover a distance of approximately 559m and 574m within the townland of Grange, Dublin 22. They will pass along and under the internal road infrastructure within the Edgeconnex site and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Kilmahud Circuit.

Demolition phase

14.21 No demolition will be required to facilitate the construction of the proposed development.

Construction phase

14.22 The construction and installation of the underground ducting for the two underground single circuit 110kV transmission lines, will require the excavation of made ground, topsoil, subsoil and possibly bedrock (if encountered).

14.23 The optimum depth of excavation required to facilitate installation of the 110kV ducting for the transmission line is 1.25m below ground level (bgl) but may increase to up to c. 3.5m at utility crossings. The typical width of each trench is 0.6m, however this may vary depending on ground conditions and existing services.

14.24 It has been estimated that along the route that up to a maximum of 1,213m^3 of excavated material will be generated including tarmac, made ground, soils/stones. Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that the majority of the excavated material will require removal offsite. The importation of an equivalent volume of fill material to offset the removal will be required for construction of foundations and to reinstate the trenches. This fill material will be specified by the Operator, and is designed such that the maximum amount of protection is afforded to the electrical infrastructure beneath it.

14.25 The surplus excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. EPA agreement will be obtained before re-using the excess soils as a by-product. However, it is not currently anticipated that any excavated material will be removed offsite for reuse as a by-product.

14.26 If any excavated material requires removal from site and is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the *Waste Management Act 1996* (as amended), the *Waste Management (Collection Permit) Regulations 2007* (as amended) and the *Waste Management (Facility Permit & Registration) Regulations 2007* (as amended). The volume of waste requiring recovery/disposal will dictate whether a Certificate of Registration (COR), permit or licence is required by the receiving facility.

14.27 Site-specific investigations were undertaken by Site Investigations Ltd (SIL) (January 2021). The ground investigation report shows there was no evidence of significant subsurface contamination encountered during the site investigation works. Three samples recorded Total Petroleum Hydrocarbons above the limit of detection but the levels were low and not in the liquid phase so the soils can be classified as non-hazardous. This is discussed further in Chapter 7 of this EIA. It is not anticipated that significant subsurface contamination will be encountered along the proposed services routes.

14.28 In order to establish the appropriate reuse, recovery and/or disposal route for the surplus soils and stones to be removed off-site as a waste, it will first need to be classified. The material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste

Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous. Environmental soil analysis will be carried out on a number of representative soil samples for a range of parameters to allow the soil to be accurately classified as hazardous or non-hazardous.

14.29 In addition, soil analysis will also be carried out in accordance with the requirements for acceptance of waste at landfills in accordance with *Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC*, commonly known as Waste Acceptance Criteria. This legislation sets limit values for acceptance of waste at landfills based on properties of the waste including potential pollutant concentrations and leachability. (Note: Clean inert soils and stones excavated from greenfield sections of the route would generally not require classification/testing but would require a letter of suitability to be provided to the receiving facility.)

14.30 The surplus soils and stones may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

14.31 It is expected that wastes generated (other than excavated material and trees/shubbery) from other construction activities will be negligible and will generally comprise waste generated from construction workers. These wastes would generally be organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided at the site compound during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices. The construction compound will facilitate office, portable sanitary facilities, equipment storage, parking etc. for contractors.

14.32 Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP included as Appendix 14.1 of the Appendix document.

14.33 It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the construction waste that will be generated from the construction of the proposed development as the exact materials and quantities may be subject to some degree of change and variation during the construction process. However, the above estimates are considered to be the worst-case scenario.

14.34 An outline Construction Environmental Management Plan (CEMP) has been prepared by CSEA to accompany the planning application and is included with the application documentation. The appointed main contractor will be required to prepare a detailed CEMP prior to commencement of construction which may refine the above waste estimates.

Operational phase

14.35 Once operational, it is anticipated that very small amount of waste will be generated at the proposed development by staff during inspections and maintenance works.

14.36 These wastes may include organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons) and non-recyclable waste. Waste fuels/oils, waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently.

Potential impacts of the Proposed Development

14.37 This section details the potential waste impacts associated with the proposed development.

Construction phase

14.38 As detailed in Section 14.21-14.33, the Proposed Development will generate surplus excavated material, as well as waste from the welfare facilities and site office at the site compound.

14.39 There is a quantity of material (made ground and soils and stones) which will need to be excavated to facilitate the Proposed Development. Clean inert soils and stones excavated will be reused on site as backfill, where practical. The reuse of suitable clean inert excavated material onsite, where practical, will reduce consumption of natural quarry resources.

14.40 Surplus excavated material classified as waste (as opposed to a by-product) will be segregated at source and transferred directly from site by a suitably permitted waste contractor(s) to suitably authorised receiving facilities. In the event that potentially contaminated material is encountered, correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on the health and safety of workers as well as on the receiving environment, both on and off-site. Contaminated material will need to be removed off-site for appropriate treatment and/or disposal. In the absence of mitigation measures the effect on the local environment is likely to be ***temporary, significant*** and ***negative***.

14.41 Waste materials generated at the site compound from the welfare facilities and site office will be temporarily stored in dedicated receptacles at the site compound pending collection by a suitably permitted waste contractor(s). The waste storage area will need to be easily accessible to waste collection vehicles. In the absence of mitigation measures the effect on the local environment is likely to be ***temporary, significant*** and ***negative***.

14.42 If waste material is not managed and stored correctly on the site or at the site compound, it is likely to lead to litter or pollution issues at site, site compound and/or on adjacent properties. The knock-on effect of litter issues is the presence of vermin on the site, site compound and the surrounding areas. Waste material will be appropriately managed on site so as to avoid these issues. In the absence of mitigation measures the effect on the local environment is likely to *be* ***temporary, significant*** and ***negative***.

14.43 The use of non-permitted waste contractors for transportation or unauthorised receiving facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. Removal and reuse/recycling/recovery/disposal of waste material from site will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation measures the effect on the local environment is likely to be ***temporary, significant*** and ***negative***.

14.44 Wastes will be collected by a suitably permitted contractor(s) and be transferred to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal. There are numerous authorised waste facilities in the Leinster region which can accept non-hazardous and hazardous waste materials and acceptance of waste from the Proposed Development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the predicted construction waste materials at facilities in the region. In the absence of mitigation measures the effect on the local environment is likely to be ***temporary, significant*** and ***negative***.

14.45 Where offsite reuse of the wastes generated is not feasible, recycling and/or recovery of the waste will be carried where possible. Recovery and recycling of construction waste has a positive impact on sustainable resource consumption, for example where waste trees/shrubbery is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

14.46 In the absence of mitigation measures the potential impact of construction waste generation from the development is considered to be ***temporary, significant*** and ***negative***.

Operational phase

14.47 A very small amount of waste will be generated at the proposed development by staff during inspections and maintenance works.

14.48 The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill.

14.49 The use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

14.50 In the absence of mitigation measures the potential impact of operational waste generation from the development is considered to be ***long-term, negative,*** and ***imperceptible***.

Remedial and mitigation measures

14.51 This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

Construction phase

14.52 A project specific outline C&D WMP has been prepared in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* guidance document issued by the Department of Environment, Heritage and Local Government (DoEHLG). Adherence to the high-level strategy presented in the C&D WMP enclosed in Appendix 14.1 will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the proposed development. Prior to commencement of construction, the contractor(s) will be required to refine/update this document to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

14.53 It has been estimated that along the route that up to a maximum of 1,213m^3 of excavated material will be generated including tarmac, made ground, soils/stones. Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of this material will require removal offsite. It will be reused offsite where practical and where it cannot be reused, it will be recycled/recovered.

14.54 In addition, the following mitigation measures will be implemented:

- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated;
  - Made ground
  - Soils and stones
  - Trees/shrubbery
  - In addition, the following wastes will be segregated at the site compound:
    - Organic (food) waste
    - Packaging (paper/card/plastic)
    - Mixed dry recyclables
    - Mixed non-recyclable waste
- All excavations will be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. In the event that 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, which establishes the criteria for the acceptance of waste at landfills;

- Waste materials generated at the site compound will be stored in suitable receptacles in designated areas of the site compound;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager will be appointed by the main contractor to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

14.55 Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, which requires removal off-site. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as previously referred to and detailed in the C&D WMP (Appendix 14.1).

14.56 These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997 to 2009* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Operational phase

14.57 Any small volumes of waste materials generated will be segregated into appropriate categories and removed by maintenance contractors. Wastes will be collected by a suitably permitted contractor(s) and be transferred to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal.

14.58 These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

Predicted impacts of the Proposed Development

14.59 This section describes the predicted impact of the proposed development following the implementation of the remedial and mitigation measures.

Construction phase

14.60 A carefully planned approach to waste management as set out in Sections 14.52 – 14.56 and adherence to the outline C&D WMP during the construction and demolition phase will ensure that the impact on the environment will be ***temporary, neutral*** and ***imperceptible***.

Operational phase

14.61 During the operational phase, a structured approach to waste management as set out in Sections 14.57 – 14.58 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be ***long-term, neutral*** and ***imperceptible***.

Residual impacts

14.62 Adherence to the mitigation measures outlined in Sections 14.52 - 14.58 will ensure that there are no significant impacts on resource or waste management from the Proposed Development. The management of waste during the construction phase in accordance with the Construction & Demolition Waste Management Plan (C&D WMP) and during the operational phase in accordance with the

mitigation measures will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy.

Monitoring and/or Reinstatement

Construction phase

14.63 The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the construction phase where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste, as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

Operational phase

14.64 There is no specific monitoring required during the operational phase. Waste legislation and SDCC Waste Bye-Laws should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

Reinstatement

14.65 In the event that the underground transmission lines are discontinued, there is not likely to be any significant impacts on waste management at the site.

Cumulative impacts

14.66 The anticipated cumulative effect of the Proposed Development with any/all relevant other planned developments as outlined in Chapter 2 or permitted developments as outlined in Chapter 3 are discussed in below for construction and operational phases respectively.

14.67 The construction of the proposed development and other surrounding proposed and permitted developments requires site clearance, excavations and levelling which will generate a requirement for soil removal and/or import. An increased density of construction activities in the short-term will impact in respect to waste on increased traffic from waste contractors, but overall is likely to provide an improvement in the efficiencies of waste collections in the area and will be short-term.

14.68 Provided mitigation measures set out in the planning permissions / EIA Reports for these developments are implemented during construction of the proposed development, the cumulative impact will be ***temporary, neutral*** and ***imperceptible.***

14.69 The waste quantities to be generated from the construction and operation of the proposed developments within the overall landholding are anticipated to be relatively small.

14.70 The proposed development and other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such it is considered that the cumulative impact relating to waste management will be ***long-term, neutral,*** and ***imperceptible.***

15. MATERIAL ASSETS

Introduction

15.1 This chapter evaluates the impacts, if any, which the Proposed Development may have on Material Assets as defined in Directive 2014/52/EU, the EPA Draft EIA Report Guidelines 2017 and EPA Draft Advice Notes for EIS 2015.

Methodology

15.2 The chapter includes 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.

15.3 The EPA Draft EIA Report Guidelines 2017 state that material assets are now taken to mean built services and infrastructure, roads and traffic as well as waste management. In this EIA Report, the impacts on some of the material assets described above have been considered in the following chapters:

- Chapter 5, Population and Human Health;
- Chapter 10, Air Quality & Climate;
- Chapter 12, Traffic & Transportation; and
- Chapter 14, Waste Management.

15.4 The European Commission Guidance on Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017) refers to a number of examples of material assets including buildings, other structures, mineral resources and water resources. The impacts on mineral resources and water resources have been considered in the following chapters of this EIA Report:

- Chapter 7, Land, Soils, Geology & Hydrogeology; and
- Chapter 8, Hydrology.

15.5 This chapter assesses ownership and access (including buildings and other structures), built services and infrastructure. The potential impacts on built services and infrastructure, if any, are assessed in terms of the following:

- Power and Electricity supply;
- Telecommunications;
- Surface water infrastructure;
- Foul drainage infrastructure; and
- Water supply.

15.6 The Proposed Development will not impact on any other structures. Assessment of impact on utilities has been undertaken by confirmation of supply with the various key utility suppliers of South Dublin County Council (SDCC), Eirgrid, ESB Networks, and Irish Water (IW). Mitigation measures are proposed where required

Ownership and access

15.7 The EPA Draft Advice Notes 2015 refer to the need to consider the ownership and accessibility of the site. This section addresses ownership and accessibility of the site for the Proposed Development.

15.8 The site of the Proposed Development as described in Chapter 2 Description of the Proposed Development is under the following ownership:

- GIS substation and Transformer / MV Building Compounds (which don't form part of the application, but are included within the red line of the application) and the first c. 80m of the two transmission lines are within the applicants ownership; and

- The rest of the 110kV transmission lines to the Grange Castle-Kilmahud circuits continues for c. 490m along and under the internal access road to their site and bus turnaround area within the Grange Castle Business Park; and then above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Grange Castle – Kilmahud Circuits. This part of the route is in the ownership of SDCC.

15.9 A letter of consent, to apply for development on the lands, has been obtained from SDCC and is included with the Proposed Development planning application documents.

15.10 As detailed in Chapter 2, the permitted GIS substation and Transformer / MV Building compound (SDCC Reg. Ref. SD18A/0298) is currently under construction and is due to be completed in early summer 2021. The main access to the GIS substation compound will be via the permitted entrance to the Edgeconnex site from the Grange Castle Business Park from the east. This access road will also serve the access for the two currently operating data centres, as well as the construction access to the partly built data centre under SDCC Reg. Ref. SD17A/0141 / SD17A/0392; as well as the two data centres permitted under SDCC Reg. Ref. SD18A/0298. There is good visibility on approach to the permitted access point from within the business park.

Receiving environment

15.11 The nature of the proposal means that there is no drainage infrastructure associated with the proposed underground 110kV transmission lines. Temporary facilities will be provided as part of the construction compound as part of the construction phase of the Proposed Development. These are described in Chapter 2 (Description of the Proposed Development) and Chapter 8 (Hydrology). The permitted built services and infrastructure in the vicinity of the site are outlined in the following sections.

Power and electrical supply

15.12 The availability of power is a key consideration in site selection for the Permitted data centre development. One of the key reasons the site was chosen for the data centre campus was the relative proximity to existing substations. Interim power demand for the two existing data centre developments, is provided by the temporary gas powered plant permitted under SDCC Reg. Ref. SD16A/0345 and SDCC Reg. Ref. SD19A/0342.

Telecommunications

15.13 A fibre optic cable distribution network is installed within the site for the Existing and Permitted Development. This is connected into the wider telecommunications network. There is no requirement for telecoms for the Proposed Development although it will facilitate telecom communication to the permitted substation.

Surface water infrastructure

15.14 There are no proposed surface water works associated with the proposed development. The CSEA Consulting Engineers, Engineering Planning Report and the Flood Risk Assessment by Pinnacle Consulting review the existing and proposed surface water environment and accompanies the planning application for the Proposed Development. No changes to the attenuation are proposed to that already permitted.

Foul drainage infrastructure

15.15 There are no proposed foul drainage works associated with the proposed development. All foul effluent generated from the single WC facility within the permitted and under construction substation is directed via gravity into the Grange Castle Business Park Waste Water Treatment Plant that will ultimately drain to the regional Wastewater Treatment Plant at Ringsend in Dublin for ultimate disposal.

15.16 Welfare facilities (canteen, toilets etc.) will be available within the construction compound for the construction of the Permitted Development and it is proposed that can be utilised for the c. 10 – 15 staff required for the construction phase of the Proposed Development.

15.17 As there is no proposed foul drainage works associated with the proposed development it will not affect the ability of any existing or future developments in the area to access wastewater discharge.

Water supply

15.18 There will be no water demand generated by the Proposed Development. It will therefore not affect the ability of any existing or future developments in the area to access water through the water supply within the Business Park.

Characteristics of the Proposed Development

Construction phase

Power and Electrical Supply

15.19 During construction, contractors will require power for heating and lighting of the site and their onsite construction compound. In addition, on site construction equipment/plant will require power. The power requirements for the construction phase will be relatively minor.

15.20 The excavation of trenches within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure that there is no impact on existing users. Once the construction of the Proposed Development is completed, ESB Networks personnel will be mobilised to complete the commissioning.

Telecommunications

15.21 Telecommunications including fibre required during the construction phase will be provided via a temporary mobile connection. The fibre optic cable distribution network for the permitted data centre development will be extended to the permitted GIS substation. The proposed 110kV transmission lines will not require the provision of telecommunications services. The extension of the network within the overall landholding will have a temporary imperceptible effect on the environment.

Surface water and foul drainage infrastructure and water supply

15.22 The route of the 110kV transmission line to the Grange Castle-Kilmahud circuit traverses an existing culverted part of the Griffeen River. It is proposed to cross over this culvert. There is no potential for hydrological pathways and as such impacts on the Griffeen River as a result of this crossing. The implementation of construction mitigation measures detailed in Chapter 2 will ensure that there is no predicted impact on the Griffeen River from the works to the north of the river.

15.23 If any stormwater collects in the trenches during construction, it will need to be discharged to the sewer network. Any discharge water will be treated using a siltbuster or similar to remove suspended solids prior to discharge.

15.24 Welfare facilities (canteens, toilets etc.) will be available within the construction compound for the construction phase of the Proposed Development. The increase in water demand and wastewater discharges, if any, will be imperceptible and will not affect existing users.

Operational phase

Power and electrical supply

The Proposed Development will supply the permanent power supply to the adjacent data centre development.

Telecommunications

15.25 There is sufficient capacity available in the network to accommodate the Proposed Development.

Surface Water and Foul Drainage Infrastructure and Water Supply

15.26 Rainwater runoff from the already permitted and under construction 110kV GIS substation compound will discharge to the surface water drainage network for the Edgeconnex campus. No additional surface water works are proposed under this application. The underground single circuit 110kV transmission lines from the proposed substation to the existing Grange Castle – Kilmahud circuits do not require any surface water drainage infrastructure.

15.27 Once operational, a small number of ESB Networks staff will undertake operational activities from the substation with only interim inspections required along the underground 110kV transmission lines. Two ESB maintenance staff will carry out a routine inspection of the 110kV cable installations one year after completion and once every three years thereafter.

15.28 Domestic effluent arising from the welfare facilities for staff at the permitted GIS substation building, which will only become operational on the implementation of the proposed development, will be collected in the permitted foul drainage network within the site and discharged to the local private foul drainage network within Grange Castle Business Park. The wastewater discharged from the permitted substation will ultimately discharge to the municipal Waste Water Treatment Plant (WWTP) at Ringsend.

15.29 The underground single circuit 110kV transmission lines from the proposed substation to the existing Grange Castle - Kilmahud Circuits will not generate any wastewater and as such do not require any foul drainage infrastructure.

15.30 Water will be required for the welfare facilities for staff at the permitted GIS substation. This is permitted to be provided via a connection to the watermain for the wider development. The water demand for the permitted substation will be minimal. Chapter 8 Hydrology addresses the impacts on water supply. By nature of the developments, the underground single circuit 110kV transmission lines from the proposed substation to the Grange Castle - Kilmahud Circuit does not require any water supply.

Potential impacts of the Proposed Development

Construction phase

Power and electrical supply

15.31 The construction compound and temporary power supply will be utilised for the Proposed Development. The power requirements for the construction phase will be relatively minor and therefore the power demand for the construction phase would have a potential ***temporary, neutral, imperceptible*** impact. The excavation of trenches within the vicinity of existing electrical services will be carried out by hand and in consultation with ESB Networks to ensure there is no impact on existing users

Telecommunications

15.32 Telecommunications including fibre required during the construction phase will be provided via a mobile connection. A fibre optic cable distribution network will be installed within the site, for the entire Permitted and Proposed Development. There are no potential impacts associated with telecommunications for the Proposed Development for the construction phase.

Surface water infrastructure

15.33 As discussed earlier in this chapter, the surface water drainage network is designed to accommodate surface water drainage from the full development of the Edgeconnex site, including that within the Proposed Development site. This permitted surface water drainage includes interceptors, attenuation measures that restricts discharge into the local network. As such, there is no potential impacts on the surface water infrastructure.

15.34 There is a need to increase the capacity of the attenuation pond in order to accommodate surface water runoff from the Proposed Development as well as the permitted and concurrent applications and no potential impacts

15.35 The route of the 110kV transmission line to the Grange Castle - Kilmahud Circuits traverses over an existing culverted part of the Griffeen River. There are no predicted impacts on the Griffeen River. There are no potential impacts associated with surface water infrastructure for the Proposed Development for the construction phase.

15.36 The potential impact associated with surface water for the construction phase is ***temporary, neutral and imperceptible***.

Foul drainage infrastructure

15.37 Welfare facilities (canteens, toilets etc.) will be available within the proposed construction compound for the small number of staff required for the construction phase of the Proposed Development. The increase in wastewater discharges, if any, will be imperceptible and will not affect existing users. There may be a requirement to discharge stormwater collected in the trenches for the 110kV transmission lines to sewer. Any discharge water will be treated using a siltbuster or similar to remove suspended solids to ensure there is no impact on the foul drainage network. There will be no impact from construction works on the existing foul sewer network during construction.

15.38 It not anticipated that the connection to this sewer would have any offsite impact. The potential impact associated with foul drainage for the construction phase is ***temporary, neutral and imperceptible***.

Water supply

15.39 Welfare facilities (canteens, toilets etc.) will be available within the construction compound for the small number of staff required for the construction phase of the Proposed Development. The increase in water demand, if any, will not be significant enough to impact existing users. The potential impact associated with water supply for the construction phase is ***temporary, neutral and imperceptible.***

Operational phase

Power and electrical supply

15.40 The permitted 110kV GIS substation and proposed 110kV transmission lines will support power demand for the permitted data centre facilities (built and unbuilt) on the overall site. The Proposed Development will ensure a continuity of supply of electricity to the permitted data centres on the wider site.

15.41 There are **no potential impacts** associated with power and electrical supply for the Proposed Development for the operational phase.

Telecommunications

15.42 There are ***no potential impacts*** associated with telecommunications for the Proposed Development for the operational phase as outlined in Chapter 2.

Surface water

15.43 The underground single circuit 110kV transmission lines from the permitted substation to the existing Grange Castle -Kilmahud Circuits do not require any surface water drainage infrastructure. The cable installations are underground and the joint bays and pull pits will be constructed on a primarily permeable gravel surface.

15.44 There are no potential impacts associated with surface water infrastructure for the Proposed Development for the operational phase.

Foul drainage infrastructure

15.45 The underground single circuit 110kV transmission lines from the permitted substation to the existing Grange Castle - Kilmahud Circuits do not require any foul drainage infrastructure. There are ***no***

potential impacts associated with foul drainage infrastructure for the Proposed Development for the operational phase.

Water Supply

15.46 The underground single circuit 110kV transmission lines from the permitted substation to the existing Grange Castle – Kilmahud circuit do not require any water supply. There are ***no potential impacts*** associated with water supply for the Proposed Development for the operational phase.

Remedial and mitigation measures

Construction phase

15.47 Construction of the 110kV transmission lines will not require any power, telecommunications, drainage infrastructure and water supply from existing services.

15.48 Completed surveys have identified where short term diversion of any services will be required. Ongoing consultation with EirGrid, ESB Networks, SDCC, Irish Water and other relevant utility providers within the locality and compliance with any requirements or guidelines they may have will ensure a smooth construction schedule without disruption to the local and business community. Such diversions are common practice.

Power and Electricity Supply

15.49 The power demand for the construction phase will be relatively minor and the temporary connection works are entirely within the wider site, and there will therefore be no offsite impact. The excavation of trenches within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users. Once the construction of the Proposed Development is completed, ESB Networks will be mobilised to complete the commissioning in accordance with the ESB Network requirements. As stated in Chapter 2, there is no requirement for chemicals usage and minimal access to the route by personnel and there is no likely environmental effect as a result of commissioning.

Telecommmunications

15.50 No remedial or mitigation measures are required in relation to telecommunications.

Surface Water and Foul Drainage Infrastructure and Water Supply

15.51 Welfare facilities (canteens, toilets etc.) will be available within the construction compound of the Permitted Development and it is proposed that this will be in place for the construction of the Proposed Development.

15.52 No remedial or mitigation measures are required in relation to foul drainage infrastructure and water supply.

15.53 Surface water run-off water containing silt will be contained on site and treated (using a siltbuster or temporary on-site settlement ponds/tanks) to ensure adequate silt removal. The construction works will not require any interruptions to service in existing surface water sewers.

Operational phase

Power and electricity supply

15.54 The Proposed Development has been designed in accordance with ESB Networks requirements. Eirgrid has confirmed that there is sufficient power available from the existing area network for the Proposed Development. The nature of the Proposed Development ensures that it will facilitate continuity of supply of electricity to the permitted Edgeconnex data centre development.

15.55 No remedial or mitigation measures are required in relation to power and electricity supply.

Telecommunications

15.56 As there are no potential effects on telecommunications during the operational phase of the Proposed Development, no remedial or mitigation measures are required.

Surface Water and Foul Drainage Infrastructure and Water Supply

15.57 There are no potential effects associated with surface water and foul drainage infrastructure or water supply for the Proposed Development for the operational phase and as such no remedial or mitigation measures are deemed necessary.

Predicted impact of the Proposed Development

Construction phase

15.58 The implementation of mitigation measures detailed in paragraphs will ensure that the predicted impacts on the material assets assessed in this chapter will be ***temporary, neutral*** and ***imperceptible*** for the construction phase.

Operational phase

Power and electrical supply and Telecommuncations

15.59 The Proposed Development has been designed in accordance with the requirements of ESB Networks. Eirgrid has confirmed that there is sufficient power available from the existing area network for the Proposed Development. There are no predicted impacts associated with power and electrical supply, and telecommunications for the Proposed Development for the operational phase.

Surface Water and Foul Drainage Infrastructure and Water Supply

15.60 There are no predicted impact on water supply, surface water infrastructure and foul drainage infrastructure post construction.

Predicted impact – operational phase

15.61 The predicted impacts on power and electrical supply, telecommunications, surface water infrastructure, foul drainage infrastructure and water supply will be ***long-term, neutral*** and ***imperceptible.***

Residual impacts

15.62 The Proposed Development entails minimal use of material assets examined in this chapter (i.e. power and electrical supply, telecommunications, surface water infrastructure, foul drainage infrastructure and water supply) during construction with no impact once operational. The overall predicted residual impact of the Proposed Development can be classed as ***long-term*** and ***not significant*** with respect to material assets.

15.63 Interactions are addressed in Chapter 16 of this EIA Report.

Cumulative impacts

15.64 The Proposed Development entails minimal use of material assets during construction. Once operational, the Proposed Development will result in minimal impact on surface water, foul drainage and water infrastructure. The permitted substation will facilitate the operation of the permitted and under construction substation that will connect to the surface water, foul drainage and water supply infrastructure within the Business Park.

15.65 The Applicant has previously engaged with IW to ensure that there is sufficient capacity to cater for the water supply and wastewater for the permitted substation.

15.66 It is predicted that the cumulative impact of the Proposed Development with other permitted and planned developments is considered to be imperceptible during the construction and operational phases. The Proposed Development entails minimal use of material assets (i.e. power and electrical supply, telecommunications, surface water infrastructure, foul drainage infrastructure and water supply) during construction with no impact once operational. The overall predicted cumulative impact of the Proposed Development with other permitted developments can be classed as ***long-term*** and ***not significant*** with respect to material assets during the construction and operational phases.

16. INTERACTIONS

Introduction

16.1 This chapter of the EIA Report addresses potential interactions and inter-relationships between the environmental factors discussed in the preceding chapters. This covers both the construction and operational phase of the Proposed Development.

16.2 As a requirement of the EIA Directive, the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, the EPA Draft EIA Report Guidelines 2017 and EPA Draft Advice Notes for EIS 2015, not only are the individual significant impacts required to be considered when assessing the impact of a development on the environment, but so must the interrelationships between these factors be identified and assessed.

16.3 In the main, the majority of EIA Report chapters have already included and described assessments of potential interactions between aspects, however this section of the assessment presents a summary and assessment of the identified interactions. These interactions have been identified and considered by the various specialists contributing to this impact assessment.

Discussion – Positive Impacts

16.4 The reasoning behind the interactions that are considered to have a positive effect (i.e. a change which improves the quality of the environment) is outlined in this section.

Planning and Alternatives on:

Population and Human Health

16.5 The Proposed Development will be designed to provide a permanent power supply for the permitted data centre development and permitted substation from the National Grid via the Grange Castle–Kilmahud Circuit. The Proposed Development will create c. 10 temporary jobs during the construction phase, which will have a ***temporary, positive***, ***not significant*** effect on employment and business in the area.

Discussion – Neutral Impacts

16.6 The reasoning behind the interactions that are considered to have a neutral effect (i.e. no effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error) is outlined in this section.

Land, Soils, Geology and Hydrogeology on:

Population and Human Health

16.7 As the lands are already zoned for development within a data centre campus and business park there is no overall loss of agricultural land use. The change of land use has already been established for the Edgeconnex campus and within the Business Park. The employment created by the construction of the Proposed Development counterbalances this economic loss and so the impact is ***long-term, imperceptible*** and ***neutral***.

Hydrology

16.8 The main potential impact of the construction works proposed is on surface water quality (due to sediment laden run-off, material spillages) and groundwater quality (due to removal of protective soil for the construction of the proposed substation). However, the implementation of a CEMP as detailed in Chapter 2 (Description of the Proposed Development) and Chapter 8 (Hydrology), as well as mitigation measures that included permitted surface water attenuation for the Edgeconnex site, including the permitted substation site, will ensure the effect on Hydrology will be ***temporary, imperceptible*** and ***neutral***.

Biodiversity

16.9 The surrounding area is being extensively developed and the majority of its natural flora and fauna has been removed/displaced. Notwithstanding the loss of soil environment during construction; the mitigation measures in the form of replacement planting under the Proposed Development, and mitigation planting under the data centre campus development, will maintain habitat for flora and fauna and therefore the effect on biodiversity will be ***long-term, moderate*** and ***neutral***.

Air Quality and Climate

16.10 There is a potential for the construction activity to impact on air quality in terms of dust generated but mitigation measures outlined in both Chapter 7 (Land, Soils, Geology & Hydrogeology) and Chapter 10 (Air Quality & Climate) of this EIA Report, implemented through the CEMP, will ensure a ***temporary, imperceptible*** and ***neutral*** effect. There are no predicted perceptible impact during operation.

Traffic

16.11 Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from, and bringing materials / fill to, the site during the construction of the development. The increase in vehicle movements as a result of materials generated by the construction phase will be temporary in duration and has been addressed in Chapter 12 (Traffic and Transportation). The effects is anticipated to be ***temporary, neutral*** and ***imperceptible***.

Waste Management

16.12 As detailed in Chapter 14 (Waste Management), c. 1,213m^3 of excavated material may be generated during construction. The majority of the excavated material along the transmission line will need to be removed off-site either as a waste or, where appropriate, as a by-product. The management of waste during the construction phase in accordance with the Construction & Demolition Waste Management Plan (C&D WMP) will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy. Therefore, the effect of generation of soils/stones in terms of waste management will be ***neutral***.

Hydrology on:

Population and Human Health

16.13 Once operational, the permitted substation that will be made operational by the Proposed Development will generate minimal wastewater emissions (foul water) from the GIS substation welfare facilities. This will discharge via the local sewer network to the private Grange Castle Waste Water Treatment Plant in Grange Castle; and ultimately to the Local Authority wastewater treatment plant (WWTP) at Ringsend. As treated wastewater discharges from the WWTP to Dublin Bay, which is a public amenity, there is a potential for impact on the human beings using this amenity. However, as the Grange Castle and Ringsend WWTP will provide treatment for wastewater emissions, the effect is considered to be ***long-term, imperceptible*** and ***neutral***.

Land, Soils, Geology and Hydrogeology

16.14 Surface water run-off collected in excavations during the construction phase of the Proposed Development will be pumped out and treated prior to discharge (see Chapter 8 Hydrology). The effect will be ***temporary***, ***imperceptible*** and ***neutral***. Surface water run-off from the Edgeconnex site once operational will be collected within the permitted attenuation pond. The attenuation pond is adequately sized to accommodate surface water run-off from the Edgeconnex site. The effect will be ***long-term***, ***imperceptible*** and ***neutral***.

16.15 The 110kV transmission line will cross over the Griffeen Stream culvert. The implementation of mitigation measures will ensure the impact on the stream is ***imperceptible*** and ***neutral.***

Biodiversity

16.16 There is no formal designation on the Proposed Development lands and the development area may be considered of Low Local Ecological Value. Designated sites that local streams ultimately runs into (River Liffey) are located a 5.5kms distance downstream as outlined in Chapter 6 of the EIA Report. The impact on biodiversity will be ***long-term, imperceptible*** and ***neutral***.

Air Quality and Climate on:

Population and Human Health

16.17 The mitigation measures that will be put in place at the Proposed Development for the construction phase will ensure that the impact of construction dust emissions in the form of nuisance dust are ***short-term*** and ***imperceptible***. Further detail on human health and air quality is presented in Chapter 5.

Biodiversity

16.18 Mitigation measures during the construction phase of the Proposed Development will ensure that dust generation is minimised and the effect on biodiversity will be ***temporary***, ***imperceptible*** and ***neutral***. There is no interaction between Air Quality and Climate on Biodiversity during the Operational Phase due to the low level of maintenance traffic that will be generated by all aspects of the Proposed Development.

Hydrology

16.19 Mitigation measures implemented during the construction phase will ensure that the deposition of dust is minimised and therefore the predicted effect from air (including dust) on the water environment during construction is ***temporary, imperceptible*** and ***neutral***. There is no interaction between Air Quality and Climate on Hydrology during the Operational Phase.

Noise and Vibration on:

Population and Human Health

16.20 The potential impact of noise and vibration on the local population is discussed in Chapter 5 (Population and Human Health) and Chapter 9 (Noise & Vibration). Noise emissions associated with the construction phase of the development are expected to be less than the prevailing ambient noise level at the nearest sensitive locations. In addition, due to the distance between the site and the nearest sensitive locations, vibration impacts generated during construction are expected to be ***negligible***. There are no predicted noise impacts beyond the emergency generator that will only operate in emergency circumstances to provide back-up power to the permitted GIS building, and has been scoped out of this assessment as it does not form part of the Proposed Development. The level of traffic generated by maintenance traffic to the substation and transmission lines is very low and will be imperceptible and therefore once operational there will not be a significant impact on human health as a result of noise emissions.

Landscape and Visual on:

Biodiversity

16.21 The construction of the Proposed Development will involve the removal of some of the existing landscape. The mitigation measures in the form of replacement planting and landscaping features such as berms, granted under the permitted development for the Edgeconnex site, will maintain habitat for flora and fauna and therefore the effect on biodiversity will be ***long-term, moderate*** and ***neutral***.

Waste Management on:

Land, Soils, Geology and Hydrogeology:

16.22 As detailed in Chapter 14 (Waste Management) excavated waste material will be generated during construction. The majority of the excavated material will need to be removed off-site either as a waste

or, where appropriate, as a by-product. The management of waste during the construction phase in accordance with the Construction & Demolition Waste Management Plan (C&D WMP) will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy. Therefore, the effect of generation of soils/stones in terms of waste management will be ***temporary, neutral*** and ***imperceptible***.

Population & Human Health

16.23 The potential impacts on human beings in relation to the generation of waste during the construction phases are that incorrect management of waste. This could result in littering which could cause a nuisance to the public and attract vermin. A carefully planned approach to waste management and adherence to the project specific Construction & Demolition Waste Management Plan (C&D WMP) will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects is anticipated to be ***temporary, neutral*** and ***imperceptible***.

Material Assets on:

Population and Human Health

16.24 The Proposed Development will not have a significant impact on material assets such as surface water drainage, water supply, wastewater drainage, power supply and road infrastructure. The individual chapters of this EIA Report (Chapter 12 Traffic and Transportation and Chapter 15 Material Assets) have assessed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in each of these chapters will ensure there are no residual negative impacts on the local population. The predicted effect is therefore ***imperceptible*** and ***neutral***.

Discussion – Negative Impacts

16.25 *The reasoning behind the interactions that are considered to have a negative effect (i.e. a change which reduces the quality of the environment) is outlined in this section.*

Noise on:

Biodiversity

16.26 Noise generated during the construction phase of the Proposed Development will have a ***temporary negative*** impact on fauna which are likely to be displaced during construction works. As the area is already in a developing commercial/industrial area the overall operational noise levels will not change significantly.

Land, Soils, Geology and Hydrogeology on:

Noise

16.27 Impacts associated with excavation works will be transient in nature and have a short term negative impact on the noise environment, which will be mitigated by the implementation of the CEMP. The effect will be ***slight, negative*** and ***temporary*** in duration***.***

Landscape and Visual on:

Traffic and Transportation

16.28 The establishment of site enclosures, construction traffic access routes, construction vehicular activity, site lighting and temporary traffic management regimes will cause disruption during the construction of the Proposed Development. Effects on landscape character during construction will be ***temporary*** and will generally vary from ***slight/not significant***, and from ***neutral to negative.*** Effects on views during construction will be ***temporary***, and will vary from ***slight*** to ***imperceptible***, and from ***neutral*** to ***negative***. Residual impacts on landscape and visual effects from the wider locality will be not significant or imperceptible.

Summary

16.29 In summary, the interactions between the environmental factors and impacts discussed in this EIA Report have been assessed and the majority of interactions are ***neutral.***

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