10. Population and Human Health

10.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and assesses the likely direct and indirect significant effects on population and human health such as the socio-economic and public health aspects, associated with the Construction, Operational and Decommissioning Phases of the Data Centre Development DC3 (referred to as the "Proposed Development") in accordance with the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022). It should be noted that Chapter 18 (Major Accidents and Disasters), separately addresses the potential effects of possible unplanned events, such as major accidents or disasters, on humans. Chapter 4 (Description of the Proposed Development) provides a description of the Proposed Development and Chapter 5 (Construction) describes the construction strategy.

During the Construction Phase, the potential population and human health effects associated with the Proposed Development have been assessed. This included construction activities such as site clearance, excavation, operation of construction machinery and equipment.

During the Operational Phase, the potential effects on population and human health associated with noise, traffic, visual impact and air quality have been assessed. The assessment has been carried out according to best practice and guidelines relating to population and human health.

The design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental effects, where practicable. In addition, feedback received from consultation with SDCC throughout the alternatives assessment and design development process have been considered, where appropriate.

The aim of the Proposed Development when in operation is to offer expanded compute capacity to GIL's customers and products.

The existing GIL Campus spans approximately 25 hectares and hosts two data centre buildings (DC1 and DC2) as well as ancillary elements. The Proposed Development will be part of an expansion of the existing GIL Campus.

Population aspects of relevance to this assessment primarily include economic and employment opportunities as well as traffic distribution. Other aspects relevant to human beings such as natural amenity, built and natural heritage, ecosystem services, utilities and nuisance are dealt with in the following chapters:

- Traffic and Transport (Chapter 6);
- Air Quality (Chapter 7);
- Climate (Chapter 8);
- Noise and Vibration (Chapter 9);
- Biodiversity (Chapter 11);
- Water (Chapter 12);
- Land, Soils, Geology and Hydrogeology (Chapter 13);
- Archaeological, Architectural and Cultural Heritage (Chapter 14);
- Landscape and Visual (Chapter 15);
- Material Assets (Chapter 17); and
- Major Accidents and Disasters (Chapter 18).

Refer to Appendix 1.1 for the competency of the author of this Chapter.

10.2 Assessment Methodology

10.2.1 General

Population aspects of relevance to this assessment primarily include economic and employment opportunities as well as traffic distribution and visual impact. Potential human health effects are primarily considered through an assessment of the environmental pathways by which health can be affected such as air, noise, water or soil.

The assessment on human health therefore draws on the findings of other relevant chapters of the EIAR as appropriate to assess the potential significant effects on human health.

This Chapter initially sets out the assessment methodology in Section 10.2 and describes the baseline environment of the Proposed Development in Section 10.3.

The potential effects of the Proposed Development which are of relevance for population and human health are described in Section 10.4. Measures are then proposed to mitigate and monitor likely significant potential effects in Section 10.5 and residual effects are described in Section 10.6.

10.2.2 Guidance and Legislation

This assessment has been undertaken with due regard to the following guidance:

- US EPA (2016) Health Impact Assessment Resource and Tool Compilation;
- EIA Directive (2014/52/EU);
- Part X of the Planning and Development Act 2000, as amended;
- IEMA (2017) Health in Environmental Impact Assessment - A Primer for a Proportionate Approach;
- IEMA (2022) Determining Significance for Human Health in Environmental Impact Assessment;
- Institute of Public Health Ireland (2009) Health Impact Assessment Guidance;
- British Standards Institution (2014) 5228-1 and 2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Noise and Vibration;
- EPA (2016) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4);
- EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports; and
- Air Quality Standards Regulations 2022.

10.2.3 Proposed Development Area

The Proposed Development study area with regard to population and human health comprises all areas within the Proposed Development boundary, refer to Figure 1.2 in Chapter 1 (Introduction). For the purposes of this assessment, the South Dublin County (hereafter referred to as SDC), Clondalkin-Village Electoral Division (hereafter referred to as Clondalkin-Village ED) and Small Area 267053001 (hereafter referred to as SA) where the Proposed Development is located was examined in the context of the receiving environment, and with the potential for potential significant effects on population and human health.

10.2.4 Categorisation of the Baseline Environment

The categorisation of the baseline environment has required the assimilation and examination of baseline data through desktop research, site visits and analysis to establish the existing conditions in the Proposed Development area.

It should be noted that the desktop research was limited by the age and availability of published data to inform the baseline. Specifically, the following data has been examined in order to categorise the baseline environment:

- Demographic data from the 2022 Census that has been published by the Central Statistics Office (CSO);
- Health in Ireland Key Trends 2023 Report (Government of Ireland (2024));
- Relevant environmental baseline data gathered and considered as part of this EIAR, especially traffic and transport, air quality, noise, townscape and visual assessments; and
- The Proposed Development as described in Chapter 4 (and associated design drawings).

10.2.5 Assessment of Effects Methodology

The approach to assessing potential effects on population and human health is set out in the current EIA Directive (2014/52/EU). The recitals to the 1985 and 2011 Directives refer to 'Human Health' and include 'Human Beings' as the corresponding environmental factor. The 2014 Directive changes the title of this factor to 'Population and Human Health'.

According to the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022) "*in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc.*"

Potential effects of the Proposed Development on population and human health arise from traffic and transport, air quality and climate, noise and vibration, landscape and visual, and the risk of major accidents and/or disasters. These aspects are dealt with in the specific chapters in this EIAR dedicated to those topics, and this Chapter refers to the residual effects of those assessments included elsewhere in this EIAR for which potential human health effects might occur.

The assessment of the potential effects of the Proposed Development on population and human health has been undertaken having regard to the EPA EIAR Guidelines (EPA, 2022).

Each effect has been categorised based on:

- Quality of the effect;
- Significance of the effect; and
- Duration of the effect.

The definition of these effect characteristics as per the EPA EIAR Guidelines is provided in Table 1.2 in Chapter 1 (Introduction). These characteristics have been used to assess the quality and duration of all effects.

Table 10.1 provides the significance criteria used to identify the significance of effects on population and human health. For the purposes of assessing the effects on population and human health, an effect is deemed to be not significant from a rating of Imperceptible to Moderate, and significant from Significant to Profound.

Table 10.1: Significance Criteria for Utilities.

Significance Level	Criteria
Profound	An effect which obliterates sensitive characteristics.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
Significant	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.

Significance Level	Criteria
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Imperceptible	An effect capable of measurement but without significant consequences.

Following the assessment of effects, specific mitigation and monitoring measures have been developed to avoid, reduce and, if possible, remedy any negative effects on population and human health. These are described in Section 10.5 and residual effects are described in Section 10.6.

10.3 Baseline Environment

The description of the baseline conditions has been made in the context of the Proposed Development site and land use; and demographics in relation to population, health, age structure and economic activity.

10.3.1 Population and Employment

10.3.1.1 National Context

In 2021, the population of Ireland exceeded 5 million people for the first time in 171 years. The country experienced a total growth of 8.1% and the population increased by 387,274 persons between 2016 and 2022 (CSO, 2022b).

Unlike the two previous censuses, annual average growth was driven by migration as opposed to natural increases. As per the Census 2022, the annual growth was characterised by an estimated net migration of 36,631, which was greater than the annual average natural increase of 27,915 (2022). Refer to Table 10.2.

Table 10.2: Population dynamics from 2016 to 2022 in Ireland. Source: CSO, 2022b.

2016 population	2022 population	%Change 2016-2022	Change (2016-2022)
4,761,865	5,149,139	8.1	387,274

The CSO Labour Force Survey for Q4 of 2023 indicated that in Ireland, there was an annual increase in employment of people aged between 15 and 89 years by 89,600 or 3.4% in the 12 months leading up to Q4 2023. However, during Q4 of 2022, the unemployment for persons aged between 15 and 74 years increased by 4.2% from 4.1% (2023).

Additionally, the number of persons not in the labour force in Q4 increased by 0.1%, or 1,700 persons, from the previous year. Moreover, the Potential Additional Labour Force for Q4 of 2023 was 105,700 which consisted of 90,000 persons 'Available but not seeking work' and 15,700 persons 'Seeking but not immediately available for work'.

27.3% of the persons identifying as 'wanting to work but not seeking work' or 'available for work' mentioned in was due to education or training. 32.3% of persons 'not seeking work' reported it was due to own illness or disability (CSO, 2023).

Results from a review of the CSO 2022 Summary Results regarding the number of persons at work, their occupations and related industries for the State of Ireland are presented in Table 10.3, Table 10.4 and Table 10.5 respectively.

Table 10.3: Persons aged 15 years and over by principal status in the State. Source: CSO, 2022b.

Principal Status	Persons	Percentage of Population (%)
At work	2,320,297	56.1
Looking for first regular job	34,526	0.8

Unemployed having lost or given up previous job	176,276	4.3
Student	459,275	11.1
Looking after home/family	272,318	6.6
Retired	657,790	15.9
Unable to work due to permanent sickness or disability	189,308	4.6
Other	27,062	0.7

Table 10.4: Persons at work by industry in the State. Source: CSO, 2022b.

Broad Industrial Group	Number of Persons		
	Both sexes	Male	Female
Agriculture, forestry and fishing (A)	82,228	71,679	10,549
Mining and quarrying (B)	4,756	4,127	629
Manufacturing (C)	242,857	165,625	77,232
Electricity, gas, steam and air conditioning supply (D)	13,312	9,692	3,620
Water supply; sewerage, waste management and remediation activities (E)	12,177	9,612	2,565
Construction (F)	134,482	123,052	11,430
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	276,896	146,453	130,443
Transportation and storage (H)	86,912	68,050	18,862
Accommodation and food service activities (I)	122,613	58,964	63,649
Information and communication (J)	125,471	81,643	43,828
Financial and insurance activities (K)	105,238	53,222	52,016
Real estate activities (L)	12,362	6,420	5,942
Professional, scientific and technical activities (M)	158,146	87,694	70,452
Administrative and support service activities (N)	87,031	49,737	37,294
Public administration and defence; compulsory social security (O)	129,978	64,831	65,147
Education (P)	211,457	51,053	160,404
Human health and social work activities (Q)	269,617	61,293	208,324
Arts, entertainment and recreation (R)	38,169	20,879	17,290
Other service activities (S)	52,663	15,489	37,174
Activities of households as employers; producing activities of households for own use (T)	1,684	122	1,562
Activities of extraterritorial organisations and bodies (U)	1,661	822	839
Industry not stated	150,587	90,894	59,693

Table 10.5: Persons at work by occupation in the State. Source: CSO, 2022b.

Occupation	Number of Persons		
	Total	Male	Female
Corporate managers and directors	108,380	63,695	44,685
Other managers and proprietors	32,392	16,856	15,536
Science, research, engineering and technology professionals	112,242	82,754	29,488
Health professionals	98,794	17,688	81,106
Teaching and educational professionals	115,205	29,312	85,893
Business, media and public service professionals	119,136	59,311	59,825
Science, engineering and technology associate professionals	48,265	32,869	15,396
Health and social care associate professionals	21,159	5,537	15,622
Protective service occupations	24,003	18,978	5,025
Culture, media and sports occupations	17,779	9,613	8,166
Business and public service associate professionals	133,043	68,225	64,818
Administrative occupations	180,068	46,875	133,193
Secretarial and related occupations	34,075	1,657	32,418
Skilled agricultural and related trades	17,208	15,484	1,724
Skilled metal, electrical and electronic trades	77,376	74,569	2,807
Skilled construction and building trades	40,256	39,688	568
Textiles, printing and other skilled trades	45,969	31,568	14,401
Caring personal service occupations	118,653	17,881	100,772
Leisure, travel and related personal service occupations	36,106	11,401	24,705
Sales occupations	103,444	34,959	68,485
Customer service occupations	30,608	11,756	18,852
Process, plant and machine operatives	81,893	57,903	23,990
Transport and mobile machine drivers and operatives	56,518	54,339	2,179
Elementary trades and related occupations	38,447	32,782	5,665
Elementary administration and service occupations	131,437	68,180	63,257

Furthermore, the following economic sectors experienced the greatest percentage increase of year-on-year growth in Q4 2023: Education (+12.2%); Agriculture, Forestry & Fishing (+9.0%) and Other NACE activities R-U (+7.8%) (CSO, 2023).

10.3.1.2 Local Context

According to the South Dublin County Development Plan 2022-2028 (hereafter referred to as SDCDP), SDC experienced continued population growth over the last two decades.

Outside of the years between 2002-2006 where rate of growth decreased, an overall increase of +16.72%, or +39,932 persons, was experienced between 2002 and 2016. Additionally, as per the Regional Spatial and Economic Strategy (RSES) 2019-2031 for the Eastern and Midland Regional Assembly (EMRA) has projected low and high populations for SDC of +14.97% and +18.02% changes in 2031 from 2016 figures.

Table 10.6 below compares the population change in SDC, Clondalkin-Village ED and SA relevant to the Proposed Development between 2016 and 2022.

Table 10.6: Regional population dynamics from 2016 to 2022. Source: CSO, 2022a; CSO, 2022b.

Area	2016	2022	% Change 2016-2022	Change (2016-2022)
SDC	278,767	301,075	8%	22,308
Clondalkin-Village ED	9,152	9,388	2.6%	186
SA	257	277	7.8%	20

The population of SDC, Clondalkin-Village ED and SA increased by 8%, 2.6% and 7.8% respectively between 2016 and 2022.

Table 10.7 below compares the ethnicity of the population in County, ED and SA relevant to the Proposed Development.

Table 10.7: Persons by ethnicity. Source: CSO, 2022a.

Ethnicity	Number of Persons		
	SA	Clondalkin Village ED	SDC
White Irish	179	6,948	212,857
White Irish Traveller	0	15	1,943
Other White	62	973	28,573
Black or Black Irish	0	227	9,347
Asian or Asian Irish	7	237	19,456
Other	4	140	7,226
Note Stated	12	677	18,702

Table 10.8 compares the age of the population in SDC, ED and SA relevant to the Proposed Development.

Table 10.8: Persons by age. Source: CSO, 2022a.

Area	Number of Persons					
	0-19	20-24	25-44	45-64	65-84	85 and over
SDC	84,379	18,540	88,474	69,848	36,416	3,418
Clondalkin-Village ED	2,678	514	2728	2370	1012	86
SA	47	11	69	91	51	8

An analysis of the Census 2022 Mapping results for the SDC, Clondalkin-Village ED and SA relating to economics and employment of the area surrounding the Proposed Development was conducted. A total of 4,403 persons, or 60.48% of the population, are 'At work' within the Clondalkin-Village ED. It should also be noted that a significant portion of the population of Clondalkin-Village ED is retired.

A total of 1,001 persons, or 22.73% of the population is retired. Results relevant to the principal status of the SDC, Clondalkin-Village ED and SA relevant to the Proposed Development populations are outlined in Table 10.9 below.

Table 10.9: Persons aged 15 years and over by principal status in SA, Clondalkin-Village ED and SDC. Source: CSO, 2022a.

	SDC	Clondalkin-Village ED	SA
At work	137,111	4,403	144
Looking for first regular job	2,208	49	4
Short term unemployed	4,328	134	5
Long term unemployed	6,513	174	3
Student	25,822	685	11
Looking after home/family	15,269	448	8
Retired	34,562	1,001	58
Unable to work due to permanent sickness or disability	9,957	340	6
Other	1,316	45	0
Total	**237,086**	**7,279**	**239**

Furthermore, Table 10.10 outlines the occupations of those residing within the SDC, Clondalkin-Village ED and SA. 'Administrative and Secretarial Occupations' represent the largest employment generator in the Clondalkin-Village ED.

Table 10.10: Persons by occupation in SA, Clondalkin-Village ED and SDC. Source: CSO, 2022a.

Occupation	SDC			Clondalkin-Village ED			SA		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Managers, Directors and senior officials	7,120	4,770	11,890	178	138	316	11	4	15
Professional Occupations	13,635	15,244	28,879	258	286	544	12	6	18
Associate Professional and Technical Occupations	10,378	8,283	18,661	326	257	583	5	8	13
Administrative and Secretarial Occupations	4,186	12,399	16,585	145	479	624	3	14	17
Skilled Trades Occupations	12,957	1,124	14,081	506	47	553	19	5	24
Caring, leisure and other service occupations	1,994	8,926	10,920	51	349	400	1	13	14
Sales and Customer Service Occupations	3,539	6,465	1,004	136	228	364	6	2	8
Process, Plant and Machine Operatives	8,219	1,054	9,273	362	39	401	14	2	16
Elementary Occupations	7,835	5,145	12,980	312	193	505	7	7	14
Not stated	8,030	6,649	14,679	252	169	421	9	4	13

Occupation	SDC			Clondalkin-Village ED			SA		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	77,893	70,059	147,952	2,526	2,185	4,711	87	65	152

Table 10.11 outlines the various industries which compose the local workforce. It should be noted that Commerce and Trade represents the largest source of employment at 28.1% of persons 'At work'.

Table 10.11: Persons at work by industry in SA, Clondalkin-Village ED and SDC. Source: CSO, 2022a.

Industry	SA			Clondalkin-Village ED			SDC		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture, Forestry and Fishing	2	0	2	5	1	6	187	58	245
Building and Construction	10	0	10	273	35	308	7,456	843	8,229
Manufacturing Industries	8	5	13	298	125	423	7,794	3,557	11,351
Commerce and Trade	28	16	44	670	568	1238	20,759	18,205	38,964
Transport and Communications	13	6	19	368	145	513	11,407	4,509	15,916
Public Administration	2	4	6	137	119	256	4,103	3,748	7,851
Professional Services	7	18	25	267	719	986	9,923	23,977	33,900
Other	12	13	25	355	318	673	10,535	10,050	20,585
Total	**82**	**62**	**144**	**2,373**	**2,030**	**4,403**	**72,164**	**64,947**	**137,111**

According to 2022 Census data, the journey time to work, school or college of some 25.25% of the population of Clondalkin-Village ED is under 15 minutes. However, the journey time for 8.8% of the population in the ED is of one hour or longer (CSO, 2022a). Refer to Table 10.12 for more details.

Table 10.12: Population aged 5 years and over - journey time to work, school or college in SA and Clondalkin-Village ED. Source: CSO, 2022a.

Journey Time	Clondalkin-Village ED	SA 267053001
Under 15 mins	1,544	37
¼ hour – under ½ hour	1,874	48
½ hour – under 3/4	1,078	30
¾ hour – under 1 hour	380	15
1 hour – under 1 ½ hour	418	10
1 ½ hours and over	120	7
Not stated	702	17
Total	**6,116**	**164**

Furthermore, the most common modes of transport for travelling to work, school, college or childcare locations are cars, as a driver and/or passenger, (50.65%) followed by walking (15.8%).

For residents travelling to work specifically, excluding those working mainly from home, the most common modes of transport are cars, as a driver and/or passenger, (62.72%) followed by bus, minibus or coach (11.54%) and van (6.75%) (CSO, 2022a). Refer to Table 10.13 below.

Table 10.13: Means of travel to work, school, college or childcare in SA and Clondalkin-Village ED Source: CSO, 2022a.

Means of travel	Clondalkin-Village ED	SA
On foot	1,063	19
Bicycle	222	3
Bus, minibus or coach	732	20
Train, Dart or Luas	107	4
Motorcycle or scooter	37	2
Car driver	2,373	79
Car passenger	1,035	23
Van	269	10
Other (incl. lorry)	16	0
Work mainly at or from home	340	12
Not stated	535	8
Total	**6,729**	**180**

The SDCDP identifies Tallaght, Clondalkin and Lucan, the towns found within the wider area surrounding the Proposed Development, as the larger centres of the county and notes that these are *"critical for delivering services, retail and economic activity interconnected with existing and planned transportation."*

Additionally, the SDCDP consider that the local industrial estates provide a range of employment to their immediate environs. More specifically, the *"Greenogue and Aerodrome Business Parks at Rathcoole/Newcastle, Clondalkin Industrial Estate and Fonthill Industrial Estate are large industrial campuses comprising a mix of largely warehousing and manufacturing facilities, providing potential for new jobs or any displacement of jobs from the Naas Road or Tallaght REGEN lands over the coming years"* (SDCC, 2022).

10.3.2 Human Health

10.3.2.1 National Context

The 2023 edition of the 'Health in Ireland: Key Trends' report provides summary statistics of the overall health status of the country.

The report notes that Ireland has the highest self-perceived health status in the European Union (hereafter referred to as EU), with 80% of people perceiving their health status as either 'Very Good' or 'Good'. Additionally, the report asserts that around 29.5% of the population has reported a chronic illness, which is better than the EU average. However, it remains that within Ireland and the EU, a trend exist such that fewer low-income earners report good health statuses (Government of Ireland, 2024).

Moreover, throughout the last decade, the age-standardised mortality rates have declined for all causes by 10.3%. Mortality rates from suicide, transport accidents, pneumonia and stroke have particularly stood out with decreases of -26.1%, -52.4%, -41.0% and -39.9% respectively. It should also be mentioned that infant mortality rates, measured as deaths per 1,000 live births, have decreased by 8.5% since 2012, yet experienced a temporary increase of 14.1% between 2019 and 2021.

With regard to this matter, Ireland remains average in comparison to the EU average. Additionally, the current life expectancy in Ireland is of 84 years for women and 81 years for men (Government of Ireland, 2024).

Table 10.14 below describes the self-perceived health status of the population of Ireland.

Table 10.14: Self-perceived health status. Source: CSO, 2022b.

General Health Status	Percent of Total Population (%)
Very good	53.2
Good	29.7
Fair	8.6
Bad	1.4
Very Bad	0.3
Not Stated	6.7

10.3.2.2 Local Context

General Health

The SDC is part of the National Healthy Cities and Counties of Ireland Network, which is accredited to the World Health Organisation (hereafter referred to as WHO). Twenty countries in the EU region are a part of this network. The purpose of the network is to develop a structure to support Local Authorities in implementing a Health Ireland Framework (Government of Ireland, 2023). According to the Government of Ireland (2023) a healthy city or county aims to:

- Improve health and wellbeing by creating and continually improving its physical and social environments; and
- Develop community resources that help people to support each other and achieve their potential.

SDC Council outlines numerous planning objectives in the SDCDP (2022) with the aim to deliver *"healthy places in which to live, work, visit, socialise and invest."*

Results from the 2022 Census indicate that approximately 83% of the population in the SDC identifies themselves as being in either 'Very Good' or 'Good' health. Similarly, approximately 81.6% and 76.9% of the populations of Clondalkin-Village ED and SA respectively, perceived themselves as being in 'Very Good' or 'Good' health. Only 1.6% and 1.8% of the populations in these areas perceived themselves as being in 'Bad' or 'Very Bad' health (CSO, 2022a). Refer to Table 10.15.

Table 10.15: Self-perceived health status in SDC, Clondalkin-Village ED and SA. Source: CSO, 2022a.

General Health Status	Clondalkin-Village ED			SA			SDC		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Very good	2,331	2,391	4,722	78	62	140	79,693	81,286	160,979
Good	1,416	1,522	2,938	37	36	73	43,030	45,954	88,984
Fair	380	461	841	16	24	40	11,359	13,592	24,951
Bad	50	73	123	2	3	5	1,942	2,427	4,369
Very Bad	14	13	27	0	0	0	477	521	998
Not Stated	419	318	737	8	11	19	10,745	10,049	20,794

General Health Status	Clondalkin-Village ED			SA			SDC		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	**4,610**	**4,778**	**9,388**	**141**	**136**	**277**	**147,246**	**153,829**	**301,075**

Results from the 2022 Census also shows that there were 559 carers and 2,029 persons with a disability in Clondalkin-Village ED compared with 20 carers and 58 persons with a disability in SA (CSO, 2022a).

Information on the receiving environment with regards to air, noise and water quality is provided in the following Chapter 7 (Air Quality), Chapter 9 (Noise and Vibration) and Chapter 12 (Water).

10.3.3 Tourism

10.3.3.1 National Context

According to the Irish Tourism Industry Confederation (ITIC) *"Ireland's tourism industry demonstrated remarkable resilience this year [2023] despite domestic capacity challenges and international geopolitical upheaval."* The sector was identified as the largest indigenous industry and approximately 254,000 people worked in tourism and hospitality businesses. International visitors were estimated to spend approximately 5.3 billion Euros in 2023, with North American visitors contributing the most to this figure, followed by Continental Europeans, British tourists and the rest of the world (ITIC, 2023).

10.3.3.2 Local Context

The Dublin region is an import tourist destination for Ireland. In 2019 alone, the region received 6.6 million internation visitors, 4 million of which were for holiday purposes (SDCC, 2022). Furthermore, 1.8 million domestic tourists travelled to Dublin in 2019 and generated 296 million Euros in revenue, spending on average 1.9 nights per stay in the city (SDCC, 2023).

In SDC, tourism generates approximately 140 million Euro annually with accommodation accounting for 107.52 million Euro, attractions for 3.16 million Euro and activities 29.46 million Euro. Furthermore, Failte Ireland estimates show that tourism provided 3,780 jobs in the county. It was estimated that a combination of indicative direct visitor revenue and indirect and/or induced benefits can have a 350 million Euro economic effect from tourism expenditure in the county annually (SDCC, 2023).

As a significant economic driver, the SDCDP 2022-2028 considers tourism a *"key growth sector of the Irish economy"* as it *"supports job creation across a diverse range of sectors and skill levels"* (SDCC, 2022).

As the Proposed Development is situated in a predominantly industrial zone, there are few important touristic destinations within the immediate surrounding area. However, there are a number of hotels and accommodations nearby. The nearest hotels are The Address Hotel Citywest, Ashemere Lodge and The Green Isle Hotel Dublin are located 2.4, 2.8 and 3km from the Proposed Development respectively. The greater area surrounding the site does include more hotels and other accommodations, mainly found in Clondalkin and Tallaght.

10.3.4 Location, Land-uses and Amenities

The GIL Campus is located at Grange Castle Business Park South, Baldonnel Rd, Dublin, D22 X602. The Proposed Development site is bounded to the south by Baldonnel Road and to the east by Profile Business Park. Some residential properties can be found to the west and south, yet the surrounding land is mainly comprised of commercial, industrial and agricultural sites. The Proposed Development is also located near key roads (such as the M50 Motorway), rail connections, Dublin Airport, Dublin Port and Casement Aerodrome.

The Proposed Development is situated within SDC and is approximately 12km south west of Dublin city centre. Important nearby towns include Clondalkin, Newcastle, Tallaght and Adamstown, located approximately 4km northeast, 4km southwest, 5km southeast and 2km north of the Proposed Development respectively.

Moreover, the Proposed Development is situated within the Grange Castle Business Park which is occupied by a variety of businesses catering to several industries. As such, the Proposed Development neighbours large facility campuses such as Microsoft, Centrica, Amazon Web Services, Vantage Data Centres, Dub11 Limited and Pfizer Ireland. Additionally, the Proposed Development is approximately 200m north of Casement Aerodrome which is operated by the Department of Defence.

The site of the existing GIL Campus is zoned mainly for enterprise and employment-related uses under the SDCDP 2022-2028. Many of the lands on the north, east and west of the Proposed Development site are zoned for the same purposes and host different data centres, substations and other ancillary buildings. The area in the southeast of the Proposed Development site is zoned RU with the objective to protect and improve rural amenity and provide for agricultural development.

There are a number of dwellings located on the southern side of the Baldonnel Road which runs along the southern border of the Proposed Development site. These dwellings are situated 50 metres from the Proposed Development boundary. Additionally, a number of individual dwellings are positioned along Nangor Road approximately 370 meters from the northern boundary of the Proposed Development.

10.3.4.1 Community and Recreational Facilities

Although the Proposed Development is situated in a predominantly industrial and agricultural zone, numerous facilities are located nearby which cater to the local community and recreational activities.

The Grange Castle and Newcastle Golf Clubs are situated approximately 1km east and 5km northwest of the Proposed Development, respectively. Furthermore, the Corkagh Park, which consists of a baseball facility, play area, dog park and GAA pitch, is located approximately 2km east of the Proposed Development.

In addition, St. Finian's and Lucan Sarsfields GAA Clubs are located approximately 2.6 and 2km southwest and northwest of the Proposed Development. Similarly, the Clondalkin Rugby and St. Francis Football Clubs are found approximately 1.4 and 1.8km southeast of the Proposed Development, respectively. Additionally, the Peamount United Football club is situated approximately 2km southwest of the Proposed Development.

With regard to green spaces, the Grand Canal greenway, an important green way offering green space throughout Dublin, is approximately 1.8km north of the Proposed Development site.

Furthermore, several community centres and places of worship are located within Peamount, Newcastle, Rathcoole, Clondalkin and Tallaght. It should be noted that the nearest church is approximately 740 metres northeast of the Proposed Development.

10.3.4.2 Schools

There are no schools located within the immediate surroundings of the Proposed Development site as the populations surrounding the Proposed Development are serviced by schools in nearby towns and villages such as Clondalkin, Adamstown, Tallaght and Lucan. The nearest schools are Westbourne Park Pre-School, Adamstown Castle Educate Together and Sacred Hearth National School located 2.3, 2.4 and 2.9km northeast, north and east of the Proposed Development.

The site of Little Genius and Junior Genius Creches is approximately 300 metres west of the southern Proposed Development boundary. Additionally, the Peamount Education (Training) Centre is located approximately 1.8km to the west of the Proposed Development.

10.3.4.3 Healthcare Facilities

There are no medical facilities within the immediate area surrounding the Proposed Development. However, a number of medical centres are situated in the wider area around the Proposed Development in towns such as Rathcoole, Newcastle, Clondalkin and Tallaght. The nearest medical centres are: Nangor Medical Centre, Clondalkin Medical Centre and Draeger Medical Ireland located approximately 2.2, 2.4 and 2.6km northeast and southeast of the Proposed Development.

The nearest important hospital facilities are the Peamount Hospital and Deansrath Health Centre, found 1.9 and 2km west and northeast of the Proposed Development.

10.4 Potential Effects

This section presents potential effects that may occur due to the Proposed Development, in the absence of mitigation. This informs the need for mitigation or monitoring to be proposed (refer to Section 10.5). Potential 'residual' impacts, taking into account any proposed mitigation, are presented in Section 10.6.

10.4.1 Do-nothing Scenario

In the scenario where the Proposed Development did not proceed as planned, none of the likely construction, operational or decommissioning effects as set out in this Chapter would occur.

In the absence of the Proposed Development, the existing GIL Campus would operate as it does currently, without the potential for additional cloud computing capacity which the Proposed Development would facilitate.

Under the 'do-nothing' scenario, no additional employment opportunities would be generated, and no subsequent economic benefits would be gained locally, regionally or nationally.

Should the Proposed Development not proceed, there would be no change in existing traffic movements or journey patterns, no new atmospheric emissions, and the risk of major accidents or disasters occurring on site would remain to be determined based on existing GIL Campus operations.

10.4.2 Construction Phase

10.4.2.1 Population

Employment

Approximately 800 temporary construction jobs are expected to be provided during the 27-month Construction Phase of the Proposed Development. Additional, indirect employment is likely to arise due to the servicing of the construction workers, for example the provision of catering. The additional employment during the Construction Phase is expected to result in Positive, Significant and Short-Term effects on the local population.

Traffic

The traffic levels generated during the Construction Phase of the Proposed Development is expected to result in Negative, Not Significant, Short-Term effects on traffic and therefore not resulting in significant effects on the mobility of the local population. Access to all local residences in the immediate vicinity of the site will be maintained during the Construction Phase.

The overall potential effect on population during the Construction Phase of the Proposed Development is deemed to be Positive, Significant and Short-Term. While the traffic levels during the Construction Phase will increase, it is not expected to result in any congestion that would significantly affect the local road users, refer to Chapter 6 (Traffic and Transport).

10.4.2.2 Human Health

Air and Noise Emissions

No Significant air or noise emissions are predicted to be generated at sensitive receptors during the Construction Phase due to traffic servicing the Proposed Development. However, there is the potential for Significant dust and noise emissions to arise during certain activities during the Construction Phase of the Proposed Development that has the potential to affect human health in the absence of mitigation measures.

The unmitigated dust emissions during the Construction Phase are expected to result in Negative, Significant and Short-Term effects on human health. Chapter 7 (Air Quality) provides further detail on the potential significant effects of the Construction Phase of the Proposed Development on air quality and the proposed mitigation measures to ensure the risk to human health is mitigated.

In considering the nature and scale of the proposed construction works, unmitigated noise and vibration levels are predicted to result in Negative, Not Significant and Short-Term, to Negative, Significant to Very Significant and Short-term effects on the local population's health in the absence of mitigation measures. Chapter 9 (Noise and Vibration) provides further detail on the potential significant effects of the Construction Phase of the Proposed Development on noise and vibration.

Amenity

There is the potential for adverse visual effects to arise due to vegetation removal, the introduction of new structures and access roads, machinery, increases in HGVs on local roads, materials storage, associated earthworks, car parking, lighting and hoarding in the absence of mitigation measures. Chapter 15 (Landscape and Visual) provides further detail on the potential Significant effects during the Construction Phase of the Proposed Development on landscape and visual.

Major Accidents and Disasters

As outlined in Chapter 18 (Major Accidents and Disasters), there is a potential for Adverse Significant effects due to activities during the Construction Phase of the Proposed Development in the absence of mitigation measures. Further detail on the risks of accidents or disasters is presented in Chapter 18 (Major Accidents and Disasters).

Overall, the potential unmitigated effect the Construction Phase of the Proposed Development on human health is deemed to be Negative, Significant and Short-Term.

10.4.3 Operational Phase

10.4.3.1 Population

Employment

The Proposed Development will have a Positive, Moderate and Long-Term effect on the population of SDC and beyond, through employment generation and improvements to the digital infrastructure during the Operational Phase. The Proposed Development is expected to create a need for a total of approximately 50 additional staff, of which includes 25 highly skilled staff and 25 support staff once DC3 is fully operational in 2027. Equally, the Proposed Development will be important infrastructure which will assist in enabling an open modern economy, facilitating digital transformation by responding to increasing digital demands, and associated productivity and competitiveness gains in Ireland.

Traffic

The increase in traffic during the Operational Phase of the Proposed Development will be relatively minor resulting in Negative, Imperceptible, Long-Term effects on traffic in the local road network. The provision of a new proposed active travel link between Grange Castle Road and Profile Park Road is expected to have Positive, Significant and Permanent effects on pedestrian and cycle accessibility as walking and cycling distances to and from the site, and in the general area will be reduced significantly. Chapter 6 (Traffic and Transport) provides further details.

Overall, the Operational Phase of the Proposed Development is likely to have a Positive, Significant, Long-Term effects on the population due to the employment provision and the upgrading of the pedestrian and cycle network between Grange Castle Road and Profile Park Road.

10.4.3.2 Human Health

Air and Noise Emissions

The IE Licence requires the applicant to maintain atmospheric emissions at a limit set by the EPA. This requirement will continue to be complied with by GIL. As it is proposed to limit the emergency operation of the generators to 100 hours per annum, no Adverse Significant effects on air quality in EIA terms are predicted during the Operational Phase that could affect human health. Refer to Chapter 7 (Air Quality) of this EIAR for further detail.

Operational noise from the Proposed Development will also continue to meet the IE licence limits for the GIL Campus. An increase in noise levels of between 1 and 3 dBA is predicted to arise at 6 receptors, which constitutes a Negative, Slight to Moderate, Long-Term effect on overall noise levels at these receptors. Chapter 9 (Noise and Vibration) provides further detail on the potential noise and vibration effects associated with the Proposed Development.

Amenity

Chapter 15 (Landscape and Visual) provides detail on the aspects of the Proposed Development during the Operational Phase which may cause Negative effects on the landscape which may in turn affect human health of local receptors.

Major Accidents and Disasters

The Proposed Development is not expected to give rise to any increased risk of major accidents or disasters at the GIL Campus that could affect human health. As outlined in Chapter 18 (Major Accidents and Disasters), there is a potential for Adverse Significant effects on population and human health during the Operational Phase of the Proposed Development in the absence of mitigation. Further detail on the risks of accidents or disasters at the GIL Campus is presented in Chapter 18 (Major Accidents and Disasters).

Overall, the potential unmitigated effect the Operational Phase of the Proposed Development is predicted to have on human health is deemed as Negative, Significant and Long-Term.

10.4.4 Decommissioning Phase

It is predicted that the activities carried out during the Decommissioning Phase of the Proposed Development are likely to be similar to those activities carried out during the Construction Phase. Therefore, the potential effects that may be caused by the activities during the Decommissioning Phase on population and human health will have the same significance rating or lesser than those listed in Construction Phase.

10.5 Mitigation and Monitoring

10.5.1 Construction Phase

Construction Phase mitigation measures relating to those factors under which population and human health effects might occur are included in the relevant sections of this EIAR, i.e. traffic and transport, noise and vibration, air quality, landscape and visual, and major accidents and disasters. Other than the mitigation measures outlined in Chapter 6, 7, 9, 15 and 18 no further mitigation measures are proposed with respect to population and human health.

10.5.2 Operational Phase

The Proposed Development will operate under a revised IE Licence and as such will have prescribed Operational Phase monitoring measures set by the EPA. These controls and monitoring measures must be complied with by GIL in order to operate.

Operational Phase mitigation measures relating to those factors under which population and human health effects might occur have been addressed elsewhere in this EIAR, under the environmental factors for traffic and transport, noise and vibration, air quality, landscape and visual, and major accidents and disasters. Other than the mitigation measures outlined in Chapter 6, 7, 9, 15 and 18 no further mitigation measures are proposed with respect to population and human health.

During the Operational Phase ongoing monitoring, which is carried out in accordance with the GIL Campus IE licence, will include all aspects of the Proposed Development.

10.5.3 Decommissioning Phase

It is predicted that the activities carried out during the Decommissioning Phase of the Proposed Development would be similar to those activities carried out during the Construction Phase.

Therefore, the mitigation measures implemented during the Decommissioning Phase will be similar or equivalent to those listed in the Construction Phase. As outlined in Section 5.7, decommissioning activities will need to be undertaken in accordance with the requirements of the IE licence.

10.6 Residual Effects

Overall, a direct Positive, Moderate, Long-Term residual effect on population is predicted to occur as a result of the economic and employment opportunity associated with the Proposed Development. Following the implementation of construction, operation and decommissioning mitigation measures, no Significant Adverse effects on human health are expected to arise.

Chapter 12 (Water), Chapter 13 (Land, Soils, Geology & Hydrogeology) and Chapter 17 (Material Assets) do not report any Adverse, Significant residual effects that are likely to result in Adverse Significant effects on human health. On this basis, the potential effect of other environmental hazards associated with the Construction, Operational and Decommissioning Phases of the Proposed Development on human health will be Neutral.

10.7 References

British Standards Institution (2014) 5228-1 and 2:2009+A1:2014. *Code of practice for noise and vibration control on construction and open sites*

CSO (2022) *Census Mapping 2022*

CSO (2022) *Census of Population 2022*

CSO (2023) *Labour Force Survey Quarter 4 2023*

EC (2022) *Air Quality Standards Regulations*

EPA (2016) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4)

EPA (2022) *Guidelines on the information to be contained in Environmental Impact Assessment Reports*

EPA (n.d.) *National Radon Control Strategy*

EPA (n.d.) *Radon Map*

Government of Health (2023) *Health Counties and Cities*

Government of Ireland (2024) *Health in Ireland Key Trends 2023*

Government of Ireland (GoI) (2022) *Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022).*

EU (2014) EIA Directive (2014/52/EU)

IEMA (2017) *Health in Environmental Impact Assessment - A Primer for a Proportionate Approach*

IEMA (2022) *Determining Significance for Human Health in Environmental Impact Assessment*

Institute of Public Health Ireland (2009) *Health Impact Assessment Guidance*

ITIC (2023) *Year End Review 2023 & Outlook 2024*

Government of Ireland (2000) *Part X of the Planning and Development Act 2000*, as amended;

SDCC (2022) *South Dublin County Development Plan 2022-2028*

SDCC (2023) *South Dublin County Tourism Strategy*

US EPA (2016) *Health Impact Assessment Resource and Tool Compilation*

11. Biodiversity

11.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and assesses the likely direct and indirect significant effects associated with the Construction, Operational and Decommissioning Phases of the Data Centre Development DC3 (referred to as the "Proposed Development") in accordance with the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

During the Construction Phase, the potential biodiversity effects associated with the Proposed Development have been assessed. This included construction activities such as site clearance, excavation, operation of construction machinery and tools.

During the Operational Phase, the potential biodiversity effects associated with drainage, surface water management and lighting have been assessed.

The design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental effects, where practicable. In addition, feedback received from consultation undertaken throughout the alternatives assessment and design development process have been considered, where appropriate.

The aim of the Proposed Development when in operation, is to offer expanded compute capacity to GIL's customers and products. The Proposed Development is described in detail in Chapter 4 (Description of the Proposed Development) and Chapter 5 (Construction).

In accordance with the requirements of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended (for example, the EIA Directive), this Chapter of the EIAR identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Development on biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC (for example, the Habitats and Birds Directives). In addition, this Chapter of the EIAR also identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Development on species protected pursuant to the Wildlife Acts 1976 to 2017.

The EIA Directive does not provide a definition of biodiversity. The Convention on Biological Diversity, however, gives a formal definition of biodiversity in its Article 2:

"Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

Alongside the term *"biodiversity"* the terms *"ecology"* and *"ecological"* are also used throughout this Chapter as a broader term to consider the relationships of biodiversity receptors to one another and to their environment.

The Chapter is set out as follows:

- Section 11.2 presents the methodology;
- Section 11.3 describes the baseline environment;
- Section 11.4 summarises the main characteristics of the Proposed Development which are of relevance for biodiversity;
- Section 11.5 describes the potential effects of the Proposed Development on biodiversity during the Construction and Operation Phase;
- Section 11.6 outlines the mitigation and monitoring measures;
- Section 11.7 describes the residual effects;

- Section 11.8 includes the references quoted throughout the Chapter.

The biodiversity lead is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) and experienced leader (Project Manager) of technical projects including high profile projects and has provided expertise internationally, refer Appendix 1.1.

11.2 Assessment Methodology

11.2.1 Introduction

The methodologies used to collate information on the baseline biodiversity environment and assess the potential effects of the Proposed Development are detailed in the following sections.

11.2.2 Legislation and Planning Policies

The collation of ecological baseline data and the preparation of this Chapter has had regard to the following legislation and guidance documents. This is not an exhaustive list of all legislation and guidelines but the most relevant legislative and guidelines basis for the purposes of preparing this Chapter of the EIAR.

11.2.2.1 Legislation

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, hereafter referred to as the Habitats Directive;
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, hereafter referred to as the Birds Directive;
- 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 Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014, hereafter referred to as the EIA Directive;
- European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011), as amended, hereafter referred to as the Birds and Habitats Regulations;
- European Union (EU) (Invasive Alien Species) (Freshwater Crayfish) Regulations 2018 [SI 354/2018];
- Flora (Protection) Order, 2015 (S.I. No. 356 of 2015);
- Inland Fisheries Acts 1959 to 2017, hereafter referred to as the Fisheries Acts;
- Invasive Alien Species of Union concern listed under the EU IAS Regulation [1143/2014];
- Planning and Development Acts 2000 to 2022 (as amended), hereafter referred to as the Planning Acts; and
- Wildlife Acts 1976 to 2023, hereafter referred to as the Wildlife Acts.

These pieces of legislation include offences relating to protected species, habitats and designated sites and requirements for mitigation and licences to allow construction works to proceed. The Planning and Development Acts include provisions setting out the requirement for the consideration of the potential effects of a Proposed Development on Ramsar sites, Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). For the purposes of this Report, all sites designated as an SAC or SPA shall be referred to as a European site. Potential effects of the Proposed Development on European sites are considered in detail for the purposes of Appropriate Assessment under the Habitats Directive in the Appropriate Assessment (AA) Screening Report and Natura Impact Statement (NIS) that forms part of the planning application for the Proposed Development.

11.2.2.2 Planning policies

National Development Plan (2021-2030)

The National Development Plan (NDP) 2021-2030 (Department of Public Expenditure, NDP Delivery and Reform, 2021) aims to enhance amenity and heritage through the strategic investments priorities in national heritage including protecting Ireland's rare and endangered plants, animals and their habitats.

National Biodiversity Action Plan

The 4th National Biodiversity Action Plan (NBAP) of Ireland (Department of Housing, Local Government and Heritage, 2024), covering the period from 2023 to 2030, was unveiled on 25 January 2024. This plan, which sets the national biodiversity agenda for the next seven years, aims to bring about the transformative changes needed to appreciate and safeguard nature. The plan was formulated with the assistance, guidance, and contributions of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum.

The NBAP advocates for a comprehensive approach to biodiversity governance and conservation, involving all levels of government and society. The goal is to ensure that every individual, community, business, local authority, semi-state, and state agency is aware of biodiversity, its significance, and the consequences of its loss.

The plan builds on the successes of the previous plan and continues to implement actions within the framework of five strategic objectives:

- Address immediate conservation and restoration needs;
- Enhance Ireland's role in international biodiversity initiatives;
- Ensure nature's contributions to people;
- Implement a comprehensive approach to biodiversity; and
- Improve the evidence base for biodiversity action.

The plan comprises 194 actions which include:

- Deliver on obligations to conserve important and sensitive habitats and species;
- Develop a national restoration plan which would address the decline in species loss with objectives to achieve long-term recovery with binding targets for habitats and species;
- Expand and enhance the network of national parks;
- Increase collaboration on nature friendly farming;
- Strategically target efforts on invasive species; and
- Strengthen action on wildlife crime.

The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The law mandates that every public body, as listed in the Act, are obliged to have regard to the objectives and targets in the National Biodiversity Action Plan. Additionally, local authorities will be required to produce and update local biodiversity action plans and integrate biodiversity into their plans, policies and programmes.

Initiatives within the NBAP include the 'Business for Biodiversity' platform which was launched to encourage and incentivise businesses to assess their impacts and dependencies on biodiversity. The overarching aim of this platform is to support the implementation of the NBAP, halt harmful activities and promote restoration and regeneration of biodiversity.

Project Ireland 2040 - National Planning Framework

The National Planning Framework (NPF) (Government of Ireland, 2018) is the Irish Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040.

It is a framework to guide public and private investment, to create and promote opportunities for the country's citizens, and to protect and enhance the environment. Two objectives within the NPF which are directly relevant to the Proposed Development are the following:

National Policy Objective 59 aims to enhance the conservation status and improve the management of protected species by:

- Implementing relevant EU Directives to protect Ireland's environment and wildlife;
- Integrating Policies and objectives for the protection and restoration of biodiversity in statutory development;
- Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites; and
- Continued research, survey programmes and monitoring of habitats and species.

National Policy Objective 60 aims to conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance.

South Dublin County Development Plan (2022-2028)

The objectives identified in the South Dublin County Development Plan (SDCC, 2022) that are considered relevant to the biodiversity of the Proposed Development are tabulated in Appendix 11.1.

Of particular significance to the Proposed Development are the following:

- GI1 Objective 7: To develop linked corridors of small urban 'Miyawaki' native mini-woodlands, a minimum of 100 sq. m in size, to capture carbon and encourage biodiversity in suitable existing built-up areas, in low grade parkland, and other areas of zoned lands were deemed suitable and appropriate;
- GI2 Objective 2: To protect and enhance the biodiversity and ecological value of the existing GI network by protecting where feasible (and mitigating where removal is unavoidable) existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design and construction process, such proactive approach to include provision to inspect development sites post construction to ensure hedgerow coverage has been protected as per the plan;
- GI4 Objective 1: To limit surface water run-off from new developments through the use of Sustainable Drainage Systems (SuDS) using surface water and nature-based solutions and ensure that SuDS is integrated into all new development in the County and designed in accordance with South Dublin County Council's Sustainable Drainage Explanatory Design and Evaluation Guide, 2022;
- GI5 Objective 4: To implement the Green Space Factor (GSF) for all qualifying development comprising 2 or more residential units and any development with a floor area in excess of 500 sq m. Developers will be required to demonstrate how they can achieve a minimum GSF scoring requirement based on best international standards and the unique features of the County's GI network. Compliance will be demonstrated through the submission of a GSF Worksheet (see Chapter 12 (Water) Implementation and Monitoring, Section 12.4.2).
- NCBH11 Objective 3: To protect and retain existing trees, hedgerows, and woodlands which are of amenity and / or biodiversity and / or carbon sequestration value and / or contribute to landscape character and ensure that proper provision is made for their protection and management taking into account Living with Trees: South Dublin County Council's Tree Management Policy (2015-2020) or any superseding document and to ensure that where retention is not possible that a high value biodiversity provision is secured as part of the phasing of any development to protect the amenity of the area;
- NCBH2 Objective 4: To protect our rivers and in particular to avoid overdevelopment which could have an adverse effect on the biodiversity and ecosystems of the river; and
- NCBH5 Objective 2: To ensure that an Ecological Impact Assessment is undertaken for developments proposed in areas that support, or have the potential to support, protected species or features of biodiversity importance, and that appropriate avoidance and mitigation measures are incorporated into all development proposals.

Draft Biodiversity Action Plan for South Dublin County (2020-2026)

The Draft Biodiversity Action Plan for South Dublin County (2020-2026) (SDCC, 2020) emphasises the importance of biodiversity for the County's residents, businesses, and visitors, and the many services that nature provides. The action plan has been prepared in response to national obligations under the National Biodiversity Action Plan 2023-2030 and under the EU Biodiversity Strategy for 2030. The implementation of the plan is progressing. The plan has specific actions for policy, good governance and climate action:

- Action 3.1: Devise and implement good governance strategies to ensure the smooth integration of national and EU biodiversity legislation and policy requirements into all Council plans, projects, and services;
- Action 3.2: Develop and implement best practice biodiversity protection guidelines and maintenance plans for the County's habitats and species, for use on Council lands and as guidance to assist local communities, developers, businesses, farming community, schools, etc;
- Action 3.3: In the preparation process for the SDCC Development Plan, innovative approaches to promote strategic biodiversity policies and objectives will be developed; and
- Action 3.4: Coordinate with the Council's Climate Change Action Plan 2019-2024 to identify impacts on biodiversity arising from climate change, targeting and implementing necessary measures to assist biodiversity adapt to changing conditions.

Living with Trees 2021-2026

The 'Living with Trees' 2021-2026 policy (SDCC, 2021) aims to implement a proactive tree management program, expand the tree canopy in the county, and initiate a public awareness and education program. In relation to development the following policies are listed:

- The Council will use its powers to ensure that where it is conducive with the objectives of the County Development Plan, and other planning objectives, there is maximum retention of trees on new development sites; and
- Where there are trees within a proposed planning application site or on land adjacent to it that could influence or be affected by Proposed Development, including street trees in the ownership or management of the Council, the planning application must include a detailed submission prepared by a suitably qualified Arboriculturist in accordance with British Standard 5837: 2012 'Trees in Relation to Design, Demolition and Construction – Recommendations.

South Dublin County Council Pollinator Plan 2021-2025

The SDCC Pollinator Action Plan (SDCC, 2021) is based on the All-Ireland Pollinator Plan (National Biodiversity Datacentre (NBDC), 2021). It sets out a broad range of actions that SDCC are committed to implementing over the next five years. All actions are based on reversing declining bee populations in Ireland.

Relevant action proposed for the Proposed Development include the planting of native hedgerows specified in new development sites and parks, to replace improved grass with a dense clover sward and for future ornamental tree planting select from pollinator friendly species (requested as part of all development sites).

11.2.3 Guidance and Standards

The criteria used to assess the ecological value and significance of the Proposed Development for habitats and species follows Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority (NRA), 2009) (Appendix 11.2), consistent with the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2021). The NRA Guidelines have been used to assess the effects of not only roads but other developments such as data centres in the local area.

Survey guidance was adapted from best practice guidelines set out by the following organisations:

- A Guide to Habitats in Ireland Fossitt (J.A Fossitt, 2000);

- Bat Mitigation Guidelines For Ireland (National Parks and Wildlife Service (NPWS), Department of Environment, Heritage and Local Government, 2022);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn) (Bat Conservation Trust (BCT), 2023);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2009);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009); and
- Guidelines for Preliminary Ecological Appraisal, (2nd edn) (CIEEM, 2017).

11.2.4 Scope of Assessment

The assessment of potential effects on habitats and species resulting from the Proposed Development was based on the baseline known at the time of writing.

The assessment involved the following stages:

- Identification of the potential Key Ecological Receptors (KERs). A KER refers to a specific ecological feature or component that is particularly sensitive to potential effects from development activities;
- Establish the ecological zones of influence of the Proposed Development for each important ecological feature identified;
- Evaluation of ecological resources and features likely to be affected (the baseline environment);
- Identification of the biophysical changes likely to affect valued ecological resources and features and an assessment of whether these biophysical changes are likely to give rise to a significant ecological effect;
- Refinement of the Proposed Development to incorporate ecological mitigation and enhancement measures to avoid, reduce or compensate for any significant adverse effects; and
- Assessment of the predicted residual effects taking mitigation and enhancement measures into account and evaluation of the significance of the consequent residual effects.

11.2.5 Zone of Influence (ZoI)

The ZoI is a distance within which the Proposed Development could potentially affect KERs. The ZoI varies by KER and depends on the source of impact, the sensitivity of the receptor, and the presence of a pathway between the two.

In this instance, the key sources of potential impacts are construction activity within the lands and the potential for this to generate pollutants to the local surface water network, disturb or displace species within the lands, or result in the direct loss of habitat and/or mortality of fauna within the lands, and the potential for discharge of pollutants to local surface waters during operation of the project.

The potential receptors in this instance are designated sites (including European sites) outside of the landownership and terrestrial habitats and fauna within the site and immediate vicinity.

Given the scale of this Proposed Development, the potential to affect off-site ecological features is moderate. As such the maximum ZoI of the Proposed Development upon ecological features is anticipated to be:

- EU Annex I habitat – up to 500 metres (m) from Proposed Development as direct and indirect effects will occur within the site or immediately adjacent habitat may be affected;
- International statutory designations – up to 20 kilometres (km) from Proposed Development as direct and indirect effects may occur and a potential hydrological pathway was identified;
- National statutory and non-statutory designations – up to 2km from Proposed Development as direct and indirect effects may occur and a potential hydrological pathway was identified; and

- Protected and notable fauna – up to 2km from Proposed Development as considered to be appropriate foraging distance for bats, birds and relevant terrestrial mammals.

11.2.5.1 Baseline Collection: Desk Study

A desktop study was carried out to inform the initial scope of the ecological surveys required to inform the environmental impact assessment. The desktop study involved collection and review of relevant published and unpublished sources of data and collation of existing information on the ecological environment.

Details were sought for European sites within 15km, national sites (Natural Heritage Area (NHA)) and non-statutory sites (proposed Natural Heritage Area (pNHA)) within 2km and Annex I habitat within 500m of the Proposed Development were also identified using the NPWS Designation Viewer and online data.

Species records were obtained from the National Biodiversity Data Centre (NBDC) from 2km radius of the Proposed Development[1]. This included protected, rare, and invasive species, listed under Irish legislation (Section 11.2.2.1). Any records over ten years old have been omitted as these are not considered to reflect current species assemblage of the Proposed Development and surrounding area.

Bat landscape suitability layer (Lundy *et al*, 2011) was also reviewed using NBDC. That layer was developed by review of Biodiversity Ireland's National Bat Landscape database based on Lundy *et al.,* 2011 using Maximum Entropy modelling to provide the likelihood of finding bat species in the landscape. The habitat suitability index generated ranges from 0-100, with 100 being most suitable for bats.

Previous ecological reports undertaken for the Proposed Development by Scott Cawley were also reviewed for additional survey data, desk records and Proposed Development details. Available data was reviewed.

The following data sources utilised are listed:

- Birds of Conservation Concern in Ireland 4: 2020–2026 (Gilbert *et al*, 2021);
- Environmental Protection Agency (EPA) Online Map Viewer (EPA, 2024);
- Geological Survey Ireland Map Viewer (GSI, 2024);
- Google aerial photography (viewed in October 2023);
- National Biodiversity Data Centre (NBDC) (NBDC, 2024);
- NPWS online data on designated sites (NPWS, 2024);
- NPWS online data on protected flora and fauna (NPWS, 2024); and
- South Dublin County Development Plan 2022-2028 and interactive map (ArcGIS, 2022).

Bat data collected as part of previous studies on the Proposed Development were reviewed (Scott Cawley, 2019, Appendix 11.3). This data consisted of two transect surveys (21 August 2019 and 4 September 2019) and one static monitor deployment (21 August 2019 to 4 September 2019).

Existing bat records held by Bat Conservation Ireland (BCI) and NPWS were also reviewed on the National Bat Database of Ireland and using the NBDC map viewer through various datasets. Records were reviewed in April 2024 from the NBDC for 2km around the Proposed Development within the past ten years. Relevant surveys from the National Bat Database of Ireland were also reviewed for records of bat roosts within 10km of the Proposed Development.

The National Bat Landscape viewer (Lundy et al., 2011) based on Maximum Entropy modelling was reviewed using NBDC. This provides the likelihood of finding bat species in the landscape. The habitat suitability index generated ranges from zero to 100, with 100 being most suitable for bats.

Core Sustenance Zone's (CSZ) were reviewed for relevant species and used to inform interpretation. A CSZ, refers to the area surrounding a communal bat roost within which habitat availability and quality significantly influence the resilience and conservation status of the colony using the roost.

[1] These were obtained from 2km grid squares: O03L, O03G, O03K, O03F, O02P and O02J

11.2.6 Baseline Collection: Field Survey

11.2.6.1 Habitat Survey

The Proposed Development site was initially surveyed on 30 January 2024 by Arup ecologists. A follow up survey was undertaken on the 9 May 2024 to confirm habitat classification during the growing season and optimal survey window. All habitats were classified using the Guide to Habitats in Ireland (Fossitt, 2000), recording dominant species, indicator species and/or species of conservation interest. Habitats were assessed for their potential to support protected or notable species in accordance with the CIEEM guidelines. The location, extent and distribution of habitats were classified and mapped based principally on vegetation. The occurrence of any invasive non-native species were recorded if identified. Botanical species were written with plant names in the text are given with common names first, followed by the scientific name in brackets (Stace, 2013).

11.2.6.2 Fauna Survey

Bat Scoping Assessment

During the initial site visit in January 2024, the habitats within and bordering the Proposed Development were examined for their potential to support bats. Any trees and structures were assessed for their suitability to support roosting bats and categorised according to Tables 4.2 of the BCT Bat Survey Guidelines (Appendix 11.4). An assessment of the Proposed Development site in relation to foraging and commuting activity was also undertaken according to Tables 4.1 of the BCT Bat Survey Guidelines (Appendix 11.4).

A ground level search was undertaken to look for Potential Roost Features (PRFs) in trees or structures.

The trees and buildings were inspected for PRF such as:

- Missing roof tiles, gables, soffits, or any other roofing material;
- Gaps in, or damage to brickwork, stonework, or between roofing material;
- Gaps in, or damage to window frames and door frames; and
- Cracks, knot holes and other holes that have the potential to be entered by bats.

If any PRFs were identified, they would be inspected for signs of bat presence including:

- Bat droppings;
- Scratch and grease marks;
- Live or dead bats; and
- Noises of bats calling from within the roost.

Each building and tree was awarded a level of suitability to support roosting bats at different times of the year. These were categorised then according to Bat Roost Potential (BRP) in Table 4.1 of the BCT Bat Survey Guidelines (Appendix 11.4).

Night-Time Bat Walk

A transect route was pre-determined utilising aerial imagery and previously produced habitat maps. The night-time bat walk was undertaken on the 16 April 2024. Ecologists walked the transect around the study area at a constant speed stopping at twelve designated Listening Points (LPs). Bat activity was recorded for approximately five minutes at these points. Ecologists aimed to vary the starting point across the surveys.

During transect surveys, observations were noted by surveyors using survey forms and a transect map. Bat calls were recorded using an Elekon Batlogger M full spectrum handheld detector. Observations such as numbers and species of bats heard and seen, the direction of flight and behaviour (for example, foraging or commuting) and time were noted. Activity was recorded as bat passes, using the same measure as used for the statics but with a handheld detector, recorded regardless of bats observed or not.

The survey effort consisted of a single survey conducted in spring beginning at sunset and continuing for two hours after sunset. The date, survey start time and weather conditions for each transect survey is shown in Table 11.1 and Table 11.2.

Table 11.1: Transect survey 2024 dates, times and type.

Season	Date	Survey Type	Sunset/Sunrise	Start Time	End Time
Spring	16.04.2024	Dusk	20:34	20:34	22:37

Table 11.2: Transect survey 2024 weather conditions.

Date	Temperature (℃)		Wind Speed (Beaufort)		Cloud Cover (oktas)		Precipitation	
16.04.2024	**Start**	**End**	**Start**	**End**	**Start**	**End**	**Start**	**End**
	11	7	1	1	2	2	No	No

Recordings were saved to SD memory cards. The detectors record bat calls and produce a .WAV file containing a sequence of calls within a short time duration. These were reviewed using the Bat Explorer software. This auto identification software was used to provide an automated first pass at identifying bat passes. Results were then subject to manual Quality Assurance (QA) checks. The QA process involved reviewing all files to ensure species identification in the field was accurate. The QA check was undertaken by an experienced ecologist specialising in bat call identification. Identification of calls was aided by using published reference material including British Bat Calls.

For the purpose of data analysis, each file was considered to be a time a bat passed the recorder. For transect surveys, results of activity are shown in terms of bat passes (1 .WAV file = 1 bat pass).

Flight paths were mapped from survey notes to illustrate activity across the route.

Manual Static Detectors

Two static detectors were deployed to remotely record bat activity via recording of echolocation calls across the Proposed Development site from 16 April 2024 to 24 April 2024. The static detectors used were Wildlife Acoustics Song Meter SM4BAT Full Spectrum Ultrasonic Recorders.

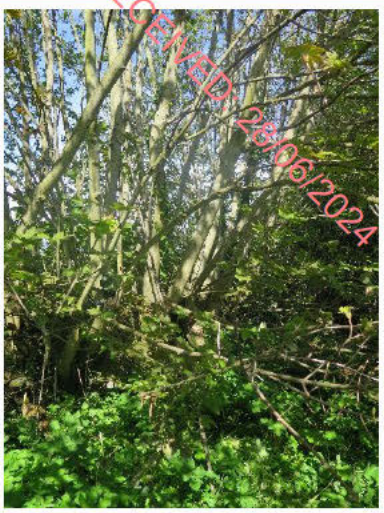
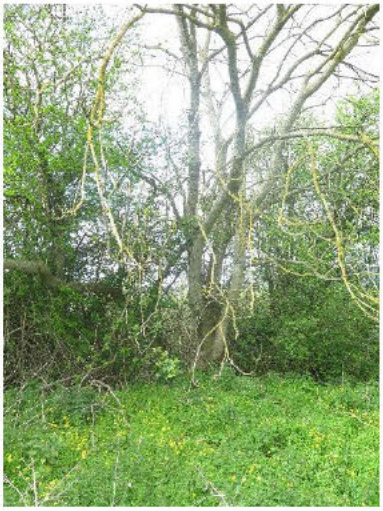
The parameter settings of the static detectors were as follows:

- Sample rate 256 kHz;
- Minimum duration 1.5ms;
- Trigger level 12 dB tigger window 3 sec;
- Minimum trigger frequency 16kHz;
- Maximum length of recording: 15 seconds;
- Compression: none; and
- Monitoring schedule 30 minutes before sunset and 30 minutes after sunrise.

The microphones used with the detectors during the surveys were regularly checked and calibrated using a Wildlife Acoustics Calibration Unit to ensure that they were functioning properly.

The strategy to determine locations for deployment was based on subjectively selecting features likely to be of importance to bats in terms of both as flight lines and foraging habitat, using professional judgement. A description of the habitat at each deployment location for selection is detailed in Table 11.3 below.

Table 11.3: Location of static bat detectors.

Location	Grid Reference (Irish National Grid)	Habitat Description	Photo of Set Up
1	O 03250 30185	Northern extent of hedgerow with drainage ditch (Semi-cluttered habitat). Dry meadows and grassy verges on either side of the boundary classified as an open habitat type.	
2	O 03484 30234	Southern extent of treeline (Semi-cluttered habitat). Joins the southern boundary of the Proposed Development.	

The aim of the survey was for the static detectors to collect data on a minimum of five consecutive nights per deployment in appropriate weather conditions, with reference to BCT guidance (BCT, 2023). The information of surveys dates and weather conditions shown below in Table 11.4. During the monitoring period weather conditions were checked using the time and date website (Ventusky, 2024).

Table 11.4: Monitoring period and conditions for static detectors.

Survey	Static	Number of Nights*	Weather Conditions during Monitoring Period
April 16.04.2024 to 24.04.2024	Location 1	7	No overnight rain throughout monitoring period. Calm wind conditions with one night above 11mph. Temperatures were mild ranging from 3 to 13°C.
	Location 2	7	

*Nights of suitable weather conditions for bat activity

The detectors record bat calls and produce a WAV file containing a sequence of calls within a short time duration. Again, each file can be considered a single occurrence of a bat passing the recorder. The results of static activity surveys are presented in terms of bat passes.

Data was analysed using Kaleidoscope Pro software. This auto identification software was used to provide an automated first pass at identifying bat passes. Results where then subjected to manual QA checks. The QA process involved initially reviewing all files. A second QA check was then undertaken according to a series of parameters[2]. The QA check was undertaken by an experienced ecologist specialising in bat call identification. Common pipistrelle and soprano pipistrelle calls, which look and sound similar, have peak frequencies only 10 kilohertz (kHz) apart and these calls often overlap due to call plasticity, allowing bats to adapt their calls to the habitats they are in. Therefore, to avoid misidentification of species, the label Pipistrellus sp. has been used for any calls falling within the range of peak frequency where call overlap is known to occur between 49kHz and 51kHz. Identification of calls was aided by using published reference material including British Bat Calls (Russ, 2021).

The automated static detector records bat calls each time a bat passes, therefore number of bats cannot be determined from this data, as it is unknown whether the same bat is being recorded passing multiple times or whether every pass is a different individual bat; guidelines suggest it is likely somewhere between these two. Therefore, the data should be viewed as a recording of activity rather than number of bats recorded.

All *Myotis* species were grouped as *Myotis spp.* due to large overlap in diagnostic features across species of this genus.

11.2.6.3 Amphibian Survey

To confirm the presence or absence of common frog (*Rana temporaria*) and smooth newt (*Triturus vulgaris*), a methodology has been adopted from a range of sources to satisfy both species. A combination of survey techniques on multiple visits to waterbodies over the breeding season (March-June) were employed to check for breeding smooth newt, common frog adults, frogspawn and tadpoles.

Primarily the methodology followed techniques for smooth newt outlined by the Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009) and Northern Ireland Environment Agency (NIEA) survey specifications (NIEA, 2017). Common frog methodology was based Irish Wildlife Trust (IWT) National Smooth Survey Report (IWT, 2013). Additional guidance was gathered from the and the Herpetofauna Works Manual (Joint Nature Conservation Committee (JNCC), 2003).

Several waterbodies within the area of the Proposed Development were identified as being potential smooth newt breeding waterbodies and were surveyed (Table 11.5).

Table 11.5: Description of waterbodies subject to amphibian survey.

Waterbody	Coordinates	Description	Photo
1	O 03462 30201	Drainage ditch within hedgerow. 30 centimetres (cm) depth stream with a gravel substrate with organic matter. No in channel vegetation. Steady flow north.	

[2] Review all files assigned a species in Auto ID, with the exception of common and soprano pipistrelle. Such files where match ratio is <0.9 where checked and all noise files were ignored.

Waterbody	Coordinates	Description	Photo
2	O 03605 30059	Area that had standing water on initial survey visit.	
3	O 03545 30612	Culverted stream (pool)	
4	O 03504 30628	Culverted stream	
5	O 03256 30591	SuDS pond	

The peak number of breeding adults within suitable waterbodies occurs between late-March and late-May. Surveys can be undertaken until late June, after which NPWS will not issue licences to conduct surveys.

Waterbodies were visited on three separate occasions, between mid-April and early-June, during which a combination of survey techniques were employed:

- Torch survey: carried out after sunset by shining a high powered (1 million candlepower Clulite) torch into the water. Surveyors walked slowly around the entire margin of the waterbody using the torch to search for any newts;
- Egg searching: Live and dead vegetation within the waterbodies was searched for smooth newt eggs. Surveyors walked slowly around the margin and checked vegetation within a reachable distance. Any potential eggs were checked by "unwrapping" vegetation, to determine if any eggs are enclosed, and identified whether they were smooth newt eggs. Had a smooth newt been identified in a waterbody, no further search would have taken place;
- Refuge searching: The searching of existing refuges such as logs, bark, rocks, paving slabs, wooden planks and debris (for example, discarded furniture) present within the terrestrial habitats immediately surrounding the waterbodies was also undertaken; and
- Net searching: Searches of the water bodies were conducted using a long-handled dip-net. The perimeter was walked, and the net agitated through aquatic vegetation in a two-metre arc. Any newts caught, would have been identified, and then released. This technique was conducted during dusk / twilight conditions.

Prior to survey, a "Licence to Capture Protected Wild Animals for Educational, Scientific or Other Purposes" was obtained from NPWS Wildlife Licensing Unit (Licence No: C124/2024/2). A copy of the licence is provided in Appendix 11.5.

As weather conditions can influence the results of newt surveys, with newt activity considered to drop considerably below 5°C and with rainfall and wind decreasing water clarity, surveys should not be conducted in these conditions.

11.2.6.4 Invasive Species Survey

The date of the initial field survey was in January 2024. A dedicated invasive species survey was undertaken on 9 May 2024 by an Arup ecologist. Invasive species listed on Irish Legislation or noted as medium or high by NBDC were recorded if present. The site walk over was undertaken during the growing season and within appropriate weather conditions.

11.2.6.5 Limitations of Field Surveys

Ecological surveys were limited by factors which affect the presence of plants and animals, such as the time of year, migration patterns and behaviour. The absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

The initial surveys in January 2024 were carried out at a sub-optimal time of year for habitat/flora surveys (which are ideally conducted between April-September). It is also a sub-optimal time of the year to record Invasive Non-Native Species (INNS). Repeat site visits were therefore undertaken in April and May 2024 to ensure habitats and flora, including any INNS could be appropriately identified.

Any grid references provided within this report are approximate (obtained through handheld GPS devices) and are to be used as a guide only.

There is a lack of guidance around survey best practice for undertaking bat surveys in Ireland. This report follows guidance set out by a range of organisations (Section 11.2.2). It should be noted that the bat surveys undertaken for the Proposed Development are limited to one season (spring) despite guidance of a low-moderate foraging and commuting habitat requiring survey to reflect summer and autumn seasons. With project timescales, effort has been made to establish a baseline reflective of various seasons. This report has incorporated previous survey data (Scott Cawley) collected in August and September 2019. It has also utilised bat data collected from nearby planning applications that contain data for the summer months.

Due to a delay obtaining a license for the amphibian surveys, for the first survey (16 April) the ecologist was limited to non-disturbance methods such as refuge searching and using torches to search waterbodies. The remaining two amphibian surveys were undertaken under licence and used torching and egg searches.

Temperatures throughout the monitoring period were recorded at below 5ºC on occasions of three nights. However, the length of the required monitoring period provided additional data to compensate for the potential lower levels of activity.

Professional judgement allows for the likely presence of these species to be predicted with sufficient certainty as to not significantly limit the validity of these findings.

11.2.7 Ecological Evaluation and Impact Assessment

11.2.7.1 Ecological Feature Evaluation Criteria

Ecological features were identified on site through desk study and field survey data. These were then evaluated using the geographic frame of reference detailed in Appendix 11.2 (NRA, 2009) and listed below:

- International importance;
- National importance;
- County importance (or vice-county in the case of plant or insect species);
- Local importance (higher value); and
- Local importance (lower value).

To qualify as KERs, features must be of local importance (higher value) or higher as per the criteria in Appendix 11.2. Features of lower ecological value are not assessed.

As stated in Section 11.2.3, the NRA Guidelines follow Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018) and have been used to assess the impacts of similar projects in an Irish context.

11.2.7.2 Impact Assessment Criteria

This report followed guidance (CIEEM, 2018) to predict the potential ecological impacts of the Proposed Development. It is recommended in this guidance that an Ecological Impact Assessment (EcIA) process is used to present an assessment of the ecological effects of any project which could affect biodiversity. The EcIA process is often incorporated into the EIA process.

Impacts are actions resulting in changes to an ecological feature. Both positive and negative impacts of the Proposed Development were identified within this assessment. This included potential impacts on KER from all Phases of the project, for example, Construction, Operational and Decommissioning.

In accordance with NRA guidelines (NRA,2009), impact assessment is only undertaken of KERs within the ZoI of the Proposed Development and are *"both of sufficient value to be material in decision making and likely to be affected significantly".*

Effects are the outcomes to an ecological feature, resulting from an impact. Effects were identified and described with reference to their quality, significant, extent, probability and duration. The characterisation of effects followed guidance from the EPA (EPA, 2021). This variation to CIEEM was undertaken to align with the various chapters of this EIAR.

The assessment of the effects determined the significance of any potential effects on the KERs identified within their respective ZoIs. While the EPA guidance refers to significance as an effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment. The CIEEM guidance (CIEEM, 2018) defines a significant effect as '*an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general*'.

The significance of effects has been determined using the CIEEM guidance, by assessing the impacts of the Proposed Development on the structure and function of habitats and ecosystems, and the conservation status of habitats and species (including extent, abundance and distribution).

In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effects, mitigation/compensation measures should be applied in accordance with the precautionary principle. Where uncertainty exists, it must be acknowledged (CIEEM, 2018).

Effects can be considered significant at a wide range of scales. The levels of geographical importance used in this assessment comprise:

- International and European – Statutory sites designated or classified under international conventions or European legislation. Sites supporting a species or species' assemblage important in an international context;
- National – Statutory sites designated under national legislation, for example Natural Heritage Areas (NHAs). Sites supporting a species or species' assemblage important in a national context;
- Regional –Non-statutory designated sites such as proposed NHAs. Sites supporting a population of a species or species' assemblage important in a regional context;
- Local – Sites that have no formal designation but contain species or habitats that are important to the ecological integrity of the local area; and
- Negligible – No effect on species or habitats present are anticipated.

11.2.7.3 Cumulative effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. A cumulative effect assessment has been undertaken which considers whether effects from any of the developments described in Chapter 19 (Cumulative Effects and Environmental Interactions) of the EIAR will collectively result in a significant effect.

11.3 Baseline

11.3.1 Designated Sites

11.3.1.1 European Sites

The Proposed Development is not within or immediately adjacent to any European sites. The nearest European site is approximately 5.8km north-west of the Proposed Development (Rye Water Valley SAC). A total of six European sites were identified within 15km:

- Glenasmole Valley SAC;
- Poulaphouca Reservoir SPA;
- Red Bog, Kildare SAC;
- Rye Water Valley SAC;
- Wicklow Mountains SAC; and
- Wicklow Mountains SPA.

These European sites, along with their features of interest and distances to the Proposed Development are outlined Appendix 11.6. Figure 11.1 shows the European sites within 15km of the Proposed Development and the potential hydrological pathway to Dublin Bay though surface water. Figure 11.2 displays non-designated sites within 2km of the Proposed Development.

The Proposed Development is upstream of European sites in Dublin Bay. The AA Screening Report and NIS which accompanies this planning application, has considered potential source-pathway-receptor links through hydrological pathways (surface water and foul water networks) to Dublin Bay with connections to European and nationally designated sites. A small stream (Griffeen River), which occurs approximately 50m to the north-west of the Proposed Development, is hydrologically connected to the River Liffey, discharging eventually into Dublin Bay.

For this reason, European sites have been considered as KERs for the Proposed Development of international importance.

11.3.1.2 Nationally Protected Sites

The Proposed Development is not within or immediately adjacent to any nationally protected sites. There are no NHAs within 2km of the Proposed Development. Nationally protected sites have not been considered as KERs for the Proposed Development.

11.3.2 Non-Designated Sites

No Annex I habitats were identified within 2km of the Proposed Development. All pNHAs were published on a non-statutory basis in 1995. They have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats. However, a process is underway to resurvey and formally designate some pNHAs as NHAs. There are no Nature Reserves within 2km of the Proposed Development. There is one pNHA located with 2km of the Proposed Development (Grand Canal pNHA). This site supports a diversity of species such as the legally protected otter (*Lutra lutra*). It also supports plant species such as opposite-leaved pondweed (*Groenlandia densa*). Grand Canal pNHA is located approximately 1.5km from the Proposed Development but is not hydrologically connected, surface water flows from the Proposed Development into the Griffeen River and into River Liffey, which discharges into Dublin Bay. Due to the lack of connectivity to the Grand Canal pNHA, nationally designated sites have not been considered as KERs for the Proposed Development.

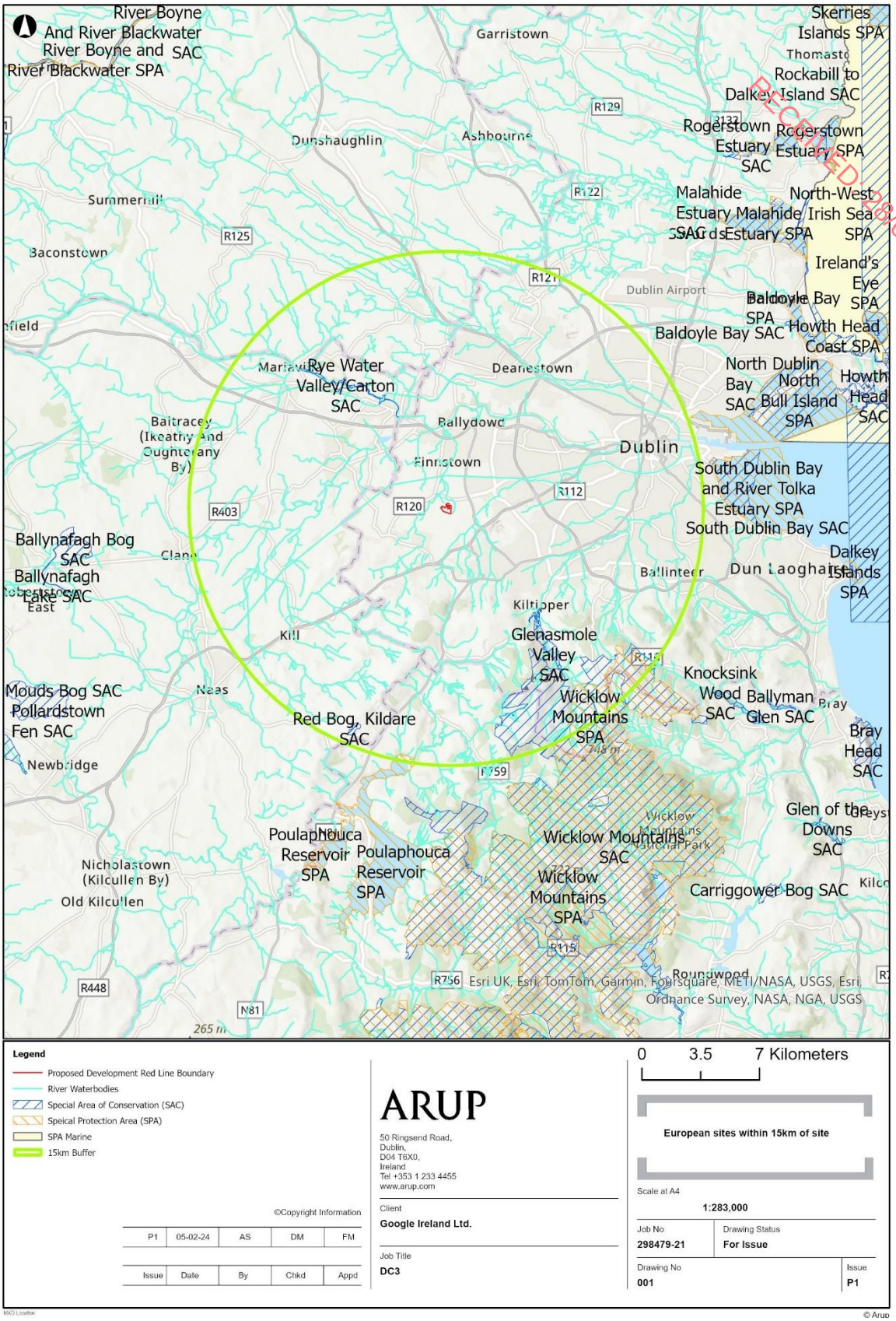


Figure 11.1: European sites with 15km of the Proposed Development.

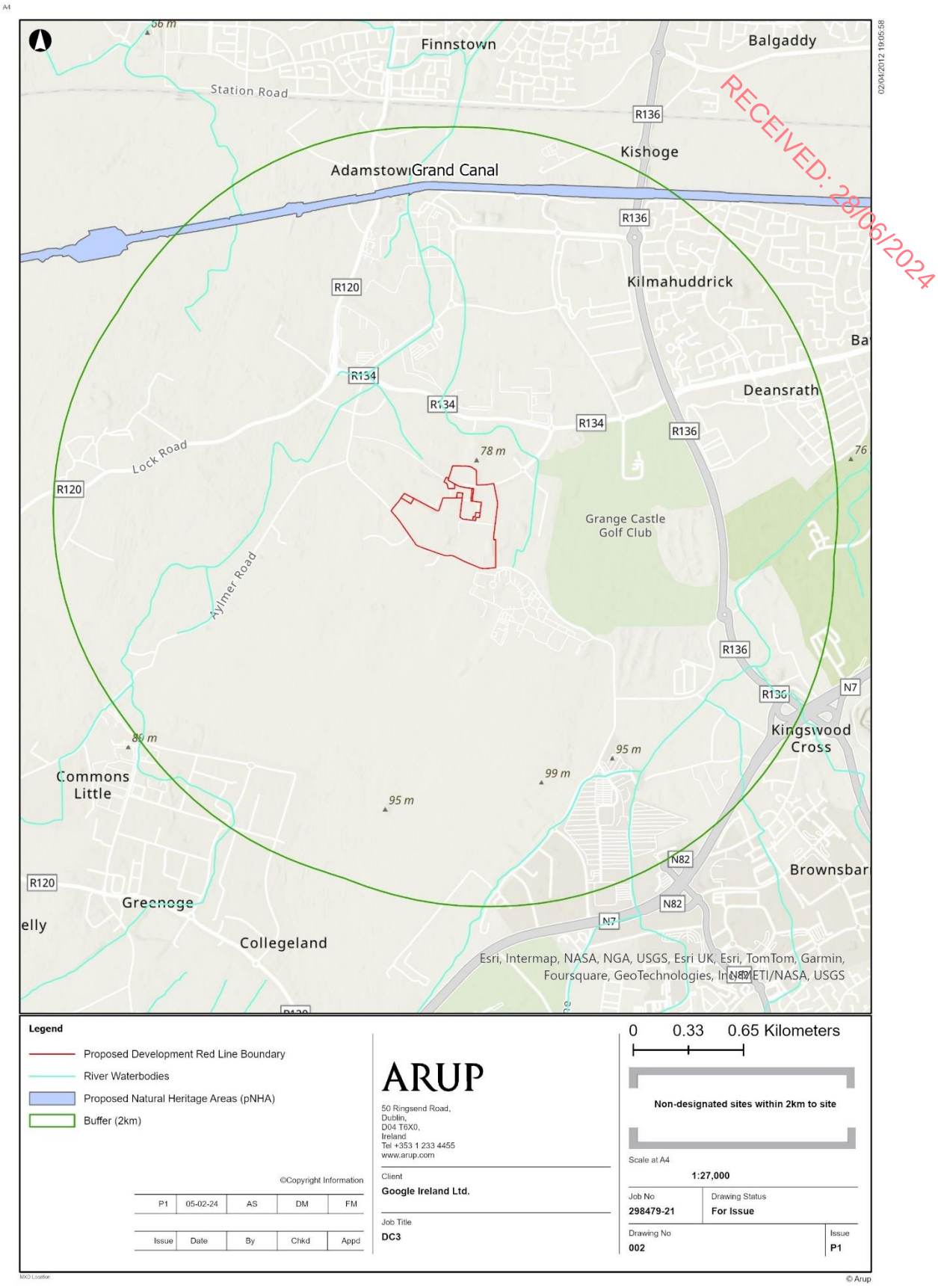


Figure 11.2: Non-designated sites within 2km of the Proposed Development.

11.3.3 Habitats: Field Study

A habitat map detailing the findings of the habitat survey is provided in Figure 11.3. There were ten habitats recorded within the Proposed Development site. These are described, and photographs of habitats are provided in Appendix 11.7.

11.3.3.1 Amenity Grassland (GA2)

This habitat occurred within the existing GIL Campus along roads and walkways. It is actively managed through regular mowing regime. Dominant species included perennial rye-grass (*Lolium perenne*). Common herb species were also present such as dandelion (*Taraxacum officinale*), creeping buttercup (*Ranunculus repens*) and white clover (*Trifolium repens*). This habitat is classified as local importance (Lower Value) and not a KER.

11.3.3.2 Building and Artificial Surfaces (BL3)

A large proportion of the Proposed Development site consists of building and artificial surfaces. Buildings recorded within the existing GIL Campus: DC1, DC2, security building and smoking shelters. No features were recorded such as bird or bat boxes that would be utilised by such species. Bird deterrents (spikes) were recorded on the roof and ledge of building. Buildings had negligible BRP due to materials and lack of signs. Hardstanding existed in the form of tarmacked paths and carparks. This habitat is classified as local importance (Lower Value) and not a KER.

11.3.3.3 Drainage Ditch (FW4)

Two open channel watercourses are located within the Proposed Development site between the treeline on the north boundary and a hedgerow to the south. At the southern boundary of the Proposed Development site, the open channel watercourse transitions into a culverted watercourse beneath the DC1 building at the northern border of the Proposed Development site. It emerges from the northern side of the Proposed Development site and continues in a northerly direction and ultimately connects with Baldonnell Stream at the north of the Proposed Development site.

The habitat is initially classified as a drainage ditch; however, it's important to note that other chapters within the EIAR refer to it as a watercourse. To ensure consistency and clarity throughout the document, this Chapter will henceforth use the term 'watercourse' to align with terminology used in other sections of the EIAR.

This watercourse is referred to as a tributary of Baldonnell Stream. Due to the existing culvert, the stream's longitudinal connectivity is disrupted, which accelerates flow velocity. This makes it very improbable for fish to navigate through them due to insufficient energy and reduced connectivity upstream.

Both sections of the watercourse are approximately 1m wide, slowly flowing on inspection. There is evidence of significant artificial straightening, fencing and culverting. The watercourse presents evidence of anthropogenic changes in the channel bed such as: masonry blocks, concrete rubble, dumping of rubbish, oil spillage, trash debris and channel bed protection at some locations (concrete). There is also a high percentage of fine silt which is what is expected for this river type and the cleanliness of the water seems moderate.

Both banks were sloping and heavily vegetated with bramble (*Rubus fruticosus* agg.), ivy (*Hedera helix*) and common nettle (*Urtica dioica*), with large trees including oak (*Quercus petraea*), ash (*Fraxinus excelsior*), willow (*Salix* spp.), and hawthorn (*Crataegus monogyna*), providing shade to the watercourse. The northern section of the watercourse appears less shaded by vegetation than the southern extent. Non-native species sycamore (*Acer pseudoplatanus*) was also present. Evidence of heavy rabbit (*Oryctolagus cuniculus*) use was noted, including burrows and droppings. The watercourse showed evidence of extensive alteration to bank structure through embankments, concreting and poaching. Horses, likely belonging to the private landowner, seem to access to drink water without designated entry points, resulting in trampling and erosion along the channel banks. No evidence of vegetation management is present. For further information, refer to the Chapter 12 (Water) of the EIAR which discusses the Hydromorphological Assessment.

No signs of otter or aquatic species were recorded on inspection. Habitats were considered suitable for breeding amphibians such as common frog and smooth newt (refer to Section 11.3.4.2) and the bank vegetation provides suitable habitat for a range of invertebrate species. The channel also provides shelter and a source of water for mammals and birds.

The watercourse provides hydrological connectivity to habitats outside of the Proposed Development site, albeit restricted through existing culverts. This habitat is classified as being of local importance (Higher Value) and identified as a KER.

11.3.3.4 Dry Meadows and Grassy Verges (GS2)

The majority of habitat outside the existing GIL Campus boundary can be classified as GS2. Large mounds of earth were recorded within these habitats (TN 1-4). These were vegetated with scrub and small pockets of standing water with wet ground recorded at the base (TN 5 & 6). Grassland was unmanaged and rank. This habitat provides foraging, roosting and nesting habitat for a range of fauna species. There was a badger (*Meles meles*) hair recorded at [redacted] No other signs of badger (such as snuffle holes, latrines, prints or setts) were recorded throughout the area of the Proposed Development site during visits in April and May. Common grass species dominated the habitat: red fescue (*Festuca rubra*), Yorkshire fog (*Holcus lanatus*) and cocksfoot (*Dactylis glomerata*). Herbaceous species identified included dandelion, common nettle, creeping buttercup, broad leaved dock (*Rumex obtusifolius*), cow parsley (*Anthriscus sylvestris*) common hogweed, (*Heracleum Sphondylium*), bush vetch (*Vicia sepium*) and ragwort (*Senecio jacobaea*). Scattered scrub species including bramble and ash. This habitat is classified as being of local importance (Higher Value) and identified as a KER.

11.3.3.5 Hedgerow (WL1)

Hedgerows are comprised mainly of native tree and shrub species. This habitat provides breeding, resting and feeding habitat for a range of fauna species for example, fox (*Vulpes vulpes*), rabbit and an assemblage of birds. Species present comprise of ash, elder (*Sambucus nigra*), hawthorn and blackthorn (*Prunus spinosa*) and bramble. The understorey is comprised of similar species assemblage as is noted in GS2. This habitat is classified as being of local importance (Higher Value) and identified as a KER.

11.3.3.6 Recolonising Bare Ground (ED3)

This habitat comprises areas which have been disturbed and invaded by a range of re-colonising species. This habitat is very common and has potential to support a limited range of fauna. Species recorded comprise of broad-leaved dock, ragwort, dandelion, meadow buttercup, Yorkshire fog and greater plantain (*Plantago major*). The non-native invasive species butterfly-bush (*Buddleja davidii*) was also recorded in this habitat within the lands. This habitat is classified as being of local importance (Lower Value) and not recorded as a KER.

11.3.3.7 Scrub (WS1)

Large mounds of earth were vegetated with scrub. Blackthorn was encroaching from the hedgerow into GS2 along the south boundary. Scrub species consisted of bramble, dogwood (*Cornus sanguinea*), hazel (*Corylus avellana*), ash, hawthorn, and blackthorn. This habitat is classified as being of local importance (Higher Value) and identified as a KER.

11.3.3.8 Ornamental/ Non-Native Shrub Mosaic (WS3)

Ornamental and non-native species have been planted throughout the existing GIL Campus in formal flower beds. Species are predominantly non-native, although this habitat may provide some breeding habitat and feeding resources for birds and other fauna species. Species recorded include common bamboo (*Bambusa vulgaris*), New Zealand flax (*Phormium tenax*), cherry laurel (*Prunus laurocerasus*) and daffodil (*Narcissus* sp.). This habitat is classified as being of local importance (Lower Value) and not recorded as a KER.

11.3.3.9 Other Artificial Lakes and Ponds (FL8)

There is an attenuation pond on the existing GIL Campus used as a stormwater attenuation feature. The pond is surrounded by recolonising bare ground habitat and some formal ornamental planting. A mammal path (likely fox) was evident. However, due to the steepness of the gradient, it is considered unsuitable for protected fauna such as badger and hedgehog. It is also poorly connected to linear features and adjacent lighting. Aquatic vegetation present within the pond include various sedge and rush species. This habitat is classified as being of local importance (Lower Value) and not recorded as a KER.

11.3.3.10 Treeline (WL2)

Treeline comprised mainly native broadleaved tree and shrub species. Many of the trees are covered in dense ivy. This habitat provides breeding, resting and feeding habitat for a range of fauna species (TN 8). Tree species were predominantly ash and oak. This habitat is classified as being of local importance (Higher Value) and identified as a KER.

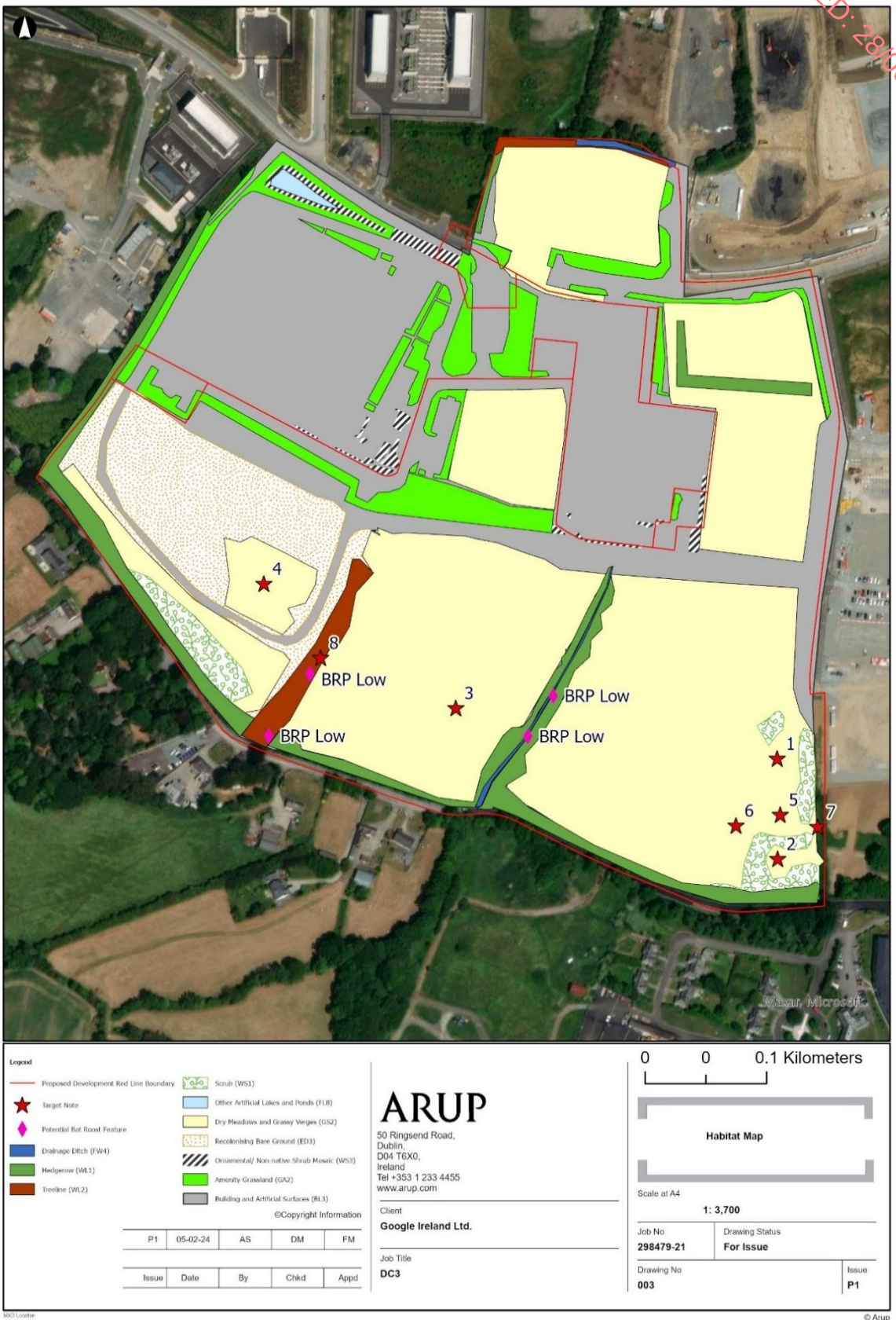


Figure 11.3: Fossitt habitat map.

11.3.4 Protected and Notable Species

11.3.4.1 Aquatic Species

No fish species were identified from NBDC records within 2km. *Gammarus* sp., river limpet (*Ancylus fluviatilis*) and *Sphaeriidae* sp. were identified within 2km; however, these are not designated under Irish Legislation (Section 11.2.2.1). The relevant NBDC records can be viewed in Appendix 11.8.

The Griffeen River flows about 500m to the west of the Proposed Development and Baldonnell Stream flows about 120m to the east of the Proposed Development. Another stream, noted as Milltown 09, originating at the boundary to the north of the Proposed Development flows towards the Griffeen River and it enters the Griffeen River at the point east of townland Milltown, to the south of Nangor Road. As discussed in Section 11.3.3, at the southern boundary of the Proposed Development, there is an open channel watercourse that transitions into a culverted watercourse beneath the existing DC1 building at the northern side of the Proposed Development. It emerges from the northern side of the Proposed Development site and continues in a northerly direction. The stream ultimately connects with the Baldonnell Stream to the north of the Proposed Development site.

On inspection of these open channels within the Proposed Development site, there were no notable aquatic species identified; however, a single three-spined stickleback (*Gasterosteus aculeatus*) was identified on the watercourse at the northern boundary. This species is found in ponds, lakes, ditches and rivers, often in slow moving water and can disperse through the faeces of birds. A dedicated freshwater survey was not undertaken as part of this assessment. The hydromorphological survey found that due to the existing culvert, the stream's longitudinal connectivity is disrupted, which accelerates flow velocity. This makes it very improbable for large fish to navigate through due to insufficient energy and reduced connectivity upstream (south of site). For further information, refer to Chapter 12 (Water) of the EIAR which discusses the Hydromorphological Assessment.

White-clawed crayfish (*Austropotamobius pallipes*) is the only invertebrate species protected under the Wildlife Acts and listed on Annex II and V of the EU's Habitats Directive was returned within the 2km search area. No evidence of white-clawed crayfish was recorded during the site visit. This species will utilise freshwater habitats such as ponds, lakes and rivers. They require connectivity to other suitable habitats with populations for breeding. They are also dependent on water quality (English Nature, 2002) however, given the nature of the SuDS pond (attenuation of surface water runoff from the existing GIL Campus) and the watercourses are small in size and culverted, neither of these habitat requirements are met. Therefore, it is unlikely that this species is supported on the Proposed Development site. The River Camac where this species was recorded is located outside of the Proposed Development site's catchment.

It is considered unlikely that protected aquatic species are present within the Proposed Development site given the poor connectivity, size and low flow rate of the watercourse. Therefore, this group is not identified as a KER or taken forward to Section 11.5.

11.3.4.2 Amphibians

There was one record of common frog within the NBDC records from 2019 (2km south). No signs of amphibians were noted during the initial habitat survey. The small pockets of standing water in the area of the Proposed Development were considered to have limited suitability for breeding smooth newt due to lack of vegetation and permanence (TN 5 and 6). The watercourse and SuDS pond represent suitable breeding habitat for both newt and frog. Woodland, hedgerow and treelines suitable for hibernating newts and frogs and as frog foraging habitat. Both smooth newt, common frog and their breeding and resting places are protected through the Wildlife Acts.

The results of the amphibian surveys are displayed in Appendix 11.9 for various dates at each waterbody. A single male common frog was recorded during the 5 June 2024 surveys. The common frog, being widespread, will utilise areas with suitable cover, in proximity to a pond or stream. They hibernate at the bottom of ponds in frost-free refugia, such as under logs or in dense piles of vegetation. Tadpoles will feed on algae or detritus on the pond floor (Reid et al, 2011).

Given the existing culverted nature of the watercourse, depth (under 30cm) and lack of aquatic vegetation it is likely that common frog utilise the watercourse for foraging. No smooth newts were recorded on the Proposed Development site during the surveys.

The watercourse offers suboptimal breeding habitat for smooth newt given the flow, lack of broad leaved vegetation and existing culverted nature. Therefore, this group is taken forward to Section 11.5 and identified as a KER.

Photograph 11.1: Adult frog recorded in watercourse within Proposed Development

11.3.4.3 Bats

Desk Study

Bat data collected as part of previous studies on the Proposed Development site during August and September (Scott Cawley, 2019) recorded four bat species within the Proposed Development site:

- Common pipistrelle (Pipistrellus pipistrellus);
- Soprano pipistrelle (Pipistrellus pygmaeus);
- Leisler's bat (Nyctalus leisleri); and
- One myotis bat species (Myotis sp.).

This Report identified several habitats including hedgerows and treelines within the Proposed Development and surrounding area were considered to be suitable foraging and commuting habitat for bats. No records of bat roosts were recorded on the Proposed Development site. Four trees within the Proposed Development site were considered to have PRFs that could support bats. These trees were all considered to be suitable for roosting bats as they are large, old trees with dense ivy cover.

Bat surveys were undertaken for the environmental impact assessment of a nearby planning application SD21A/0241 for Vantage Data Centres Dub 11 Ltd (Ramboll, 2022). At its closest point this is approximately 100m north-east from the Proposed Development. Bat surveys were undertaken as part of the baseline in 2021. Two bat transects were performed. No bats were recorded during the transect undertaken on the 23 June, while 29 bat passes (from soprano pipistrelle, Leisler's bat and common pipistrelle, in order of abundance) were recorded during the July transect. Static detectors monitored the site between 14 June and 23 June 2021 but recorded no bat activity. Two emergence surveys were also conducted at a dwelling on the site in June and July 2021. However, no bats were recorded emerging or entering the structure. The overall assessment of bat activity on this neighbouring site associated with the Vantage datacentre suggested low levels of commuting and foraging bats were using the site.

The NBDC Bat Landscape Suitability layer was consulted, which shows the Proposed Development site has a moderate suitability for bats with a suitability index of 26.67. However, it is important to note, the adjacent Baldonnel Road (south) is an area of high suitability for bats with a suitability index of 39.67.

The NBDC had records of the following bat species within 2km from the past 10 years: common pipistrelle, soprano pipistrelle, brown long-eared (*Plecotus auritus*), Daubenton's (*Myotis daubentonii*) and Leisler's.

There were no records of lesser horseshoe (*Rhinolophus hipposideros*) bat given the location of the Proposed Development site (Dublin, east coast).

There were no recent records of roosts within close proximity to the Proposed Development. The nearest was a soprano pipistrelle roost approximately 6km north-east. A full list of roosts within 10km are shown in Appendix 11.10. However, the Proposed Development is not within any CSZ of these roosts given the distance.

Scoping Survey

As discussed, there are four trees with PRFs (Figure 11.6). As per BCT Guidelines, they were all assigned 'low' characterisations. These trees were all considered to be suitable for roosting bats as they are large, old trees with dense ivy cover. Species included oak and ash. Ash trees had signs of ash dieback (*Hymenoscyphus fraxineus*) which can result in PRFs being formed by associated decay and resulting cavities. PRFs have also been formed between bark and ivy latticing. Further detail in Appendix 11.11 No buildings had bat roosting potential due to roof materials and lack of suitable roost features or entry points.

The Proposed Development site comprises hardstanding and artificial surfaces with existing artificial lighting across the existing GIL Campus, making much of the site sub-optimal for foraging. In addition, the habitats in the wider landscape to the north, west and east are predominantly industrial and commercial providing limited opportunities for foraging and commuting. However, habitats suitable for bats (dry meadows and grassy verges, treelines and hedgerows) make up approximately half the area of the Proposed Development with these connected to the wider landscape through treelines and hedgerows. In particular, this connectivity is provided to woodland in the south. Therefore, it has been assessed that the Proposed Development site has low-moderate foraging and commuting habitat (in accordance with BCT Guidelines).

Night-Time Bat Walk

Overall, the species composition was dominated by Leisler's with the occasional common pipistrelle and soprano pipistrelle activity on the night-time bat walk.

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Ventusky. 2024. Temperature. presents the breakdown of passes per species recorded. The species composition can be described as consisting predominately of species which are abundant and widespread (in accordance with BCT guidelines and professional judgement).

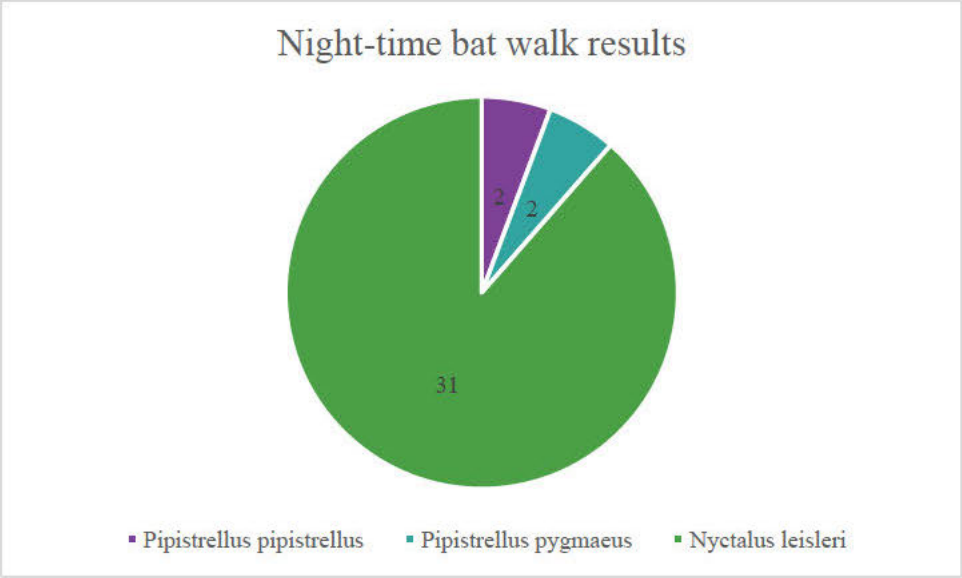

Figure 11.4: Night-time bat walk species composition breakdown.

The study area had low levels of activity presented in a heatmap in Figure 11.5. There were low numbers of bat passes recorded on the existing GIL Campus at DC1 and DC2, with the exception of the SuDS pond and treeline to the east. Activity was highest along the LP 4 to 8. No activity was record at LP 9-12 or OP10. Areas of higher activity were recorded around the hedgerow and scrub along the south boundary and the treeline on the east boundary, extending north.

Behaviour appears to be dominated by commuting calls with foraging observed on occasion. All Leisler's bat passes (shown in blue on Figure 11.5) were heard but not seen with calls indicative of commuting. Leisler's typically do not use linear features whilst commuting and fly at considerable hight. A single pipistrelle was observed foraging at LP 6, along the treeline (shown in orange on Figure 11.5). The flight paths observed are presented in Figure 11.6.

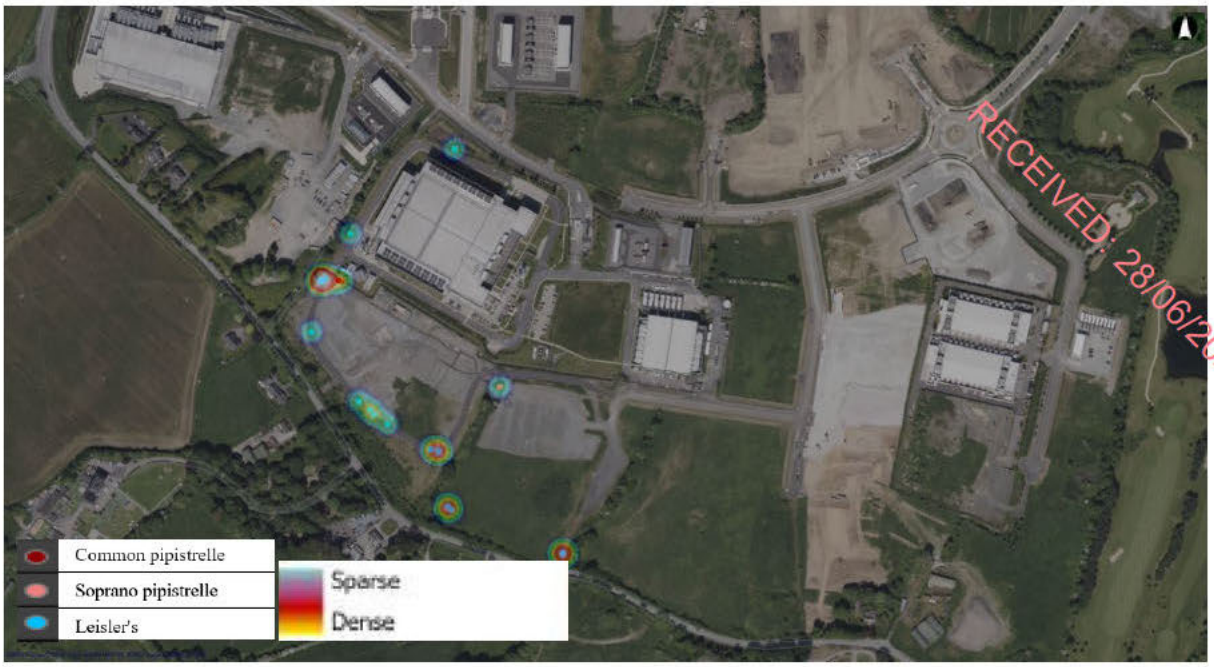

Figure 11.5: Night-time bat walk recorded bat passes (heatmap).

Manual Static Detectors Results

The results of the two static detectors deployed from 16 April 2024 to 24 April 2024 are shown below in Table 11.6. The total number of calls recorded was similar at both locations. However, Location 2 appeared to record considerably more pipistrelle species than Location 1 which predominantly recorded Leisler's. The location of the static monitors is illustrated in Figure 11.6. Foraging calls were noted with social calls on occasion.

Table 11.6: Manual static bat detector results (April 2024).

Location 1		Location 2	
Species	Passes	Species	Passes
Myotis spp.	2	Myotis spp.	1
Leisler's	646	Leisler's	172
Nathusius pipistrelle	1	Nathusius pipistrelle	0
Common pipistrelle	64	Common pipistrelle	483
Soprano pipistrelle	79	Soprano pipistrelle	131
Brown long eared	1	Brown long eared	0
Pipistrellus sp	0	Pipistrellus sp	13
Total	**793**	**Total**	**800**

Interpretation of Results

Records of numerous bat species (Leisler's, common pipistrelle and soprano pipistrelle) have been identified through data searches, desk-based review of previous surveys on the site of the Proposed Development and surrounding area, and field survey undertaken as part of this application. The assemblage score does not exceed the threshold for county importance. However, all bat species are protected under the Wildlife Acts and the European Habitats Regulations, where they are listed on Annex IV. Therefore, bats are identified as KERs and discussed further in Section 11.5.

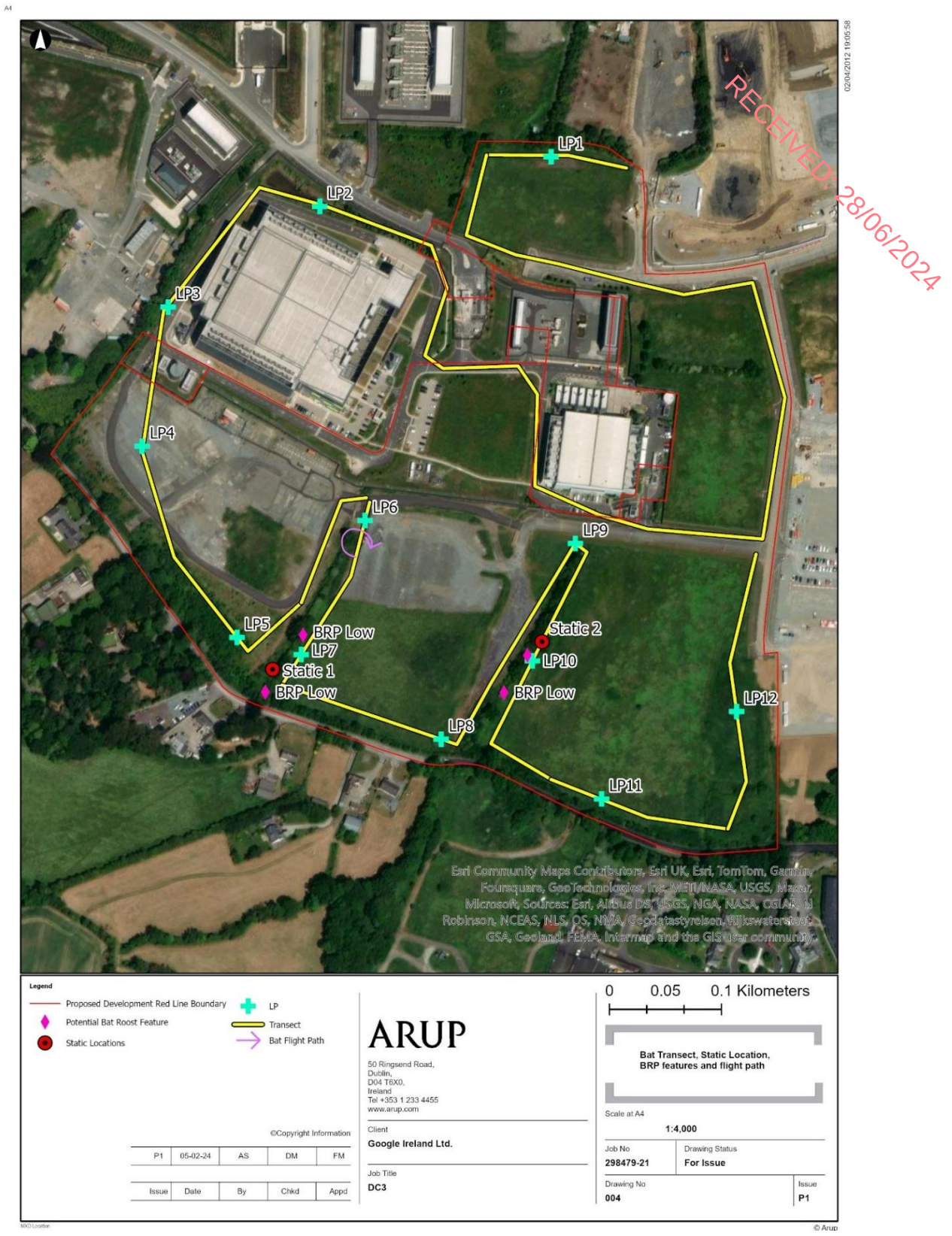

Figure 11.6: Bat survey map.

11.3.4.4 Birds

NBDC records of bird species recorded within 2km of the Proposed Development are listed as follows:

- barn swallow (*Hirundo rustica*);
- common coot (*Fulica atra*);

- common pochard (*Aythya ferina*);
- common starling (*Sturnus vulgaris*);
- common swift (*Apus apus*);
- Eurasian teal (*Anas crecca*);
- great cormorant (*Phalacrocorax carbo*);
- house martin (*Delichon urbicum*);
- house sparrow (*Passer domesticus*);
- little grebe (*Tachybaptus ruficollis*);
- northern wheatear (*Oenanthe oenanthe*);
- peregrine falcon (*Falco peregrinus*);
- sand martin (*Riparia riparia*); and
- tufted duck (*Aythya fuligula*).

Bird species record on the site visit include, robin (*Erithacus rubecula*), blackbird (*Turdus merula*), great tit (*Parus major*), buzzard (*Buteo buteo*), goldfinch (*Carduelis carduelis*), herring gull[3] (*Larus argentatus*), hooded crow (*Corvus cornix*), magpie (*Pica pica*), bull finch (*Pyrrhula pyrrhula*), wood pigeon (*Columba palumbus*), song thrush (*Turdus philomelos*) and wren (*Troglodytes troglodytes*). Suitable nesting and foraging habitats are present within the Proposed Development site through treeline, hedgerow, grassland and scrub. These also provide connectivity to the wider landscape, specially along the south boundary.

The NBDC records were reviewed for Annex I bird species. Peregrine falcon often utilise upland and mountainous habitats for breeding and prefer saltmarshes and coastal habitats during winter. Wetland and waterbirds Special Conservation Interest (SCI)s[4] require access to coastal or riparian habitats. Barn owl (*Tyto alba*) were not listed in NBDC records and no evidence of presence or suitable nesting habitat was identified during the survey.

It is likely that the Proposed Development site does not support populations of Annex I bird species due to the following:

- The watercourse on the Proposed Development site is not considered suitable to support wetland and waterbird species given the presence of existing culverts and size;
- There is a lack of suitable habitat for wetland and waterbird for example, rocky shore, mudflats or saltmarsh. The grassland is predominantly dry and considered sub-optimal to waders;
- There is a lack of suitable wintering and summer habitats for species such as merlin, hen harrier and peregrine for example, coastal, saltmarsh, cliff, upland heath and mountainous terrain; and
- There was no other evidence recorded or through NBDC of any Annex I bird species using the Proposed Development site.

All nesting wild birds are protected from disturbance and destruction under the Wildlife Acts. Desktop and site visit records indicate that the habitats on the Proposed Development site are populated by a common assemblage of farmland and garden species.

Given the potential for a common assemblage of bird species to utilise the grassland, treeline, hedgerow and scrub for breeding and foraging, breeding birds are identified as KERs and discussed further in Section 11.5.

[3] Flying overheard and not recorded landing on site.

[4] SCIs are designated to SPAs.

11.3.4.5 Invertebrates

No protected invertebrate species were identified from NBDC records. There were three near threatened species records: large red tailed bumble bee (*Bombus (Melanobombus) lapidarius*), moss carder-bee (*Bombus (Thoracombus) muscorum*) and a small solidarity bee (*Lasioglossum (dialictus) smeathmanellum*).

Given the lack of desk records and evidence from site surveys this group is not taken forward to Section 11.5. However, Section 11.6.6 provides habitat enhancements measures for invertebrates.

11.3.4.6 Other terrestrial mammals

Protected mammals identified from NBDC records are pine marten (*Martes martes*) and west European hedgehog (*Erinaceus europaeus*). Scott Cawley recorded otter, west European hedgehog and Irish hare (*Lepus timidus* subsp. *hibernicus*) within 2km of the Proposed Development site (Scott Cawley, 2019). No signs of these species were noted during the field survey of the site.

A hole that could have been a potential mammal burrow was monitored for signs of protected mammal including otter. A camera was deployed from 26 April to 09 May 2024) which returned no evidence of otter or any other protected mammal. Otter are unlikely to utilise the Proposed Development site for foraging or resting owing to the lack of suitable features along the artificially modified watercourses and habitat in surrounding area. The surface water watercourse and an artificial pond are unlikely to support an abundance of variety of fish for foraging otter. There is limited resting habitat in the area of the Proposed Development due to lack of riparian woodland, proximity to foraging habitat, presences of existing culverts and to the extent of human activity from surrounding land use (industrial and commercial). More suitable habitat exists in the surrounding landscape south of the site which is connected through watercourses and woodland. No signs (prints, spraint, hairs, sighting) of otter or confirmed holts were recorded during the site visit to inform this Report.

The hedgerows within the Proposed Development site could host populations of hedgehog and pygmy shrew (*Sorex minutus*) with the dry meadows and grassy verges providing suitable habitat for both species. There was evidence of rabbit and fox throughout site.

There were no NBDC records for badger, and no setts were identified on the NBDC badger dataset. No signs of badger or other protected mammals were noted within the Proposed Development site during previous fauna surveys undertaken by Scott Cawley in 2019. However, a badger hair was identified on a [redacted] No other indicative signs of badger (prints, latrine, snuffle hole or setts) were identified during the field survey. Suitable habitat for resting badger exists at mounds with scrub vegetation providing shelter (multiple rabbit burrows). Therefore, it is considered likely that badger will, on occasion, commute through [redacted] Badger and their resting places are protected through the Wildlife Acts.

Figure 11.7: [redacted]

Therefore, other terrestrial mammals are identified as KERs and discussed further in Section 11.5.

11.3.4.7 Invasive Non-Natives Species

Several Invasive Non-Native Species (INNS) were identified in the NBDC records:

- American mink (*Mustela vison*);
- black currant (*Ribes nigrum*);
- brown rat (*Rattus norvegicus*);
- butterfly-bush (*Buddleja davidii*);
- cherry laurel (*Prunus laurocerasus*);
- eastern grey squirrel (*Sciurus carolinensis*);
- European rabbit (*Oryctolagus cuniculus*);
- giant hogweed (*Heracleum mantegazzianum*);
- greater white-toothed Shrew (*Crocidura russula*);
- harlequin ladybird (*Harmonia axyridis*);
- Himalayan balsam (*Impatiens glandulifera*);
- Japanese knotweed (*Fallopia japonica*);
- Jenkins' spire snail (*Potamopyrgus antipodarum*);
- Spanish bluebell (*Hyacinthoides hispanica*);
- sycamore (*Acer pseudoplatanus*); and
- three-cornered garlic (*Allium triquetrum*).

No INNS were identified during the initial habitat survey in January 2024; however, this was carried out in a sub-optimal time of the year to record most INNS. A separate INNS survey was undertaken on the 09 May 2024. No INNS species listed under Irish Law (Section 11.2.2.1) were identified within the boundary of the Proposed Development site. However, Spanish bluebell (*Hyacinthoides hispanica*) was identified on the existing GIL Campus at O 03479 30336, approximately 15m from the boundary of the Proposed Development (Photograph 11.2).

Photograph 11.2: Spanish bluebell identified outside the Proposed Development boundary.

Several species were identified that are noted by the NBDC as medium impact invasive species:

- Buddleja (*Buddleja davidii*): Medium impact;
- Sycamore (*Acer pseudoplatanus*): Medium impact; and
- Pampas grass (*Cortaderia selloana*): Medium impact.

See Section 11.6 for mitigation measures.

11.3.5 Summary of Key Ecological Features

As stated in guidance, ecological resources of below 'Local Importance (higher value)' should not be selected as 'key ecological receptors' for which detailed assessment is required. The following ecological features are considered to be KERs in relation to the Proposed Development site and its potential construction/decommissioning and/or operational effects:

- European sites are considered to be KERs as the Proposed Development has connectivity to European sites in Dublin Bay;
- Other terrestrial mammals (badger, pygmy shrew and west European hedgehog) are considered to be KERs on a precautionary basis due to the presence of suitable feeding and resting habitat for protected mammal species within the Proposed Development boundary;
- Bats are considered to be KERs on a precautionary basis as all bats and their roosts are protected under the Wildlife Acts and under the Habitats Directive. Further surveys would be required to ascertain bat usage of the site across the active season and the presence/absence of bat roosts;
- Breeding birds are considered to be KERs on a precautionary basis due to the presence of suitable breeding habitat for an assemblage of common species within the lands and their protection under the Wildlife Acts;

- Hedgerow habitat within the study area provides potential foraging and commuting habitat for bats and suitable breeding habitat for birds. Hedgerows have been included as a KER for their function in supporting the local bat and breeding bird populations;
- Treeline habitat within the study area provides potential foraging and commuting habitat for bats and suitable breeding habitat for birds. Tree lines have been included as a KER for their function in supporting the local bat and breeding bird populations;
- Scrub habitat within the study area provides potential foraging and commuting habitat for bats and suitable breeding habitat for birds. Scrub has been included as a KER for their function in supporting the local bat and breeding bird populations;
- Watercourses provide connectivity to designated sites and other habitats, albeit weak given the distance of the hydrological pathway (25km via river network to nearest European site). They also provide habitat that may support invertebrate prey of birds and bats. Therefore, they have been included as a KER; and
- Dry meadows and grassy verges habitat within the lands provide shelter and foraging habitat for a range of different fauna species. This habitat has been included as a KER for its function in supporting fauna populations.

Table 11.7 summarises all ecological features identified as KERs based on the completion of the desk study and field survey of the subject lands.

Table 11.7: Ecological evaluation of KER.

Habitat/Species	Highest ecological valuation level	KER
Designated Sites		
European Sites	International Importance	Yes
pNHA	National Importance	No
Fauna		
Amphibians	Local Importance (Higher Value)	Yes
Bats	Local Importance (Higher Value)	Yes
Birds	Local Importance (Higher Value)	Yes
Other mammals (badger, pygmy shrew and west European hedgehog)	Local Importance (Higher Value)	Yes
Habitat and Flora		
Amenity grassland	Local Importance (Lower Value)	No
Building and artificial surfaces	Local Importance (Lower Value)	No
Drainage ditch/watercourses	Local Importance (Higher Value)	Yes, in relation to protected fauna
Dry meadows and grassy verges	Local Importance (Higher Value)	Yes, in relation to protected fauna
Hedgerow	Local Importance (Higher Value)	Yes, in relation to protected fauna
Recolonising bare ground	Local Importance (Lower Value)	No
Scrub	Local Importance (Higher Value)	Yes, in relation to protected fauna
Ornamental/ non-native shrub mosaic	Local Importance (Lower Value)	No
Other Artificial Lakes and Ponds	Local Importance (Lower Value)	No
Treeline	Local Importance (Higher Value)	Yes, in relation to protected fauna

11.4 Characteristics of the Proposed Development

11.4.1 Construction Phase

Based on the assumption that planning consent is secured in Quarter 3/4 2024, construction works would commence in Quarter 4 of 2024. The works are anticipated to be undertaken over a period of 27 months, with a completion target of Quarter 2 in 2027. In terms of potential effects on biodiversity, the following activities are considered as part of the Construction Phase:

- Vegetation clearance, habitat removal and tree felling: Site wide strip and associated site clearance works would include, but are not limited to, removal of existing spoil deemed surplus to requirements, clearance of overgrowth and defined hedgerows/trees, topsoil strip. Land take will be required from semi-natural habitats within the site boundary including hedgerows, treelines, watercourse and dry meadow grassland;
- Acoustic disturbance from excavation and site clearance: Highly vibratory tools would be required to break ground and fell trees;
- Ground excavation causing the release of contaminants into groundwater or aerial emissions: Moderate scale excavations will occur during groundworks. Excavated material would be re-used as part of the earthworks and as temporary back-fill where necessary. Temporary storage of spoil would occur onsite;
- Diversion of water courses: A watercourse on the Proposed Development site is proposed to be diverted around the DC3 building (Figure 11.8). For further information, refer to Chapter 12 (Water). Within the Proposed Development site, two short 600mm culverts (Culverts 2 and the northern part of Culvert 3) provide pinch points to flow and cause overland flooding to the Proposed Development site. These will be removed. Two new large culverts (Culvert A: 1.5m x 1m, Culvert B: 1.05m diameter) and an open stream will replace the removed culverts and allow realignment of the watercourse at the southeast part of the site (around DC3), providing additional conveyance capacity. Parts of Culvert 3, which is located within DC1, will be maintained in place as per current arrangement, with a part of Culvert 3 diverted and realigned around the proposed HV compound (Culvert C). Downstream of the proposed HV compound, along Prior Park Road, the existing culvert will be opened up and de-culverted within the biodiversity area. Overall, the watercourse within the site will comprise of two open stream sections of total length of 220.1m (compared to 187.8m presently), with two long culverts at the south and north of the data hall building (Culvert A and B to C) of total length of 651m (compared to 409.2m presently) (table). The total length of the watercourse due to the realignment works will increase by 274.2m (See Table 11.8 for distances). A step-pool arrangement is proposed at the end of the open stream before connecting to the northern culvert to allow a steep fall of 2m. The step-pools achieve the 2m vertical transition and hence allow the design of a relatively shallow and gentle open stream directly upstream that can slow down flows and encourage habitat creation;
- Discharge of surface water containing contaminants into surface waterbody: Surface waters from the Proposed Development site will be diverted through the settlement ponds (located between the area of construction and the nearest field drain) before being discharged to the local watercourse and subsequently to Dublin Bay via the Griffeen River and the River Liffey. Dewatering and over-pumping are likely to be required to allow for excavation to achieve the required sub-foundation level;
- Dust generation: Direct effects are likely due to construction activities such as site clearance and excavation. Indirect effects relate to the potential offsite effects associated with construction traffic accessing the site for deliveries, removals and staff;
- Environmental incidents and accidents for example, spillages: As with all construction sites there remains the risk of an accidental pollution event;
- Lighting may be required during the Construction Phase;
- Foul water drainage: Foul water discharge generated during construction will be minor. A temporary connection to the effluent sewer system will be required upon approval and agreement with Uisce Eireann. This will connect to the existing public sewer, before ultimately being discharged to Ringsend Urban Waste Water Treatment Plant; and
- Landscaping has been designed to incorporate Miyawaki forests, berms, enhanced linear features (hedgerows and treelines) and wetland habitats through wet and dry SuDS, grass swales and riparian corridor (diversion of watercourse mentioned above). Refer to Chapter 15 (Landscape and Visual) for further detail.

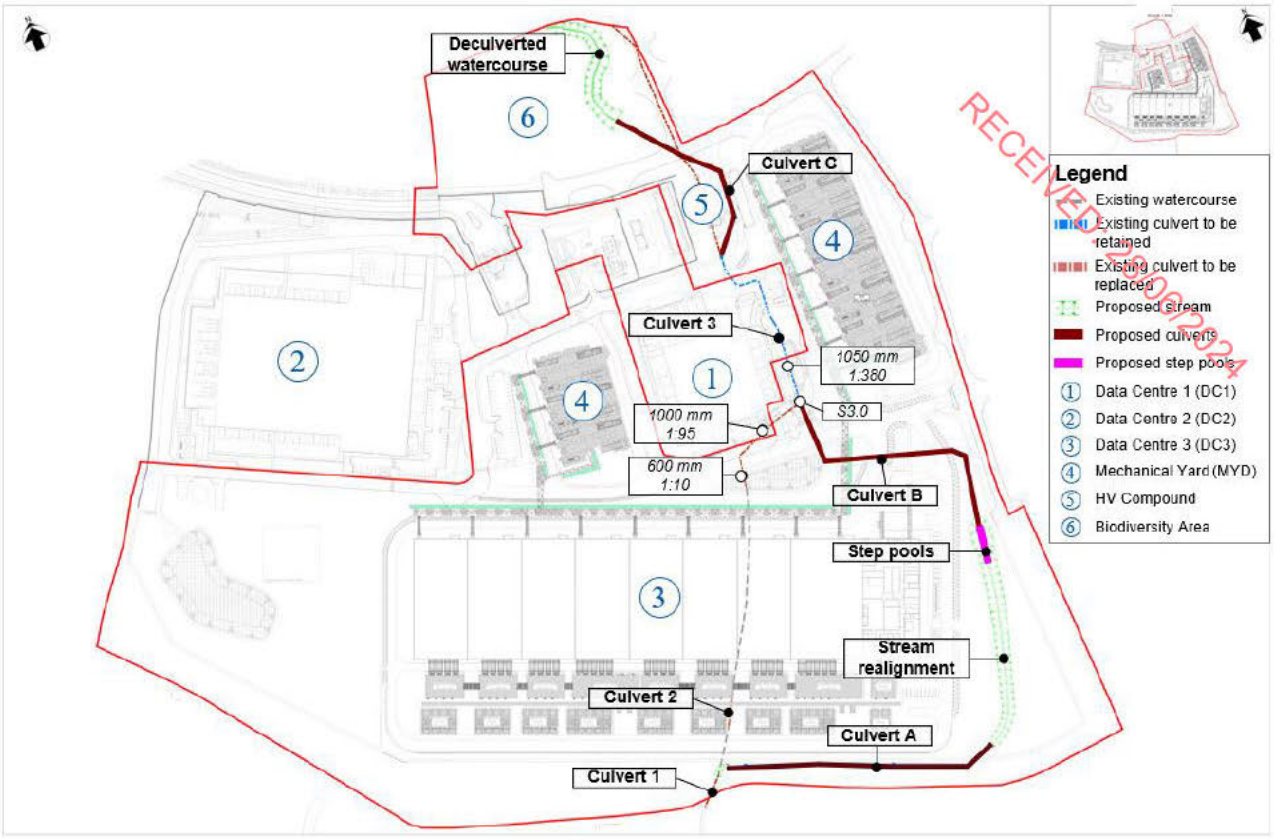

Figure 11.8: Proposed Development

Table 11.8: Proposed changes to the length of culvert and open watercourse

	Baseline length (m)	Proposed length (m)
Culvert	409.2	651
Open watercourse	187.8	220

11.4.2 Operational Phase

The Proposed Development will provide a data storage facility which will incorporate data halls with associated support areas, HV compound, offices and staff facilities, a loading area, mechanical yards (MYD) and electrical yards (EYD), internal and external utilities, together with ancillary buildings. In terms of effects on biodiversity, the following activities are considered as part of the Operational Phase:

- Site operation and management (lighting): Additional lighting will be required in external areas for security and safety purposes;
- Site operation and management (water): Potential adverse effects will be limited to accidental spillage of potentially polluting substances such as fuel entering surface water. The surface waters from the Proposed Development site will discharge to local watercourses, which subsequently discharge to Dublin Bay via the Griffeen River and the River Liffey after approximately 17km. The Proposed Development will have separated industrial and sanitary networks which then connect prior to discharge off site. This allows for convenient segregation of the two networks to the outfall should a localisation or permit require it. The foul water network then undergoes treatment at Ringsend Wastewater Treatment Plant (WWTP) before being discharged to Dublin Bay. There is sufficient capacity in the existing GIL Campus foul discharge system to accommodate the additional load in operation of Proposed Development, therefore this is not considered an impact;
- Site operation and management (landscaping): Landscaping has been designed to be low maintenance however there may be some degree of management such as maintaining boundaries; and

- Presence of people, vehicles and their activities: There will be a limited increase in people on site due to slight increase in employees and baseline levels of human activity given degree of development in surrounding area.

Table 11.9 summarises the potential effects that may arise as a result of the Proposed Development during the Construction and Operational Phases.

Table 11.9: Summary of potential impacts arising during the Construction and Operational Phases.

Phase	Potential Impact	Considered
Construction	Vegetation clearance, habitat removal and tree felling	Yes
	Acoustic disturbance from excavation and site clearance	Yes
	Ground excavation causing the release of contaminants into groundwater or ariel emissions	Yes
	Diversion of water courses	Yes
	Discharge of surface water containing contaminants into surface waterbody	Yes
	Dust generation	Yes
	Environmental incidents and accidents for example, spillages	Yes
	Lighting	Yes
	Drainage	Yes
	Implementation of landscape design and habitat management (type and location)	Yes
Operation	Presence of people, vehicles and their activities for example, increased public access and recreational pressure, risk of fires	Yes
	Runoff containing contaminants or sediments	Yes
	Site operation and management for example, maintenance operations, industrial processes generating emissions, lighting, noise, water abstraction and discharge	Yes

11.4.3 Decommissioning Phase

It is envisaged that the Proposed Development will have a long lifespan of 35-40 years, or more. Regular maintenance and upgrading of the data centre facility over time will enable it to continue to meet future demands. Upon closure, which is unforeseen at this time, it is anticipated that the facility will be suitable for re-use as would any other industrial site. All bespoke plant and equipment that would be surplus to requirements for a standard industrial site would simply be decommissioned, removed and recycled/disposed of as appropriate to the guidelines and regulations of that time. Any external areas or structures may be re-used for similar industrial usage. The costs associated with the closure of the facility will be met by the owners of the facility at that time.

During the Decommissioning Phase of the Proposed Development, the potential effects of the Proposed Development on biodiversity are likely to be similar to those arising during the Construction Phase, refer to Section 11.4.1. The watercourse will remain in place.

As outlined in Chapter 5 (Construction) Section 5.7, decommissioning activities will need to be undertaken in accordance with the requirements of the Industrial Emissions License (IEL).

11.5 Potential Effects

Annex III of the amended Directive 2014/52/EU requires that the EIAR should assess:

- The magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected);
- The nature of the impact;
- The transboundary nature of the impact;
- The intensity and complexity of the impact;
- The probability of the impact;

- The expected onset, duration, frequency and reversibility of the impact;
- The cumulation of the impact with the impacts of other existing and/or approved projects; and
- The possibility of effectively reducing the impact.

Table 11.10 lists the potential effects as a result of the Proposed Development in both the Construction, Decommissioning and Operational Phase. When describing changes/activities and impacts on ecosystem structure and function, important elements to consider include quality, significant, extent, probability and duration. Section 3.7 of the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, 2022) provides standard definitions which have been used to classify the effects.

This classification scheme is outlined in Chapter 1 (Introduction) Table 1.1 of the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, 2022). It should be noted that as a precautionary measure, mitigation is proposed for effects where significance is characterised by slight, and moderate as well as significant.

Table 11.10: Potential effects from the Construction Phase, Operational Phase and Decommissioning Phase of the Proposed Development.

Potential Effects of Construction/Decommissioning Activities	Potential Effects of Operational Activities
Direct mortality of individuals	Displacement of species
Disturbance from noise, light, vibration and dust	Disturbance to foraging and commuting
Habitat degradation due to pollution, changes to hydrology including diversion of flow, aerial emission and sedimentation etc.	Habitat improvements
Habitat loss	Habitat degradation due to changes to hydrology including diversion of flow, sedimentation etc.
Loss of foraging and commuting resource	

11.5.1 Do-Nothing Scenario

Most of the habitats to be affected have been significantly modified from their natural state by human activity. In pockets of semi-natural habitats within the Proposed Development boundary, the general pattern of succession from grassland to scrub to woodland would be expected to continue. In the absence of development, it is expected that the lands within the Proposed Development site would largely remain under the same management regimes. No significant changes to the habitats within the boundary are likely to occur, in the "Do-Nothing" Scenario.

11.5.2 Designated Sites

11.5.2.1 Construction Phase

Arup prepared a Combined AA Screening and NIS report (which accompanies this planning application). This report investigated the potential for the Proposed Development to have likely significant effects on European sites (SAC/cSAC/SPA) either alone or in combination with other plans or projects. The assessment identified a Source-Pathway-Receptor (S-P-R) link from the Proposed Development and several European sites (South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Dublin Bay SAC and North Bull Island SPA). Surface water is discharged to a local watercourse which provides a weak and in-direct hydrological connection. During the Construction Phase several impacts are listed below that have the potential to lower water quality at European sites:

- Diversion of water courses and release of sedimentation;
- Discharge of surface water containing contaminants into surface waterbody (including sedimentation from excavation); and
- Environmental incidents and accidents for example, spillages.

The effect can be described as Negative, Significant - Likely, Short-Term on European sites within Dublin Bay. It is therefore considered a Significant effect in the absence of mitigation.

Rationale for the predicted effect: The lowering of water quality may impair foraging ability for species and sedimentation may smooth aquatic plants. Thus, degrade habitat, negatively impacting the European sites' conservation objectives. However, the duration will be limited to the Construction Phase (27 months).

11.5.2.2 Operational Phase

During the Operational Phase, impacts are limited to the direct emissions to water. This is through surface water runoff containing harmful contaminant that may arise from an accidental spill. As discussed, there is weak hydrological connection between the Proposed Development and European sites through surface waterbodies.

Albeit small, an additional load on the foul water network will result from the Operational Phase. Wastewater from the Proposed Development passes through Ringsend WWTP which also discharges to Dublin Bay (as mentioned in proximity to European sites).

The effect on European sites would be the degradation of habitat through the lowering of water quality from these two sources.

The effect can be described as Negative, Not Significant, Un-likely, Temporary on European sites within Dublin Bay. It is therefore considered a Not Significant effect in the absence of mitigation.

Rationale for the predicted effect: Accidental spills or release of wastewater may impair water quality, however, given the embedded design measures of the Proposed Development and the treatment of waste water at Ringsend WWTP, it is extremely unlikely that such an impact would occur. In addition, the duration would be temporary as it would be isolated to a pollution event. The effect would be imperceptible as the hydrological water connections are indirect and weak, and the separation distance is significant, such that there is no real likelihood of any adverse effects on European sites in the wider catchment area (even in the absence of the design elements).

11.5.3 Habitats

11.5.3.1 Construction Phase

Direct impacts on habitats as a result of construction works are described in Table 11.11. The Proposed Development will result in the permanent loss of existing habitats: watercourse, dry meadows and grassy verges, hedgerow, scrub and treeline. Potential effects that are likely in the absence of mitigation are:

- Changes to hydrology including diversion of flow;
- Habitat loss; and
- Habitat degradation.

It should be noted these habitats have been included as a KER for their function in supporting the local fauna populations and the connectivity to European sites, therefore indirect effects will result from habitat loss. These are assessed under the relevant KERs. The value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Effects resulting from habitat improvements are assessed under relevant fauna.

The classification scheme below for the value of habitats and the impacts on them, is detailed in Appendix 11.2.

No Annex I habitats were identified on the area of the Proposed Development and therefore none will be lost as a result of the Proposed Development. However, Table 3 of the SDCC Development Plan contains objectives directly related to loss of habitat, specifically, the protection of hedgerows given their role in ecological connectivity:

- GI2 Objective 5: To protect and enhance the County's hedgerow network; and
- NCBH11 Objective 4: To protect the hedgerows of the County, acknowledging their role as wildlife habitats, biodiversity corridors.

Table 11.11: Impact on habitats due to the Proposed Development.

Habitat	Ecological Value (NRA Guidelines)	Predicted Impact	Predicted Effects in Absence of Mitigation	Significant	Rationale
Drainage ditch FW4	Local importance (higher value)	The watercourse diversion will result in the removal of the existing drainage to the south of the Proposed Development site. The realigned watercourse will comprise two open stream sections of total length of 220.1m (compared to 187.8m presently). New (larger) culverts will also be added to the north and south. Associated landscaping and diversion design aims to achieve a relatively shallow and gentle open watercourse directly upstream that can slow down flows and encourage habitat creation by using step-pools to achieve the 2m vertical transition. Further detailed is discussed in 11.4.1.	Habitat loss *Direct effect: Negative, slight-moderate, likely and medium-term across the drainage ditch habitat on the Proposed Development site.* *Indirect effect to European sites, bats and birds. See Sections 11.5.2, 11.5.5.2 and 11.5.6.*	Yes	The loss of habitat reduces the current biodiversity on site. However, the effect is slight due to the ecological value of the habitat. The current habitat lacks a diversity in aquatic species, includes non-native species and altered by human activity (culverting and dumping). Not all of this habitat will be removed, approximately 50% to the north boundary will remain. It is also widespread in the surrounding environment. The effects are expected to last a" 7-15 years until the re-diversion is developed.
			Changes to hydrology including diversion of flow *Direct effect: Negative, slight, short-term across the drainage ditch habitat in the Proposed Development site.*	Yes	The change of hydrology during the re-alignment may reduce water levels to a small degree within the watercourse to the north. This is likely to be limited to the construction period (50) months.
		Construction works will be undertaken in proximity to retained and diverted watercourse habitat within the site. Consequently, there is the potential for pollution pathways, for example, aerial pollutants and surface water runoff of contaminants arising from construction activities and accidental encroachment (fuels, sediment, dust, other contaminants).	Habitat degradation *Indirect effect: Negative, slight, likely and short-term across the drainage ditch habitat on the Proposed Development site.*	Yes	Pollutants entering the watercourse may partially reduce water quality, smoother aquatic vegetation and reduce the prey availability until dispersed. This is likely to last the construction period (50) months.
Dry meadow and grassy verge GS2	Local importance (higher value)	Within the greenfield area of the Proposed Development site, a large proportion (approximately 7ha) of this habitat will be removed through vegetation clearance to allow for the construction of the Proposed Development.	Habitat loss *Direct effect: Negative, slight-moderate, likely, long-term across the dry meadows and grassy verge habitat on the Proposed Development site.*	Yes	The loss of habitat reduces the current biodiversity on site. However, the effect is slight due to the ecological value of the habitat. The current habitat lacks a diversity sward species and includes non-native species.

Habitat	Ecological Value (NRA Guidelines)	Predicted Impact	Predicted Effects in Absence of Mitigation	Significant	Rationale
			Indirect effect to bats, birds and other mammals. See Sections 11.5.5.2, 11.5.6. and 11.5.7		It is also widespread in the surrounding environment. This is likely to last the lifetime of the Proposed Development.
		Construction works will be undertaken in proximity to the dry meadow and grassy verge. Consequently, there is the potential for pollution through aerial pathways from contaminants arising during construction activities and accidental encroachment.	Habitat degradation *Indirect effect: Negative, slight, likely and short-term across the dry meadows and grassy verge habitat on the Proposed Development site.*	Yes	During the 27-month construction period, pollutants may accumulate on this habitat and reduce the photosynthetic abilities of smoother vegetation. However, the impact on the habitat is expected to be minimal on its sensitivities (common and widespread species).
Hedgerow WL1	Local importance (higher value)	Within the greenfield area of the Proposed Development there will be vegetation clearance comprising the hedgerow surrounding the watercourse to the south (approximately 200m in length)	Habitat loss *Direct effect: Negative, slight-moderate, likely, long-term across the hedgerow habitat on the Proposed Development site.* *Indirect effect to bats, birds and other mammals. See Sections 11.5.5.2, 11.5.6. and 11.5.7*	Yes	The loss of habitat reduces the current biodiversity on site. However, the effect is slight-moderate due to the amount being removed and given the availability in the surrounding lands to the south. The ecological value of the habitat however does support fauna such as bats and birds. The hedgerow lacks a diversity in ground floral species and is made up of non-natives such as sycamore. There is also a large extent of this habitat being retained on site. This is likely to last the lifetime of the Proposed Development.
		Construction works will be undertaken in proximity to hedgerow. Consequently, there is the potential for pollution through aerial pathways from contaminants arising during construction activities and accidental encroachment (dust).	Habitat degradation *Indirect effect: Negative, slight, likely, short-term across the hedgerow habitat on the Proposed Development site.*	Yes	Over the 27-month construction period, pollutants may accumulate on this habitat, potentially diminishing the photosynthetic abilities of smoother vegetation. However, the impact on the habitat is anticipated to be minimal given its sensitivities (common and widespread species).

Habitat	Ecological Value (NRA Guidelines)	Predicted Impact	Predicted Effects in Absence of Mitigation	Significant	Rationale
Scrub WS1	Local importance (higher value)	Within the greenfield area of the Proposed Development site there will be vegetation clearance comprising the small pockets of scrub to the south.	Habitat loss *Direct effect: Negative, slight-moderate, likely, long-term across the scrub habitat on the Proposed Development site.* *Indirect effect to bats, birds and other mammals. See Sections 11.5.5.2, 11.5.6. and 11.5.7*	Yes	The loss of habitat reduces the current biodiversity on site. However, the effect is slight due to the small amount being removed and given the availability in the surrounding lands to the south. In addition, the ecological value of the habitat. This is likely to last the lifetime of the Proposed Development.
		Construction works will be undertaken in proximity to scrub. Consequently, there is the potential for pollution through aerial pathways from contaminants arising during construction activities and accidental encroachment (dust).	Habitat degradation *Indirect effect:* Negative, slight, likely, *short-term* across *the scrub habitat on the Proposed Development site.*	Yes	Throughout the 27-month construction period, pollutants could accumulate on this habitat, potentially diminishing the photosynthetic capabilities of smoother vegetation. However, the impact on the habitat is projected to be minimal given its sensitivities (common and widespread species).
Treeline WL2	Local importance (higher value)	Within the greenfield area of the Proposed Development site there will be vegetation clearance comprising the treeline (approximately 175m in length).	Habitat loss *Direct effect: Negative, slight-moderate, likely, long-term across the treeline habitat on the Proposed Development site.* *Indirect effect to bats, birds and other mammals. See Sections 11.5.5.2, 11.5.6. and 11.5.7*	Yes	The loss of habitat reduces the current biodiversity on site. However, the effect is slight due to the amount being removed and given the availability in the surrounding lands to the south. The ecological value of the habitat however does support fauna such as bats and birds. The treeline lacks a diversity in ground floral species and is made up of non-natives such as sycamore. There is also a large extent of this habitat being retained on site. This is likely to last the lifetime of the Proposed Development.

Habitat	Ecological Value (NRA Guidelines)	Predicted Impact	Predicted Effects in Absence of Mitigation	Significant	Rationale
		Construction works will be undertaken in proximity to treeline. Consequently, there is the potential for pollution through aerial pathways from contaminants arising during construction activities and accidental encroachment (dust).	Habitat degradation *Indirect effect: Negative, slight, likely, short-term across the treeline habitat on the Proposed Development site.*	Yes	Throughout the 27-month construction period, pollutants could accumulate on this habitat, potentially diminishing the photosynthetic capabilities of smoother vegetation. However, the impact on the habitat is projected to be minimal given its sensitivities (common and widespread species).

11.5.3.2 Operational Phase

Watercourse

- Changes to hydrology including diversion of flow:

The impact of the proposed culverts and stream diversion on water levels outside the Proposed Development boundary has been assessed by modelling in Chapter 12 (Water). This finds in the proposed scenario, water levels upstream of the Proposed Development (south) are locally reduced on average by 100mm compared to the existing conditions, returning to existing scenario levels 115m upstream. At the downstream end of the model, water levels locally increase by 30mm directly downstream of the Proposed Development and return to pre-development (existing) levels 75m downstream of the Proposed Development. It should be noted this increase in levels is only local and occurs during the 1% Annual Exceedance Probability (AEP) +20% climate change allowance. There is no impact during the 1% AEP. Based on these potential risks, the potential effect rating on Hydromorphology during the Operational Phase is large but the importance of the watercourse is low (according to the Hydromorphological Assessment in Appendix 12.2).

Surface water volume may also be increased by the construction of new impermeable surfaces via the new building footprints and car parks.

As mentioned in Section 11.3.5, this habitat has been identified as a KER due to its provision connectivity to Designated sites and other habitats. In addition, it also provides habitat that may support invertebrate prey of birds and bats. The changes to hydrology are indirect. The changes in hydrology whilst in operation are not expected to impact aquatic invertebrate prey for either bats or birds. Furthermore, it is not expected to change the hydrological connection to European sites identified (Section 11.5.2).

The effects can be described as Neutral, Slight, and Long-Term across this habitat in the area of the Proposed Development. It is therefore considered Not Significant in the absence of mitigation.

- Habitat degradation:

As outlined in Section 11.4.2 potential adverse effects will be limited to accidental spillage of potentially polluting substances such as fuel entering surface water. However, elements of the design have helped reduce the likelihood of this occurring and the source for effect is considered minimal. Surface water volume may be increased by the construction of new impermeable surfaces via the new building footprints and car parks. It is expected that the effects on surface water quality during operation will be imperceptible and long-term (Chapter 12 (Water)). This effect can be described as Negative, Slight, Unlikely, Temporary across this habitat in the area of the Proposed Development. It is therefore considered Not Significant in the absence of mitigation.

- Potential risk of disruption to movement of aquatic organisms (displacement of species):

A step-pool arrangement is proposed at the end of the open stream before connecting to the northern culvert to allow a steep fall of 2m. This arrangement will allow a relatively shallow and gentle open stream alignment that can slow down flows and encourage habitat creation, as well as maintaining gentle culvert slopes. However, a fall of 2m could potentially pose a barrier to aquatic organisms (further detail in Chapter 12 (Water)). This habitat may support invertebrate prey of birds and bats. The indirect effect can be described as Negative, Slight / Moderate and Long-Term across this habitat on the Proposed Development site. It is therefore considered Significant in the absence of mitigation.

11.5.4 Invasive species

11.5.4.1 Construction Phase

Habitat degradation

No INNS were identified within the Proposed Development site. Causing the spread of invasive species listed in Irish legislation is an offence. It is also an objective of the SDCC Development Plan to ensure that development proposals do not lead to the spread or introduction of invasive species. It is noted that the medium impact invasive species Buddleia, sycamore and pampas grass were recorded on site.

This effect can be described as Negative, Slight, Unlikely, and Short-Term across the habitat in the area of the Proposed Development. Although INNS were not identified in the area of the Proposed Development, on a precautionary basis, the potential of INNS to be spread during construction is considered Significant, and appropriate mitigation measures incorporated.

11.5.4.2 Operational Phase

No operational effects were identified in relation to INNS. Therefore, it is considered to be Not Significant in the absence of mitigation.

11.5.5 Protected and Notable Species

As noted in 11.5.3.1, the site clearance (removal of vegetation and soils) will result in in-direct effects to KERs. These are outlined below under relevant subheadings for specific KERs.

11.5.5.1 Amphibians

Construction Phase

- Direct mortality of individuals:

The watercourse diversion as discussed in Section 11.4.1 may result in the direct mortality or injury of small numbers of common frog, confirmed to be utilising this habitat. Although not identified on site smooth newt may be present and could be similarly impacted. In the absence of mitigation, the effect of direct mortality or injury to this species can be described as Negative, Slight, Unlikely, Short-Term and at a local geographic scale.

- Loss of foraging habitat:

Site clearance and watercourse diversion has potential for temporary loss of confirmed foraging habitat for small numbers of common frog and low value foraging habitat for smooth newt. In the absence of mitigation, the effect of the loss of foraging for amphibian this species can be described as Negative, Slight, Unlikely, Short-Term and at a local geographic scale.

Operational Phase

- Habitat improvements:

Refer to Section 11.5.5.2.

11.5.5.2 Bats

Construction Phase

- Direct mortality of individuals:

The existing treeline and hedgerow on the Proposed Development site will be removed as part of the works. As discussed (Section 11.3.4.3), no bat roosts were found on the Proposed Development site however, four trees were identified with low BRP. Removal of these trees may result in the loss of small numbers of roosting bats.

In the absence of mitigation, the direct effect can be described as Negative, Slight, Unlikely, Long-Term on the local bat population. Although no signs of these species were recorded within the Proposed Development site, due to their mobile nature and presence of suitable habitat, the effect is therefore considered Significant, on a precautionary basis, in the absence of mitigation.

- Loss of foraging habitat:

Section 11.3.4 details the results of a night-time bat walk which identified the boundaries, particularly south and south-west, as areas with the highest levels of bat activity. The removal of habitat (grassland, scrub, treeline and hedgerow) will result in the loss of foraging habitat for the local bat population. During the night-time bat walk a single common pipistrelle was identified foraging along the hedgerow proposed to be removed.

The static data suggests that the treeline and hedgerow recorded similar levels of activity, although variation in species was identified (Section 11.2.6). The removal of habitat (grassland, scrub, treeline and hedgerow) will result in the loss of foraging habitat for the local bat population.

The treeline and hedgerow habitat to be removed Is not considered to offer commuting habitat due to the lack of connectivity it provides to other areas of suitable bat habitat (extends to the active GIL Campus). The boundary vegetation will be retained; therefore, loss of commuting is not considered a potential effect.

In the absence of mitigation, the in-direct effect of loss of foraging habitat can be described as Negative, Slight-Moderate, Likely, and Long-Term on the local bat population. It is therefore considered Significant in the absence of mitigation.

- Disturbance to foraging and commuting bats:

Lighting working hours that suggest night working will be limited and therefore considered Negative, Not Significant, Unlikely and Short-Term on the local bat population. It is therefore considered Not Significant in the absence of mitigation.

Operational Phase

- Disturbance to foraging and commuting bats:

Artificial lighting proposed as part of the Operational Phase has the potential to indirectly affect foraging and commuting habitat. It is noted that there is existing lighting at the GIL Campus, although new permanent security lighting around the boundaries will likely impact on foraging and commuting local bat populations.

It should be noted that a large proportion (approximately 52%) of bat activity recorded through static monitors was associated with Leisler's bat which fly relatively high compared to other species and are less reliant on linear features. This species is also opportunistic and will tolerate light for feeding on invertebrates attracted to light sources. While all bat species have a generally low tolerance for light levels, the following bat species are particularly sensitive to elevated light levels: brown long-eared bat, whiskered bat, Natterer's bat, Daubenton's bat and lesser horseshoe bat (BCI, 2010). The remaining species composition from the static data was largely made up by common and soprano pipistrelle which are not included as species particularly sensitive to elevated light levels by the BCI. Baseline data suggests that these species are particularly sensitive to elevated lighting are not frequently utilising the Proposed Development site.

In the absence of mitigation, the effect can be described as Negative, Slight, Likely, Long-Term on the local bat population. It is therefore considered Significant in the absence of mitigation.

- Habitat improvements:

As part of the landscaping plans there is a proposal to enhance habitats for wildlife. This would be achieved by integrating linear features (planting hedgerow), opening a watercourse and inclusion of berms. This effect can be described as Positive, Significant, Likely, Long-Term on the local bat, bird and mammal (hedgehog, badger and hare) populations within the Proposed Development site in the future as these species will take time to mature. Due to the positive quality of effect, there is no mitigation proposed.

11.5.6 Breeding birds

11.5.6.1 Construction Phase

Direct mortality of individuals

All bird species are protected under the Wildlife Acts, and it is an offence to disturb birds while on their nests, or to wilfully take, remove, destroy, injure or mutilate their eggs or nests. Desktop and site visit records indicate that the habitats on site are populated by a common assemblage of farmland and garden species. No Annex I or notable species have been identified or are likely to inhabit the area of the Proposed Development and therefore further survey was not required to inform to assessment impacts on birds.

Scrub, hedgerow and treeline and will be removed in the centre of the area of the Proposed Development. These habitats currently provide habitat for breeding and foraging for nesting birds of a common assemblage (farmland and garden species) within the local bird population. In the absence of adoption of protocols for the protection of birds and their nests, there is potential for direct impacts on nesting birds and/or mortality of nesting birds at a local scale, arising from the vegetation clearance during construction. The effect can be described as Negative, Slight/Moderate, Short-Term on the local bird population. It is therefore considered Significant in the absence of mitigation.

Loss of foraging and breeding habitat

Scrub, hedgerow and treeline and will be removed in the centre of the area of the Proposed Development. These habitats currently provide habitat for breeding and foraging for nesting birds of a common assemblage (farmland and garden species) within the local bird population. Suitable habitat is available in the vicinity of the Proposed Development such as the surrounding farmland and Grange Castle Golf Club. These lands are zoned as 'RU- Rural' and 'OS- Open Space' (SDCC, 2022) and as such, won't be developed under the current development plan. The effect can be described as Negative, Slight, Likely, Long-Term, on the local bird population. It is therefore considered Significant in the absence of mitigation.

Disturbance from noise and vibration

It is possible that birds currently using the Proposed Development and its environs may be temporarily disturbed as a consequence of increased noise and human activity levels in the construction zone of the Proposed Development. This disturbance could potentially result in the temporary displacement of birds within the construction zone and as a result, a potential reduction in the breeding success of such birds during this period. This in-direct effect is considered to be Temporary and restricted to the Construction Phase of the development and post-construction until birds in the locality habituate to the increased levels of noise and human activity. Birds recorded within the subject lands are typical garden and sub-urban species which are considered to tolerate increased levels of disturbance providing suitable habitat remains. The effect can be described as Negative, Slight, Likely, Temporary on the local bird population. It is therefore considered Significant in the absence of mitigation.

11.5.6.2 Operational Phase

Habitat improvements

Refer to Section 11.5.5.2.

11.5.7 Other mammals

11.5.7.1 Construction Phase

Disturbance from foraging and commuting habitat or direct mortality

Although there were no signs of protected mammals utilising the Proposed Development site, the site holds a range of habitats (grassland, scrub, hedgerows and treeline) suitable to support protected mammal species such as hedgehog, badger and hare (Protected under the Wildlife Acts), as such they may be present at the time of construction.

Scrub, grassland, hedgerow and treeline and will be removed in the centre of the Proposed Development site. However, such mammals are generally nocturnal in habit and in many circumstances can tolerate high levels of human presence and disturbance. Mammals which use this area are also habituated to comparable levels of disturbance. There is potential for direct impacts through injury or mortality on such species at a local scale, arising from the vegetation clearance during construction. Construction may result in indirect effects though disturbance. Both effects can be described as Negative, Slight, Short-Term and Unlikely on the local mammal (hedgehog, badger and hare) population. Although no signs of these species were recorded within the Proposed Development site, due to their mobile nature and presence of suitable habitat, the effect is therefore considered Significant, on a precautionary basis, in the absence of mitigation.

Loss of foraging and commuting habitat

Scrub, grassland, hedgerow and treeline and will be removed in the centre of the Proposed Development site. As discussed, these habitats may provide habitat for foraging and resting habitat for small numbers of protected mammals (hedgehog, badger and hare) within the local population. Suitable habitat is available in the vicinity of the Proposed Development site such as the surrounding farmland and Grange Castle Golf Club. These lands are zoned as 'RU- Rural' and 'OS- Open Space' (SDCC, 2022) and as such, won't be developed under the current development plan. Direct effect can be described as Negative, Slight and Long-Term on local mammal (hedgehog, badger and hare) population within the Proposed Development site. It is therefore considered Significant in the absence of mitigation.

11.5.7.2 Operational Phase

Habitat improvements

Refer to Section 11.5.5.2.

11.5.8 Summary of Likely Effects

Table 11.12 summarises the likely effects to specific KERs in the absence of mitigation. Effects which are considered not significant are not considered in subsequent sections.

Table 11.12: Summary of likely effects in the absence of mitigation.

KER	Construction Phase Effects	Ecological Significance if Un-Mitigated	Operational Phase Effects	Ecological Significance if Un-Mitigated
European sites	Habitat degradation	Negative, Significant	Negative, Not Significant	Not Significant
Watercourse	Habitat loss	Negative, Significant	Changes to hydrology including diversion of flow	Not Significant
	Changes to hydrology including diversion of flow	Negative, Significant	Habitat degradation	Not Significant
	Habitat degradation	Negative, Significant	Dispersal of species	Negative, Significant
Dry meadows and grassy verges	Habitat loss	Negative, Significant	None.	N/A
	Habitat degradation	Negative, Significant	None.	N/A
Hedgerow	Habitat loss	Negative, Significant	None.	N/A
	Habitat degradation	Negative, Significant	None.	N/A
Scrub	Habitat loss	Negative, Significant	None.	N/A
	Habitat degradation	Negative, Significant	None.	N/A
Treeline	Habitat loss	Negative, Significant	None.	N/A
	Habitat degradation	Negative, Significant	None.	N/A
Invasive species	Habitat degradation	Negative, Significant	None.	N/A
Amphibians	Direct mortality of individuals	Negative, Significant	None.	N/A

KER	Construction Phase Effects	Ecological Significance if Un-Mitigated	Operational Phase Effects	Ecological Significance if Un-Mitigated
	Loss of foraging habitat	Negative, Significant	None.	N/A
Bats	Direct mortality of individuals	Negative, Significant	None.	N/A
	Loss of foraging habitat	Negative, Significant	Habitat Improvements	Not Significant
	Disturbance to foraging and commuting bats	Not Significant	Disturbance to foraging and commuting	Negative, Significant
Birds	Direct mortality of individuals	Negative, Significant	Habitat Improvements	Not Significant
	Loss of foraging and breeding habitat	Negative, Significant		
	Disturbance from noise and vibration	Negative, Significant		
Other mammals: badger, pygmy shrew and west European hedgehog	Direct mortality of individuals	Negative, Significant	Habitat Improvements	Not Significant
	Loss of foraging and breeding habitat	Negative, Significant		
	Disturbance from foraging and commuting habitat	Negative, Significant		

11.6 Mitigation and Monitoring Measures

11.6.1 Construction Phase

The mitigation measures have been drawn up in line with current best practice and include avoidance of sensitive habitats at the design stage and additional measures to prevent significant ecological impacts. The following mitigation measures will be implemented.

11.6.1.1 General Mitigation Measures

Industry good practice guidance will be followed by the Contractor during the Construction Phase including, where relevant, those listed in the guidance below (refer to the Construction Environmental Management Plan (CEMP) included in Appendix 5.1):

- Construction Industry Research and Information Association (CIRIA), (CIRIA, 2001). C532 Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors;
- C650 Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (CIRIA, 2005);
- BPGCS005, Oil Storage Guidelines;
- Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition projects, (EPA, 2021);
- The SuDS Manual, CIRIA (C753);
- Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters, (IFI, 2016);
- The Management of Waste from National Road Construction Projects, GE-ENV-01101, (TII, 2017); and

- Best practice biosecurity measures.

Best practice construction processes will be implemented throughout the Construction Phase by the appointed Contractor which include pollution prevention control measures to manage surface water runoff. In addition, there will be monitoring and reduction of aerial emissions and noise. These measures are a standard operating procedure to adhere with IEL requirements; they are not included to protect any European site.

11.6.2 European Sites

The AA and NIS report that forms part of the planning application for the Proposed Development provides proposals which will mitigate against the potential adverse effects of the Proposed Development on QIs/SCIs through the Construction Phase. The same measures are included in this Chapter to mitigation against the identified effect of habitat degradation through the lowering of water quality.

11.6.2.1 Monitoring

- A suitably qualified Environmental Clerk of Works (EnCoW) and Ecological Clerk of Works (ECoW) will be appointed prior to commencement of works and employed when/where appropriate during the Construction Phase. The duties of these will be to monitor the efficacy of mitigation measures implemented by the contractors and to report on the application and success of these measures;
- Water quality monitoring will be undertaken by a qualified person once in advance of construction to establish baseline levels of potential contaminants in an upstream and downstream location along the watercourse within the boundaries of the Proposed Development site;
- At the upstream culvert location background samples (for example, baseline) will be collected in the same season as the watercourse construction will occur to ensure the results are representative;
- The downstream background samples will be tested at a laboratory for a range of parameters that occur naturally and for pollutants[5] including temperature, Electrical Conductivity (EC), pH, Dissolved Oxygen (DO), Turbidity, Total Petroleum Hydrocarbon (TPH) and Diesel Range Organics (DRO);
- Water pollution trigger levels will be determined against baseline monitoring results. The baseline monitoring results will present naturally occurring water quality conditions. Any abnormally high concentrations, when compared against baseline will be monitored by the EnCoW/ECoW during construction and will flag for construction to be stopped;
- During construction within the watercourse, field parameters (temperature, pH, turbidity, DO and EC) should be monitored upstream and downstream of the construction works twice a day. Visual inspections of the watercourse at these locations will be conducted daily during construction to identify any plumes of sediment or sheens of oil which may indicate spillages. If these are identified, works will stop until the source has been identified and remediated; and
- In the event of pollution occurring or the potential to occur, the EnCoW/ECoW have a 'Stop Works' authority to ensure measures to stop a pollution event are implemented immediately.

11.6.2.2 Prevention of Release of Hydrocarbons and Contaminants

During the Construction Phase, the appointed Contractor will be required to implement the following specific mitigation measures to prevent the release of hydrocarbons, polluting chemicals, sediment/silt:

- Storage of sand/gravel/soil will be as far as practicable from watercourses and grading adjacent to these stockpiles kept to a minimum;
- Surface water run-off from temporary works area to be collected in silt/gravel traps prior to discharge to the surface water drainage network;

[5] According to CIRIA (2001) pollutants are defined as substances that occur either in a location where it is not naturally occurring or in an abnormally high concentration.

- Silt fences (to Hy-Tex Premium specification or similar) and silt traps will be installed prior to commencement of works and will be inspected daily to inform adaptive management as required. The locations of same will be determined by the EnCoW;
- All refuelling to take place in bunded enclosures and a minimum of 50m from any watercourse;
- Visual checks of the working areas and all silt/gravel traps will be carried out during weekly audits and maintenance works undertaken, if required;
- All chemical/fuel etc. will be stored in bunded containers and all storage will have sufficient bunding for all liquids stored (110% of the capacity of the largest drum);
- Spill kits will be maintained on sites and works areas;
- The Contractor will prepare a spill response procedure and implement it, if required;
- Spill incidents will be reported to the EnCoW/ECoW;
- Oil interceptors will be installed on surface water drainage network at the Proposed Development works areas for the Construction Phase;
- No foul sewer discharge will be allowed to enter the surface water drainage network; and
- Toolbox talks for all staff will be carried out by the contractor before work commences to identify environmental and ecological issues.

11.6.2.3 Protection of Watercourses

- Construction works for the watercourse re-alignment shall take place throughout the Construction Phase. The sequencing of the new re-aligned channel and culverts and subsequent connection of the existing watercourse to this channel shall ensure limited increase in water levels upstream or downstream of the Proposed Development site;
- For works occurring within 50m of the open watercourse, weather forecasts will be monitored prior to and during works to avoid working in adverse weather conditions such as heavy rains. No excavations for watercourse crossings will take place during a yellow, or higher, issued rain warning by Met Eireann;
- Excavated material will be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses;
- An EnCoW/ECoW will be present for the entire duration of any instream works and monitoring will be conducted in line with the monitoring requirements above;
- Settlement tanks, silt traps / bags and bunds will be used where required to remove silt from surface water runoff. Sizing of the tanks will be based on best available guidelines. Any construction work within a 10m buffer zone of the watercourse edge will be provided with these measures to minimise sediment discharge to a watercourse;
- Where over pumping of water is required, flow will be discharged back to the watercourse at a downstream location to maintain continuity and avoid flooding and water quality impacts;
- Surface water generated on site will be diverted to on-site attenuation facilities. The outfall from these to be in agreement with the OPW;
- All machinery will have been suitably serviced and inspected prior to site delivery. A hydrocarbon/oil boom will be available at working areas for immediate deployment within the watercourse in the event of any hydrocarbon spillage at the Proposed Development site. A fuel spillage will be considered to be any loss of fuel, oil or lubricant, including hydraulic oil and spot leakage;
- Deposition areas for spoil will be enclosed with silt fencing to prevent mobilisation of solids during adverse weather conditions and no drainage from these areas will be directed into the temporary drainage systems. A SuDS will be implemented to allow controls to be designed for the retention of large volumes of water that may arise from spoil deposition areas;

- Silt traps and fencing to be placed in working areas that have the potential to carry silt laden material from the working area to aquatic environments. Silt traps and fences will not be erected within flowing watercourses as these can act as a barrier for movement of species;
- Re-seeding of all areas of bare ground or the placement of jute matting will take place as soon as practicable to prevent run-off;
- All onsite welfare facilities will be installed and managed as per regulations to prevent nutrient overloading of aquatic environments; and
- Mitigation measures in relation to soil stripping, earth removal, stockpiling are detailed in Chapter 13 (Land, Soils, Geology and Hydrogeology) of the EIAR.

11.6.3 Habitats

11.6.3.1 Loss of habitat

Due to the permanent loss of dry meadows, grassy verges, hedgerows, scrub, treelines and watercourse, planting will be required to compensate for this impact. The SDCC Development Plan (SDCC, 2022) highlights the importance of these habitats and requires development to align a series of measures, including (but not limited to) those listed below:

1. NCBH5 Objective 1: To ensure that development does not have a significant adverse impact on biodiversity, including known rare and threatened species, and that biodiversity enhancement measures are included in all development proposals;
2. NCBH11 Objective 4: To protect the hedgerows of the County, acknowledging their role as wildlife habitats, biodiversity corridors, links within the County's green infrastructure network, their visual amenity and landscape character value and their significance as demarcations of historic field patterns and townland boundaries;
3. GI1 Objective 7: To develop linked corridors of small urban 'Miyawaki' native mini-woodlands, a minimum of 100m² in size, to capture carbon and encourage biodiversity in suitable existing built-up areas, in low grade parkland, and other areas of zoned lands were deemed suitable and appropriate;
4. GI2 Objective 2: To protect and enhance the biodiversity and ecological value of the existing GI network by protecting where feasible (and mitigating where removal is unavoidable) existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design and construction process, such proactive approach to include provision to inspect development sites post construction to ensure hedgerow coverage has been protected as per the plan;
5. GI2 Objective 5: To protect and enhance the County's hedgerow network, in particular hedgerows that form townland, parish and barony boundaries recognising their historic and cultural importance in addition to their ecological importance and increase hedgerow coverage using locally native species including a commitment for no net loss of hedgerows on any development site and to take a proactive approach to protection and enforcement;
6. GI5 Objective 4: To implement the Green Space Factor (GSF) for all qualifying development comprising 2 or more residential units and any development with a floor area in excess of 500 sq m. Developers will be required to demonstrate how they can achieve a minimum GSF scoring requirement based on best international standards and the unique features of the County's GI network. Compliance will be demonstrated through the submission of a GSF Worksheet; and
7. GI3 Objective 4: To uncover existing culverts where appropriate and in accordance with relevant river catchment proposals to restore the watercourse to acceptable ecological standards.

Compensation for scrub, hedgerow and treeline vegetation is proposed through the landscape plan for the Proposed Development which accompanies this application, which concept is about integration and strengthening existing Green Infrastructure elements, to assist in implementing the objectives outlined above. The elements are further discussed in relation to mitigation of habitat loss under the following headings.

Hedgerow/scrub planting

As stated in Table 11.11 approximately 200m of hedgerow and small sections of scrub will be removed as part of the Proposed Development.

To mitigate this, compensation has been proposed through compensation planting of hedgerow and scrub species. A total area of approximately 29,000m^2 is proposed through the landscape plan, this area also includes the woodland planting detailed below. The landscape plan seeks to improve habitat by providing a variety of habitat structure with native scrub species such as hawthorn, blackthorn bramble, hazel etc along the boundaries to provide increased connectivity and foraging opportunities. The southern boundary will be with the addition of low-level border planting and an acoustic barrier. This in turn provides security benefits for the data centre.

The typical planting palette has been designed to promote and enhance biodiversity (native seeds, fruits and pollinator friendly species). The remainder have been chosen from the 'All Ireland Pollinator Plan'(AIPP). See Section 11.6.6 for more enhancements to be considered from the AIPP.

Species were also selected to respond to the requirement to provide structural planting to strengthen the ecological connections and wildlife corridors. For example, the native riparian buffer mix included hawthorn, elder, goat willow and blackthorn.

Tree planting

Tree removal is limited to the hedgerow and treeline habitat extending from the south boundary into the centre of the site (approximately 175m in length). Trees will be retained along the south and south-west boundaries. The tree planting strategy element of the landscape plan details woodland planting will occur to the south-west, along the south boundary, south-west and northern portion of the site. The total individual tree area to be planted is 1.92m^2. The woodland planting (including the hedgerow and scrub area) is approximately 29,000m^2.

The landscaping plan demonstrated the inclusion of Miyawaki forest to obtain forest cover. This design should be developed through collaboration between a qualified ecologist and the landscape designer on the project. SDCC Development Plan (SDCC, 2022_ makes reference to "Miyawaki forest". GI1 Objective 7: To develop linked corridors of small urban 'Miyawaki' native mini-woodlands, a minimum of 100 m² in size, to capture carbon and encourage biodiversity. This method of creating forest cover is considered effective because it is based on natural reforestation principles, for example, using trees native to the area and replicating natural regeneration processes. The method is considered to have significant benefits over more traditional forestry methods when used in smaller afforestation projects and is particularly effective in the urban environment. Trees grow much faster and have been found to support more biodiversity than in neighbouring woodland, so it is considered an approach that replicated natural woodland ecosystems quicker.

Landmark trees to be planted adjacent the SuDS pond to the south-west, include native trees such as bird cherry (*Prunus padus*), holly (*Ilex aquifolium*) and oak.

The landscaping plan demonstrated the inclusion of Miyawaki forest in the south-west corner, south-east corner, north and along the south boundary of the Proposed Development. This design should be further developed through collaboration between a qualified ecologist and the landscape designer on the project.

Water features

To comply with policy and mitigate (through compensation) the loss of the watercourse habitat the Proposed Development has included the diversion of the watercourse as detailed in Section 11.4.1. The realigned watercourse will result in the lengthening of the open watercourse habitat by approximately 40m. The landscape plan includes the planting of a new native riparian habitat along the diverted stream to add to the existing green corridors. This consists of native riparian species, reflective of species already present around the watercourse for example, elder, hawthorn and willow spp.

Two attenuation basins (SuDS) are proposed. The basins will be planted with diverse mix of water tolerant and slope stabilising species. Species included in the attenuation basin mix include bugle (*Ajuga reptans*), yellow iris (*Iris pseudacorus*), soft rush (*Juncua effusus*) and hard rush (*Juncus inflexus*). The inclusion of SuDS ponds aligns with the SDCC Development Plan Objective GI4 1: ensure that SuDS is integrated into all new development in the County.

One of the attenuation basins, will be an integration of bioswales (wetland) to expand the capacity for water harvesting and storage capacity needs. The planting plans includes native species such as common reed (*Phragmites australis*), brooklime (*Veronica beccabunga*) and branched bur-reed (*Sparganium erectum*). The bioswale will be located to the north of the Proposed Development site.

A re-naturalised zone is proposed using native soil to be re-used on site to enable native seedbank to establish.

11.6.3.2 Changes to Hydrology

The watercourse runs through the Proposed Development, and it is important that construction activities do not result in pollution of this watercourse, either through siltation, which interferes with water flow, vegetation growth and aquatic fauna, or pollution (for example, chemical). Refer to the mitigation proposed in Section 11.6.2 that is also stated in Chapter 12 (Water) for water pollution prevention.

11.6.3.3 Habitat Degradation

Invasive species

Despite no scheduled invasive species were identified on the Proposed Development site, best practice measures outlined within the CEMP (Appendix 5.1) will be adhered to. If any invasive species are found on site, a method statement detailing the treatment/management of invasive species will also be required.

The SDCC Development Plan (SDCC, 2022) highlights (NCBH10 Objective 1) if developments are proposed on sites where invasive species are or were previously present, applicants should submit a control and management programme with measures to prevent, control and / or eradicate the particular invasive species as part of the planning process and to comply with the provisions of the European Communities Birds and Habitats Regulations 2011 (S.I. 477 / 2011).

Water quality

The Contractor will be required to put in place a Surface Water Management Plan (SWMP) to protect the water environment during construction. This will include all mitigation measures listed in Chapter 12 (Water) and any other water related mitigation measures listed in other chapters including but not limited to the Chapter 13 (Land, Soils, Geology and Hydrogeology). Refer to Section 11.6.3.2 for mitigation in that relate to water pollution but also changes to hydrology.

Dust Management/Aerial Emissions

Best practice construction processes (CIRIA, 2015) will be implemented throughout the Construction Phase by the appointed Contractor which include pollution prevention control measures to manage dust emissions. Refer also to the CEMP in Appendix 5.1.

11.6.4 Protected and Notable Species

11.6.4.1 Amphibians

Direct Mortality

As a precautionary measure, a visual search of the watercourse will be carried out in the days prior to commencement of maintenance works and any frogs or smooth newt will be removed to alternative habitats elsewhere within the landholding (northern boundary). This will be carried out under licence from the NPWS and under supervision of the EcOW.

Loss of Foraging Habitat

To mitigate against the loss of foraging habitat it is proposed that where possible a replacement ratio of 2:1 is achieved. As discussed above in Section 11.6.3.1, additional water features are proposed as part of the landscape plans (attenuation pond and bioswale) which will increase foraging habitat. The realigned watercourse will result in the lengthening of the open watercourse habitat by approximately 40m.

The landscape plan also includes the planting of a new native riparian habitat enhancing the connectivity for amphibians.

11.6.4.2 Bats

Direct mortality

In accordance with current guidance, trees with low suitability were not subject to further survey. No roosts were recorded at the trees with moderate or high suitability. However, the BCT Best Practice Guidance states the difficulty in ascertaining if bat roosts are absent from trees and therefore on a precautionary basis this report makes precautionary recommendations in relation to tree clearing immediately prior to felling.

Where trees are considered to have potential for bats, a PRF inspection survey will be conducted the day of the proposed felling by a suitably qualified and experienced ecologist. Access to PRFs on the day of removal will be facilitated using a cherry picker/Mobile Elevating Work Platform (MEWP) where possible and the PRFs will be inspected with the aid of an endoscope and/or torch. Where bats are encountered, all relevant works will cease and an application for a derogation licence must be submitted to the NPWS to permit removal of the roost.

Where it is not possible for a qualified ecologist to inspect the PRFs at height, a bat emergence and re-entry survey should be conducted the night prior to felling. Where a bat roost is encountered, all relevant works will cease and an application for a derogation licence must be submitted to the NPWS to permit removal of the roost. If bat roosts are not encountered during the survey, trees will be section-felled (soft-felling) in the presence of a suitably qualified ecologist. Soft-felling can be defined as:

"*Work should be conducted in a sensitive manner, and where reasonably practicable, timber with bat potential should not be directly sawn through. If such timber is removed, it should be left at the base of the tree for at least 48 hours. Where it is impractical to lower potential bat roosts, piles of brash or logs can be used to soften the impact of them hitting the ground* " (Natural England, 2013).

Tree sections with PRFs will be left in-situ with bat access points facing upwards for 48 hours to allow any bats that may be present to emerge.

Bat roost potential in the area will be increased in the short to medium term through the installation of bat boxes (these should be woodcrete rather than wooden to ensure a "like for like "replacement) on hedgerows. It is recommended that these replace PRFs lost on a 2:1 ratio. Therefore, a minimum of four bat boxes should be placed on the boundary vegetation.

Loss of foraging habitat

To mitigate against the loss of foraging habitat it is proposed that where possible a replacement ratio of 2:1 is achieved. However, given the lack of space available this is not possible to achieve on site. Mitigation focuses on promoting habitat diversity and enhancing quality to increase the availability of insect prey. The following is therefore proposed as mitigation:

- Comply with Landscape proposals of obtaining 11,000m^2 of Miyawaki forests;
- Comply with Landscape proposals of obtaining 1,350m^2 of riparian buffer;
- Comply with Landscape proposals of obtaining 2,000m^2 of hedgerow and scrub planting; and
- Comply with Landscape proposals of obtaining 5 types of water features habitat (diverted watercourse, bioswale and SuDS).

The landscaping plan also includes native species with consideration made to night scented species to include in herbaceous borders to attract invertebrate prey. Species such as yellow iris, bugle and yarrow (*Achillea millefolium*). Tree species have also been included that promote the same benefit for foraging bats: pedunculate oak (*Quercus robur*), elder and hawthorn.

11.6.4.3 Breeding Birds

Direct mortality

The following mitigation measures are proposed to comply with legislation protecting birds and their nests:

- In order to avoid disturbance of breeding birds, their nests, eggs and/or their unfledged young, all works involving the removal of trees or hedgerows will be undertaken outside of the nesting season (01 March to 31 August inclusive). Or where this seasonal restriction cannot be observed then:
- A pre-construction check will be undertaken, prior to works commencing by a Suitably Qualified Ecologist (SQE) in order to confirm whether birds are nesting within suitable habitat affected by or immediately adjacent to the subject lands. If no breeding birds are found nesting in trees or hedgerows on the Proposed Development site, this vegetation must be removed within 48 hours or repeat surveys will be necessary. Should nesting birds be present during surveys, the removal of trees or hedgerows may be required to be delayed until after the nesting season (01 March to 31 August inclusive).

Loss of foraging and breeding habitat

To mitigate against the foraging and nesting habitat, replacement nesting habitat will fulfil woodland across the site (24,340m^2). Nesting boxes are proposed within the Landscape plan and should be included to mitigate loss of nesting habitat in the short term. Six nesting boxes are proposed around the boundaries of the site.

Disturbance from noise and vibration

Noise and vibration will be managed through best practice constructions measures implemented as part of the CEMP (Appendix 5.1).

11.6.4.4 Other mammals

Disturbance from foraging and commuting habitat or direct mortality

Badger

Badger and their setts are protected under the Wildlife Acts. Given the evidence that badger are utilising the site (commuting only) and there is suitable habitat [redacted] (embankments with rabbit burrows) to support resting badger the following mitigation measures are required to comply with legislation:

- A pre-construction check for badger should be undertaken by a SQE 48 hours or less prior to works commencing to ensure that no additional setts have been constructed in the intervening period that may be impacted by the proposed works;
- If, during vegetation clearance, signs of badger are identified, including unidentified holes/burrows, works within that area should be stopped immediately, an exclusion area (30m) established and the SQE contacted to undertake a check;
- If a sett is identified, consultation with NPWS is recommended as a licence may be required;
- An accompanying toolbox talk will be delivered to inform relevant construction staff of the sensitivities of working near an area utilised by badgers and include the following measures;
- During construction, any open excavations should be covered over night to ensure animals cannot fall in and become trapped. If this is not possible, a ramp should be provided that is at a suitable angle for animals to use as a means of escape; and
- Avoidance of facing light towards sensitively commuting corridors at night.

West European hedgehog and pygmy shrew

An SQE should be installed for any woody vegetation removal to ensure that there are no pygmy shrew or west European hedgehog utilising the site during construction works.

Loss of foraging and commuting habitat

To mitigate against the habitat lost a replacement for foraging and commuting habitat is proposed for the scrub, treeline and hedgerow habitats lost as a result of the Proposed Development. This will be achieved along the east, south and west boundary with the planting of native scrub and tree species. Miyawaki forest to the north will also provide this habitat. Refer to Chapter 15 (Landscape and Visual).

11.6.5 Operational Phase

During the Operational Phase the Proposed Development environmental management system, controlled by the IEL. This will address management of potentially contaminating materials such as fuel, lubricating oils, solvent, etc. and ensure such material is appropriately controlled, in accordance with regulatory requirements.

The drainage design for the site will consider the magnitude of the changes in infiltration and runoff characteristics and the significance of potential impacts at the wetland. Further details on operational water management are included in Chapter 12 (Water).

11.6.5.1 Habitats

Dispersal of species

Despite the lack of evidence of aquatic species within the Proposed Development site, with the proposed opening of the watercourse and habitat enhancement measures, design of the open stream should adhere to Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016) as a mitigation measure.

Between the open stream and Culvert B, there is a 2m vertical transition, designed to allow for shallow slopes and reduced velocities within both the stream and Culverts A and B (Figure 11.8). To enable the 2m vertical transition, a series of 4 step pools of 0.5m height and 5m length each will be positioned between the two. The total length of the step pools is 25m (to include 5m of gentle slope at the end of the step pools and before entering Culvert B. The step pools should allow movement of any potential fish should they occur in the future. They are designed with stones and coarse bed material to prevent erosion due to the high local velocities. They will also provide energy dissipation. The surrounding proposed ground levels are set to 80m OD. As the base of the step pools will be between 75.7-77.75m OD, the difference with surrounding levels varies from 2.25m - 4.3m. A combination of retaining structure at the base and sloping grounds at higher levels is proposed to accommodate the vertical transition.

11.6.5.2 Protected and Notable Species (Bats)

Disturbance from lighting

The primary lighting mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night-time lighting. It is noted however that the mitigation proposed will also lessen in the impact in relation other nocturnal species such as badger.

The lighting scheme has considered best practice, as published by the Institute of Lighting Professionals and BCT Guidance Note 8 (GN08) Bats and Artificial Lighting (2023) in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations. To achieve the criteria set out in Guidance Notes for the Reduction of Obtrusive Light (GN01) and (GN08) and meet criteria around light intrusion, intensity of light source and upward light spill that is associated with sky glow, the following methods are proposed as mitigation to be employed across the site.

- Refine external lighting only to areas with necessity;
- Maintain ‘no lighting’ preserved areas such as the SuDS pond and proposed hedgerow to the east except during nighttime security patrols;
- Specify luminaires with good cut-off optic to avoid light beyond task area;
- Luminaires with negligible upward light;
- Colum hights to minimise light spill and glare visibility;

- Light source - typically an LED source is considered to be more appropriate to reduce the impact to bats as it has less UV component and good colour rendition;
- Colour temperature - GN08 recommends a warm white colour temperature be used to reduce the amount of blue light component. It is proposed to utilise a 3,000K or lower (warm white) LED source, avoiding detrimental impact to both amenity performance and ecology; and
- Dark corridors - shall be kept dark to promote use by light-sensitive animals. This could be achieved by different control strategies or by lowering light level.

For more information, refer to the External Lighting Zone drawing (Drawing DC3-E-1210-SDT-0 in Appendix 11.12).

11.6.6 Enhancement

GIL wishes to protect bees where possible. Whilst beehives may provide a social benefit and be of interest to employees of the Proposed Development, this will not contribute towards biodiversity conservation. Native bees are for the most part those that are traditionally social nesters or solitary, the latter of which are cavity or mining bees. Bee banks are proposed as part of the landscaping proposals. Solitary bees are particularly endangered and efforts to conserve these species would align the project with the AIPP and allow the project to create a positive narrative for native bee species.

The planting strategy as part of the landscape plans selected species with consideration to predominately native species, pollinator-friendly species and habitat creation. The typical planting palleted has been designed to enhance biodiversity. The remaining have been chosen from the AIPP. Several species included within the landscape plan are previously mentioned in Section 11.6.6 however further tree species are listed below:

- blackthorn;
- hawthorn;
- wild cherry (*Prunus avium*)
- bird cherry (*Prunus padus*); and
- willow (*Salix spp*).

In addition, the Proposed Development will enhance local efforts to conserve endangered solitary bees by installing a bee banks to mitigate the loss of the mining colonies as well as create totemic features for nesting solitary bees and interpretation opportunities. These should be positioned to ensure a southerly aspect. Design of these features should be carried out by a qualified ecologist. Other enhancement features detailed in the landscape plan include log pile and insect hotels and in-managed wildflower habitats.

As stated in Section 11.2.2.2, the SDCC Pollinator Plan 2021-2025 sets actions are based on reversing declining bee populations in Ireland. Relevant action proposed for the Proposed Development include:

- The planting of native hedgerows;
- To replace improved grass with a dense clover sward; and
- Ornamental tree planting select from pollinator friendly species (requested as part of all development sites).

11.6.7 Monitoring

Monitoring shall be carried out each year in the five years following works and will include monitoring of enhancement, mitigation measures and habitat being managed.

11.6.7.1 Method

Monitoring shall be undertaken annually from the first year to the fifth and will involve one survey day carried out by a SQE. This will ensure that mitigation has been successfully implemented, and to determine if there are any issues that need to be remediated or update.

11.6.7.2 Reporting

After each annual inspection, a monitoring report shall be produced and detail the condition of KER habitats and species. Photographs of the mitigation area shall also be included.

11.6.8 Decommissioning Phase

During the Decommissioning Phase of the Proposed Development, the mitigation and monitoring measures employed to mitigate the potential effects of the Proposed Development on Biodiversity and quality are likely to be similar to those arising during the Construction Phase.

As outlined in Chapter 5 (Construction) Section 5.7, decommissioning activities will need to be undertaken in accordance with the requirements of the IE licence.

11.7 Residual Effects

A summary of predicted residual effects is included in Table 11.13.

11.7.1 Designated Sites

Potential adverse effects on designated European sites (SAC/cSAC/SPA) are specifically addressed in a Report for Screening for AA and NIS which has been submitted as part of this application (Arup, 2024). This report concluded the following:

"In light of the best scientific knowledge, with respect to the relevant European sites, the sources and pathways for effect, and how these may result in adverse effects on the integrity of identified European sites. With the provision of the identified mitigation measures provided in Section 8, it has been objectively concluded by Arup, through precise and definitive findings and conclusions capable of removing all reasonable scientific doubt that the Proposed Development will not result in adverse effects (directly or indirectly) on the integrity and conservation objectives of any of the QIs/SCIs of the South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Dublin Bay SAC and North Bull Island SPA or any other European site, alone or in-combination with other plans and/or projects"

The competent authority will make the final determination in this regard.

However, the effects identified in this Chapter considered for EIA purposes were limited to habitat degradation in the Construction Phase. With the mitigation measures listed above, the residual effects can be described as Negative, Imperceptible, Unlikely, Short-Term on the Designated sites in Dublin Bay.

Significance of residual effects after mitigation: once mitigation measures are implemented during the Construction and Decomissioning Phases the habitat degradation is unlikely to be significant on designated sites.

11.7.2 Habitats

11.7.2.1 Loss of Habitat

Where the loss of sections of higher value habitats cannot be avoided the effects on these habitats has been minimised and the loss of these habitats has been compensated for through focused landscape design and mitigation measures. Several areas of high value habitat will be provided within the landscape design (Section 11.4.1), considering the local flora and fauna, to provide biodiversity benefits that is valuable locally as well as making important contributions towards regional priorities for nature conservation. The project will enhance ecological connectivity within and outside the Proposed Development boundary. Ongoing monitoring of mitigation and design measures will ensure that, where required, these measures can be managed and adapted to secure long-term gains for biodiversity at the site.

The direct habitat loss of the treeline, hedgerow, scrub, watercourse and dry meadow and grassy verge habitats will result in a negative, long-term residual effect on the habitat KERs. However, as these habitats were identified as KERs due to the fauna and designated sites KERS they support/provide connectivity to. As such, these indirect effects are assessed under the relevant KERs (Sections 11.7.1, 0., 11.7.3.3 and 11.7.3.4).

Therefore, there will be no significant residual effect of habitat loss on the respective habitat KERs with implemented mitigation measures, the extent of the area lost and proportion of habitat available in the surrounding landscape.

11.7.2.2 Changes to Hydrology

Mitigation measures, outlined in Section 11.6 will be implemented and inspected by a suitably qualified and experienced project ecologist making the residual effect is expected to be imperceptible. Therefore, no significant residual effects will arise.

11.7.2.3 Habitat Degradation

Mitigation measures, outlined in in the CEMP and Section 11.6 will be implemented and inspected by a suitably qualified and experienced project ecologist to ensure that no adverse effects on habitats through surface water runoff or aerial emission during construction works, resulting in a residual effect that is imperceptible. Design will improve hydromorpholgical condition of the watercourse from 'poor' to 'moderate' through improved channel vegetation, substrate condition, bank structure and stability, bank vegetation and floodplain connectivity. Therefore, no significant residual effects will arise.

11.7.2.4 Dispersal of Species

Following design measures (Section 11.6.5), residual effects on fish and aquatic invertebrates will be Neutral, Imperceptible and Long-Term at a local level. Therefore, no significant residual effects will arise.

11.7.2.5 Invasive species

Following the implementation of the mitigation measures outlined in in the CEMP, neutral residual effects have been identified. Therefore, no significant residual effects will arise.

11.7.3 Protected and Notable Species

11.7.3.1 Amphibians

Direct mortality

Given the mitigation measures mentioned in Section 11.6.4.2 the effect is unlikely and neutral. Therefore, no significant residual effects will arise.

Loss of foraging habitat

In the short to medium term, the loss of the watercourse associated with site clearance works and diversion will have a Slight, Negative effect on amphibians. However, as newly planted and enhanced habitats within the Proposed Development mature, this effect will be reduced.

The landscape plan will provide additional breeding and foraging habitat through a variation of water features both flowing and standing. New habitats within the Proposed Development are likely to increase foraging diversity at the site. These habitats are likely to provide connectivity to other foraging habitats.

Residual effects on amphibians will be Neutral, Slight and Long-Term at a local level. Therefore, no significant residual effects will arise.

11.7.3.2 Bats

Direct mortality

Given the mitigation measures described in Section 11.6.4.2, residual effects are unlikely. Therefore, no significant residual effects will arise.

Loss of foraging habitat

In the short to medium term there is predicted to be a Slight to Moderate effect on bat foraging habitat at the Proposed Development with the removal of two areas of key foraging habitat along the hedgerow and treeline. However, the landscape plan provides considerable areas of enhanced and new linear foraging habitat to the south and east. New habitats including open watercourse, hedgerow and Miyawaki forests and wetland that are likely to provide a variety of foraging habitats for bats in the Medium to Long-Term. As these habitats mature, there are likely to provide high value foraging and commuting habitats for local bat populations and provide connectivity to the wider landscape. Biodiversity enhancements, including a range of bat boxes, will create roosting opportunities for bats within the Proposed Development, where roosting habitat is currently largely absent. The residual effect of habitat loss will be Positive, Slight and Long-Term at a local level for bat populations. Therefore, no significant residual effects will arise.

Disturbance to foraging and commuting

As discussed, the lighting plan (Appendix 11.12) will be implemented to limit light spill in ecologically sensitive areas such as the habitat enhancement areas and southern boundaries. There will be a minor decrease in the suitability of habitat, however, given the species composition (widespread), extent of habitat south of the site and mitigation measures listed in Section 11.6.3.1, such as strengthening of ecological corridors (to offer additional foraging and connectivity to other habitat), the residual effect will be negative and not significant to the local bat population. Therefore, no significant residual effects will arise.

11.7.3.3 Breeding Birds

Direct mortality

Following the implementation of mitigation measures described in Section 11.6.4.3 the direct mortality and disturbance of nesting birds is unlikely. Therefore, no significant residual effects will arise.

Loss of foraging and breeding habitat

In the short to medium term, the loss of common habitats associated with site clearance works and disturbance will have a Slight, Negative effect on breeding birds. However, as newly planted and enhanced habitats within the Proposed Development mature, this effect will be reduced and foraging and breeding habitat improved.

The landscape plan will provide additional breeding and foraging habitat for other common bird species. New habitats within the Proposed Development are likely to increase breeding bird diversity at the site. These habitats are likely to provide nesting opportunities for specialist species such as grey heron (*Ardea cinerea*) and reed buntings (*Emberiza schoeniclus*).

Biodiversity enhancements have been designed to attract new species to the site, such as sand marten. Native berry producing plants, such as blackthorn and hawthorn, have been included in the planting scheme to provide additional foraging habitat for breeding birds. Residual effects on breeding birds will be Neutral, Slight and Long-Term at a local level. Therefore, no significant residual effects will arise.

Disturbance from noise and vibration

Given the mitigation measures mentioned in Section 11.6.4.3 the direct mortality and disturbance of nesting birds is unlikely. Therefore, no significant residual effects will arise.

11.7.3.4 Other Mammals

Disturbance from foraging and commuting habitat or direct mortality

The habitats to be affected are common and there is no evidence to indicate that the Proposed Development areas are of particular value for these species in the context of the surrounding countryside, south of the Proposed Development. During the Construction Phase, disturbance and direct mortality from site clearance works are predicted to have a Negative, Slight and Short-Term effect on such mammal species at a local level.

However, with the implemented mitigation measures listed in Section 11.6.4.4 the direct mortality and disturbance of such mammals is unlikely and Not Significant. Therefore, no significant residual effects will arise.

Loss of foraging and commuting habitat

The retention and enhancement of large areas of valuable habitats such as scrub, treelines and hedgerows will mean that small mammal species such as hedgehog and pygmy shrew are likely to quickly recolonise the area following construction works. The creation of new semi-natural habitats, including understorey planting, riparian buffers will provide substantial areas of cover for small mammals. As part of the management regime, unmanaged areas of scrub will be allowed to develop, providing opportunities for small mammals to colonise these areas. The inclusions of linear features within the existing and proposed areas of the site will ensure that connectivity is retained and improved throughout the construction and operation of the development. Overall, there will be a reduction in the area of such a habitat, but the above measures will provide a higher quality of habitat though reduced in size. The residual effect of the loss of foraging and commuting habitat is predicted to be Neutral, Slight and Long-Term at a local level. Therefore, no significant residual effects will arise.

Table 11.13 Summary of potential effects from the Proposed Development on KER.

KER	Highest Value within ZoI	Construction Phase Effects*	Ecological Significance if Un-Mitigated	Operational Phase Effects	Ecological Significance if Un-Mitigated	Mitigation Proposed	Residual Effect
European sites	International	Habitat degradation	Negative, Significant, Likely, Short-Term	Habitat degradation	Negative, Not Significant, Un-likely, Temporary	Yes	No significant residual effect
Watercourse	Local Importance (Higher Value)	Habitat loss	Negative, Slight-Moderate, Likely and Medium-Term	None	N/A	Yes	No significant residual effect
		Changes to hydrology including diversion of flow	Negative, Slight, Short-Term	Changes to hydrology including diversion of flow	Neutral, Slight, and Long-Term	Yes	No significant residual effect
		Habitat degradation	Negative, Slight, Likely and Short-Term	Habitat degradation	Negative, Slight, Unlikely, Temporary	Yes	No significant residual effect
				Dispersal of species	Negative, Slight / Moderate, Long-Term	Yes	No significant residual effect
Dry meadows and grassy verges	Local Importance (Higher Value)	Habitat loss	Negative, Slight-Moderate, Likely and Long-Term	None	N/A	Yes	No significant residual effect
		Habitat degradation	Negative, Slight, Likely and Short-Term	None	N/A	Yes	No significant residual effect
Hedgerow	Local Importance (Higher Value)	Habitat loss	Negative, Slight-Moderate, Likely and Long-Term	None	N/A	Yes	No significant residual effect
		Habitat degradation	Negative, Slight, Likely and Short-Term	None	N/A	Yes	No significant residual effect
Scrub	Local Importance (Higher Value)	Habitat loss	Negative, Slight-Moderate, Likely and Long-Term	None	N/A	Yes	No significant residual effect
		Habitat degradation	Negative, Slight, Likely and Short-Term	None	N/A	Yes	No significant residual effect
Treeline	Local Importance (Higher Value)	Habitat loss	Negative, Slight-Moderate, Likely and Long-Term	None	N/A	Yes	No significant residual effect
		Habitat degradation	Negative, Slight, Likely and Short-Term	None	N/A	Yes	No significant residual effect
Amphibians	Local Importance (Higher Value)	Direct mortality of individuals	Negative, Slight, Unlikely, Short-Term	N/A	N/A	Yes	No significant residual effect
		Loss of foraging habitat	Negative, Slight, Unlikely, Short-Term			Yes	No significant residual effect
Bats	Local Importance (Higher Value)	Direct mortality of individuals	Negative, Slight, Unlikely, Long-Term	None	N/A	Yes	No significant residual effect

KER	Highest Value within ZoI	Construction Phase Effects*	Ecological Significance if Un-Mitigated	Operational Phase Effects	Ecological Significance if Un-Mitigated	Mitigation Proposed	Residual Effect
		Loss of foraging habitat	Negative, Slight-Moderate, Likely, and Long-Term	None	N/A	Yes	No significant residual effect
		Disturbance to commuting and foraging	Negative, Not Significant, Unlikely and Short Term	Disturbance to foraging and commuting	Negative, Slight, Likely, Long-Term	Yes	No significant residual effect
Birds	Local Importance (Higher Value)	Direct mortality of individuals	Negative, Slight/Moderate, Short-Term	N/A	N/A	Yes	No significant residual effect
		Loss of foraging and breeding habitat	Negative, Slight, Likely, Long-Term			Yes	No significant residual effect
		Disturbance from noise and vibration	Negative, Slight, Likely, Temporary			Yes	No significant residual effect
Other mammals: badger, pygmy shrew and west European hedgehog	Local Importance (Higher Value)	Direct mortality of individuals	Negative, Slight, Short-Term and Unlikely	N/A	N/A	Yes	No significant residual effect
		Loss of foraging and commuting habitat	Negative, Slight and Long-Term			Yes	No significant residual effect
		Disturbance from foraging and commuting habitat	Negative, Slight, Short-Term and Unlikely			Yes	No significant residual effect

*During the Decommissioning Phase of the Proposed Development, the likely residual effects of the Proposed Development on biodiversity are likely to be similar to those arising during the Construction Phase. The decommissioning of the Proposed Development will be regulated by the EPA. As outlined in Section 5.7 of Chapter 5 (Construction), decommissioning activities will need to be undertaken in accordance with the requirements of the revised IE licence.

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12. Water

12.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and assesses the likely direct and indirect significant effects on water quality and quantity associated with the Construction, Operational and Decommissioning Phases of the Data Centre Development DC3 (referred to as the "Proposed Development") in accordance with the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

During the Construction Phase, the potential water quality and quantity effects associated with the Proposed Development have been assessed. This included effects arising from construction activities such as site clearance, excavation, and operation of construction machinery and tools.

During the Operational Phase, the potential water quality and quantity effects associated with drainage and stormwater discharge monitoring under the current Industrial Emissions (IE) Licence have been assessed.

The aim of the Proposed Development when in operation is to offer expanded compute capacity to GIL's customers and products. The Proposed Development is described in detail in Chapter 4 (Description of the Proposed Development) and Chapter 5 (Construction) provides a description of the construction and demolition activities.

The design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental effects, where practicable. In addition, feedback received from consultation with SDCC undertaken throughout the alternatives assessment and design development process have been considered, where appropriate.

In accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (i.e. the EIA Directive), this Chapter of the EIAR identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Development on water quality and quantity to surrounding waterbodies. In addition, this Chapter of the EIAR also identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Development on these waterbodies.

The water lead is a Professional Scientist and experienced technical task leader of projects including high profile projects and has provided expertise internationally. Full details of relevant experience are provided in Appendix 1.1.

12.2 Assessment Methodology

12.2.1 Introduction

The following sections outline the legislation and guidelines considered, and the adopted methodology for defining the baseline environment and undertaking the assessment in terms of water quantity and quality. The significance of potential effects of the Proposed Development on surface water have been assessed by classifying the importance of the relevant attributes and quantifying the likely magnitude of any potential effect on these attributes.

12.2.2 Legislation, Planning Policy and Guidance

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

12.2.2.1 Legislation

- Water Framework Directive (WFD) (2000/60/EC) (as amended)
- Groundwater Directive (2006/118/EC) (as amended)
- Habitats and Wild Fauna and Flora Directive (92/43/EEC) (as amended)

- Bathing Water Directive (rBWD) (2006/7/EC) (as amended)
- Urban Wastewater Treatment Directive 91/271/EEC (as amended)
- Nitrates Directive (91/676/EEC) (as amended)
- Directive 79/409/EEC
- Environmental Quality Standards (EQS) Directive (2008/105/EC) (as amended)
- Priority Substances Directive (2008/105/EC) (as amended)
- European Communities (Water Policy) Regulation 2003 (S.I. 722 of 2003) (as amended)
- Schedule 5 of the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009), as amended; and
- EU Groundwater Regulations (S.I. 9/2010 (as amended).
- Water Services Act (2013) (as amended)
- Arterial Drainage Act (1945) (as amended)
- Planning and Development Act (2000) (as amended); and
- Urban Wastewater Treatment Regulations 2001 (S.I. 254 of 2001) (as amended).

12.2.2.2 Planning Policies

Draft River Basin Management Plan (DHLG, 2023)

The WFD requires all Member States to protect and improve water quality in all waters so that we achieve good ecological status by 2015 or, at the latest, by 2027. It applies to rivers, lakes, groundwater, and transitional coastal waters. The Directive requires that management plans be prepared on a river basin basis and specifies a structured method for developing these plans. Ireland's river basin management planning process is based on a single national River Basin District, which is broken into 46 catchment management units (CMUs). The CMUs have been further broken down into 583 sub-catchments with waterbodies[1] within. Substantial background information for the plan and the most up to date information for the status of a waterbody is provided at www.catchments.ie. Information about the use and pressures on a waterbody is provided through specific Catchment and Sub-Catchment Assessments. The current condition of water resources is assessed against the standards and environmental objectives set out in the WFD. Hydromorphology impact was the second most significant pressure to rivers in the third assessment cycle. Measures required to ensure the condition of rivers do not deteriorate will be through protection or restoration, and in some cases collection of additional evidence. Protected areas are designated because of their special importance for bathing, drinking water, shellfish habitat, water dependent habitat or species; and nutrient sensitive areas.

In Ireland there has been significant physical alteration to the hydromorphology of a waterbody through size, slope, form, shape and functional changes to bed and banks, as well as changes to flow and water regime. This has been necessary to allow for the growth of the population and economy, as well as for drainage and flood protection of agricultural and urban land. The waterbodies that have significant hydromorphological alterations are heavily modified and have the environmental objective of 'Good Ecological Potential'. This allows for the fact that their hydromorphology has been modified to facilitate specific use. Although measures may be required to mitigate the hydromorphological impacts, heavily modified waterbodies will still be required to meet the required standards for physicochemical conditions, nutrients, specified pollutants and chemicals.

[1] A waterbody is an individual unit of a water feature used for monitoring and planning purposes.

Climate Action Plan 2024 (GoI, 2024)

The Climate Action Plan mentions that Ireland has observed significant impacts of climate change, including a consistent temperature rise over the past 120 years, reduced frost days, and shorter frost seasons. Sea levels have risen steadily since the early 1990s, and projections suggest decreased spring and summer rainfall alongside more frequent heavy precipitation events in winter and autumn. These shifts are anticipated to result in widespread direct and indirect adverse effects on Ireland. Foreseen impacts encompass heightened risks of groundwater, river, and coastal flooding, elevated coastal erosion, amplified strain on water resources and water purity, and alterations in wind velocities and storm pathways.

Although the Climate Action Plan lacks a designated water section, the measures affecting the water sector will be integrated within various related sections, including agriculture, land use, and adaptation. Under the policy measures for Ireland the anticipated climate change effects on Ireland's environment, society, and economic growth are projected to be extensive. These impacts encompass managed and natural ecosystems, water resources, agriculture and food security, the built environment, human health, and coastal areas. The most pressing risks Ireland faces from climate change predominantly revolve around alterations in extremes, such as floods, droughts, and storms. Policy measures are needed to address these risks.

According to the Climate Action Plan (CAP), the Water resource and Flood Risk Management Sector is one of the Adaptation Sectors at the National Level and entails the following Sector Levels: Flood Risk Management, Water Quality, and Water Services Infrastructure.

National Planning Framework

Objective 57 of the National Planning Framework (NPF) (Project Ireland 2040) outlines ways to enhance water quality and resource management by:

- Ensuring flood risk management informs plan-making decisions by avoiding inappropriate development in areas at risk of flooding in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities (DEHLG and OPW 2009);
- Ensuring that River Basin Management Plan objectives are fully considered throughout the physical planning process; and
- Integrating sustainable water management solutions, such as Sustainable Urban Drainage (SuDS) principles, porous surfacing and green roofs, to create safe places.

National Biodiversity Action Plan

The National Biodiversity Action Plan outlines multiple actions meant to support the resilience and health of water ecosystems throughout Ireland. Outcome 2D: "*Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored*" has the most relevance for protection of water quality and ecosystems within the Proposed Development. Under this outcome are several targets and actions intended to achieve the outcome:

- By 2027, protection and restoration measures detailed in Ireland's third RBMP are implemented to ensure that our natural waters are sustainably managed, that freshwater resources are protected so that there is no further deterioration; and where required, Ireland's rivers, lakes and coastal water bodies are restored to at least good ecological status;
- By 2027, optimised benefits in flood risk management planning and drainage schemes are in place;
- By 2026, Ireland is meeting all requirements for its transitional, coastal, and marine environment under the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD), thereby achieving and maintaining High or Good Ecological Status and Good Environmental Status, respectively; and
- By 2030, 300km of rivers are restored to a free-flowing state.

South Dublin County Development Plan (2022-2028) (SDCC, 2022)

Chapter 4: Green Infrastructure of the SDCC County Development Plan has a vision to establish a cohesive Green Infrastructure (GI) network in South Dublin County, collaborating with and enriching the area's existing biodiversity and natural heritage. This effort aims to enhance resilience under climate change.

The EU defines Green Infrastructure (GI) as: "*a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation.*"

GI will be a key in climate change mitigation and adaptation. Trees, forests, and parks provide valuable carbon sequestration services, absorbing CO_2 from the atmosphere and storing it in the soil. Furthermore, they provide cooling and shade. GI planting and SuDS can also play a significant role in stormwater runoff.

A Strategic Flood Risk Assessment (SFRA) of the County is a separate document that has been prepared to support the Strategic Environmental Assessment of the County Development Plan.

Methodology was formed as an iterative approach to achieve the objectives of sustainable water management and sustainable drainage systems.

Sustainable Water Management

- The watercourses within the County form a significant component of the Green Infrastructure (GI) network. Serving as crucial biodiversity corridors for numerous protected species, they play a vital role. Thoughtful management and enhancement of these watercourses and wetland zones offer effective strategies for flood risk management and water quality enhancement.
- Riparian corridors are the focal point for freshwaters. They provide ecosystem services, treat pollutants. Riparian vegetation acts with flow, sediment, and topography to influence, among other, flow patterns. The designation and upkeep of riparian corridors alongside primary watercourses and their tributaries are essential for optimizing the ecosystem services offered by these water bodies. Vegetative riparian buffers contribute to ecosystem services in the manners such as interception and reduction of potential pollutants from both agricultural and urban sources, attenuating flood waters, reducing runoff volumes, ecological corridors, etc.
- The objectives of achieving sustainable water management are to ensure that Proposed Developments within Riparian Corridors undergo hydromorphological assessments. These assessments should demonstrate plans to maintain and enhance corridor integrity, considering flood risk, biodiversity, ecosystem services, water quality, and habitat connectivity. Additionally, safeguard indigenous riparian vegetation and maintain a 10-meter vegetated buffer along watercourses within development sites. Where appropriate, uncover existing culverts to restore watercourses to ecological standards, enhancing habitat connectivity and reinforcing the County's Green Infrastructure network.

Sustainable Drainage Systems

The following objectives in relation to the Sustainable Drainage Systems are formulated:

- To minimize surface water runoff from newly constructed developments, employ SuDS incorporating surface water and nature-inspired solutions. Ensure SuDS integration in all new developments in the County.
- During the design phase, include a SuDS management train. This approach involves managing surface water locally within small sub-catchments instead of channelling it to and managing it in larger systems downstream in the catchment.
- Mandate multifunctional open space provision within new developments, ensuring it incorporates features for ecology and sustainable water management; and
- Encourage the integration of SuDS features in the greening efforts of both urban and rural streets to minimize or delay runoff from streets entering the storm drainage network.

- To conclude, the efforts with GI will be made in order to provide a network of natural areas that will help combat climate change-induced impacts (such as reduction of flows and flood risk mitigation) while enriching the ecosystems that play a vital role in water quality maintenance.

Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council (SDCC, 2005)

The GDSDS identifies approaches for how drainage infrastructure for new developments is managed. Sustainable drainage systems are mandatory per the GDSDS for all new developments for stormwater control and environmental improvement, except where the developer can demonstrate inclusion is impractical. The overall objective of the GDSDS is to reduce stormwater runoff and to collect and treat stormwater runoff as close to the source as possible.

SuDS measures must be provided and future maintenance of drainage assets. The goal is to implement whole-life solutions, which are gravity fed and require maintenance infrequently. SuDS require that surface water runoff is separated from wastewater and controlled on site to minimise discharge.

The GDSDS includes a Treatment Train approach, which includes techniques for pollution prevention, source control, site control and regional control. Level of service objectives include provision of flood protection, no negative aesthetic effects, social benefits and safety. Current design criteria normally require that no flooding occurs up to the 30-year return period and that properties are protected against flooding for the 100-year return period. Runoff from large storm events should be attenuated and then released at 2l/s/ha or Qbar for the 100-year return period with allowances for climate change.

12.2.2.3 Guidance

Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022)

The Guidelines set out the process and procedure through which an Environmental Impact Assessment is conducted. The primary objective of the document is to improve the quality of EIARs with a view to facilitating compliance with the EU Directive 2014/52/EU and to provide guidance for developers in understanding their responsibilities. This includes descriptions and information on the seven stages involved: screening, scoping, consideration of alternatives, describing the proposed project, describing the baseline, assessment of effects, and mitigation & monitoring. The Guidelines have an emphasis on process and method to ensure compliance and relevance of the information included in the EIAR.

Water Framework Directive: Project Assessment Checklist Tool (JASPERS, 2018)

Published methodologies for the assessment of plans or projects in relation to undertaking WFD in Ireland are currently not available. This document provides background to the WFD and its implementation in EU Member States as well as summarising some of the relevant contents of CIS Guidance Document 36.

Development Hydromorphological Assessment Guidance (SDCC, 2023)

This guidance was prepared to aid applicants in meeting the objectives of the SDC County Development Plan 2022-2028 (G13: 1-4) and associated Strategic Flood Risk Assessment as they relate to Hydromorphological Assessments. The introduction of hydromorphological assessment is key to ensuring that the objectives of the WFD are met. The requirements for a hydromorphological assessment are to determine existing hydromorphological pressures, determine deviation from 'Natural' form and propose restorative measures to improve Hydromorphological integrity and resilience throughout the river reach.

River Hydromorphology Assessment Technique (RHAT) Training Manual-Version 2. (NIEA, 2014)

A detailed hydromorphology assessment will require a site walkover using River Hydromorphology Assessment Technique (RHAT). The RHAT method was developed for WFD classification, but it also has other applications including assessing morphological pressures at a site or reach scale. The RHAT can be used as a tool to determine remedial/restoration work required to improve the river habitat as well as determine deviation from a "Natural" form. The RHAT concludes by defining a WFD Hydromorphological Status (i.e. Bad, Poor, Moderate, Good, High).

This stage takes into consideration mitigation measures and is an iterative process whereby a mitigation measure can be assessed to determine the most appropriate for the Proposed Development.

Guidelines on procedures and treatment of geology, hydrology, and hydrogeology for National Road Schemes (NRA, 2009)

The primary objective of the Guidelines is to provide guidance on the assessment of geological, hydrological, and hydrogeological impacts during the planning and design of national road schemes in Ireland. The Guidelines are not mandatory but serve as a supplement to the National Roads Project Management Guidelines (NRPMG). The document includes a list of relevant impacts and constraints to be considered as well as maps to be included when determining the impact rating for geology, hydrology, and hydrogeology. Additionally, a matrix including criteria for rating impact significance at the EIA stage is included for each subject.

The Planning System and Flood Risk Management Guidelines for Planning Authorities (OPW and DEHLG, 2009)

In November 2009, the DEHLG and the OPW jointly published a Guidance Document for Planning Authorities entitled 'The Planning System and Flood Risk Management'. The Guidelines are issued under Section 28 of the Planning and Development Act 2000; and Planning Authorities and An Bord Pleanála are therefore required to implement these Guidelines in carrying out their functions under the Planning Acts.

The aim of the Guidelines is to ensure that flood risk is neither created nor increased by inappropriate development. The Guidelines require the planning system to avoid development in areas at risk of flooding, unless they can be justified on wider sustainability grounds, where the risk can be reduced or managed to an acceptable level. They require the adoption of a Sequential Approach (to Flood Risk Management) of Avoidance, Reduction, Justification and Mitigation and they require the incorporation of a Flood Risk Assessment into the process of making decisions on planning applications and planning appeals.

Fundamental to the Guidelines is the introduction of flood risk zoning and the classification of different types of development having regard to their vulnerability. The management of flood risk is now a key element of any development proposal in an area of potential flood risk and should therefore be addressed as early as possible in the site master planning stage.

Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016)

Inland Fisheries Ireland (IFI) provides guidance on the organisation of construction activities and crossing structures to prevent damage to aquatic and riparian habitats, pollution of waters, and interference with upstream and downstream movement of aquatic life during construction activities. These include guidance around the type of culverts and structures that should be used to reduce impact on the aquatic environment and proper planning to avoid discharge of construction materials into surface waters. IFI prefers clear span river and stream crossing structures whenever possible to avoid altering or moving existing watercourses; however, when this is not possible, planning should consider options which least disrupt the riparian zone and streambed.

Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas (DHLGH, 2022)

The Best Practice Interim Guidance Document a high-level guidance document demonstrating how urban areas can be planned and designed to address impacts related to the environment, climate change and flood risk through nature-based solutions for the management of rainwater and surface water runoff. The document has a distinct focus on planning and identifying opportunities where SuDS and nature-based solutions should be employed.

Sustainable Drainage Explanatory Design and Evaluation Guide (SDCC, 2022)

South Dublin County Council has identified SuDS as the preferred way to managed rainfall from new development in the Development Plan.

This guide serves as a means to elaborate on SuDS design requirements, design process from concept design to detailed design, and components and objectives of the SuDS components.

Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0

The Greater Dublin Strategic Drainage Study sets out the technical requirements for new drainage works and provides Local Authorities with a concise document detailing an integrated approach to drainage.

The main objectives of the Code of Practice are:

- Compliance with best environmental practices and relevant environmental legislation such as the Water Framework Directive.
- To minimise the risk of flooding
- To minimise foul sewage spills to watercourses
- To provide a drainage platform for the sustainable development of the region in the future
- To ensure all drainage design is consistent cross the region and meets compliance best practices; and
- To codify drainage requirements across planning, construction, connection to public drainage infrastructure and the taking in charge of pipelines by local authorities.

12.2.3 Scope of Assessment

This assessment of effect methodology is in accordance with the guidance outlined in 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022), the assessment of hydrological aspects according to the 'Guidelines on procedures and treatment of geology, hydrology, and hydrogeology for National Road Schemes' (NRA, 2009). The key steps, being as follows:

- Description of the baseline
- Assessment of potential impacts
- Mitigation and monitoring; and
- Assessment of residual impacts.

Existing pollution has an impact on the quality of surface waters, and this has been considered when characterising the baseline surface water condition. The potential for flooding at the Proposed Development site and before the implementation of the project is considered in relation to the baseline.

To ensure compliance with the EU Water Framework Directive (2000/60/EC) (as amended), it is necessary to consider the elements of surface and groundwater systems. Ecological status of surface water is defined through assessment of ecological and chemical status. Ecological status relates to the biological quality elements supported by the physico-chemical elements and hydromorphology elements. Chemical status relates to the amount of priority substances, priority hazardous substance (i.e., listed in the EC Environmental Quality Standards Directive (2008/105/EC); transposed in Ireland by the European Communities Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272/2009 (as amended)) and other pollutants in the aquatic environment.

All new developments in Ireland that may have an impact on the water environment are required to comply with objectives of the WFD, under European Communities (Water Policy) Regulations 2003 S.I. No. 722/2003 (as amended). This includes ensuring that no changes occur that cause a deterioration of the ecological status of any water body, and that the development does not prevent the achievement of the future status objectives of any water body. Water body status deterioration can occur because of deterioration of any of the quality elements that make up the overall status (e.g., biological, physicochemical, or hydromorphological elements for surface waters) even where this does not result in a lowering of overall water body status.

12.2.4 Summary of Data Sources

Data relating to water has been obtained from the following sources:

- Surface water features, catchments, and water quality:
  - EPA Unified GIS Application (https://gis.epa.ie/EPAMaps/ accessed March 2024) for water quality and river ecological monitoring results;
  - River Basin Management Plan (RBMP) for Ireland 2018 -2021, Cycle 2 (Department of Housing, Planning and Local Government, 2018);
  - Draft RBMP for Ireland 2022-2027, Cycle 3 (Department of Housing, Planning and Local Government, 2023);
  - Liffey and Dublin Bay Catchment Summary WFD Cycle 3 (EPA, 2021);
  - Liffey_SC_090 Sub-Catchment Summary WFD Cycle 2 (EPA, 2018); and
  - Water quality and Q-value temporal monitoring at site RS09G010600 within Liffey_170 (https://www.catchments.ie/data accessed March 2024).
- Flooding:
  - Flood Risk Assessment (Appendix 12.1)
  - Historic flooding: OPW National Flood Hazard Mapping (https://www.floodinfo.ie/ accessed March 2023) and Geological Survey Ireland (GSI); and
  - Eastern Catchment Flood Risk Assessment and Management Study Hydraulics report (CFRAMS, 2014).
- Hydromorphology:
  - Hydromorphology Assessment (Appendix 12.2)

12.2.5 Assessment of Effects Methodology

The effects of the Proposed Development on water have been assessed by classifying the sensitivity of the relevant attributes (receptors) and quantifying the likely magnitude of any potential effect on these attributes. The resultant significance of the potential effect is a function of both criteria. Mitigation measures have been detailed where necessary to reduce the significance of these effects and the residual likely significant effects are described.

The criteria to determine the sensitivity of the feature and the magnitude of potential effects is based on the guidance outlined in Section 5.6 of the TII Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and hydrogeology for National Road Schemes (NRA/TII, 2009). It should be noted that the TII Guidelines refer to the sensitivity as 'Importance' and provide ranking criteria accordingly – the terminology of 'Importance' and sensitivity have both been used in this Chapter to avoid confusion.

The process is to determine the Importance (or Sensitivity) of the identified constraint (Table 12.1), determine the Magnitude of any potential impacts (Table 12.2) and the resultant significance of that effect (Table 12.3).

Table 12.1: Criteria for rating site attributes -- Estimation of the importance of hydrology attributes. Source: NRA/TII, 2009.

Sensitivity	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.

Sensitivity	Criteria	Typical Example
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities
High	Attribute has a high quality or value on a local scale	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2- 3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying < 50homes. Quality Class D (Biotic Index Q2, Q1). Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people

Table 12.2: Criteria for rating site attributes impact significance at EIA stage - Estimation of magnitude of effects on hydrology attributes. Source: NRA/TII, 2009.

Importance	Criteria	Typical Example
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Loss or extensive change to a WFD waterbody, unclassified waterbody or water dependent habitat Increase in predicted peak flood level >100mm[2] Extensive loss of fishery Calculated risk of serious pollution incident >2% annually[3] Extensive reduction in amenity value
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm[2] Partial loss of fishery Calculated risk of serious pollution incident >1% annually[3] Partial reduction in amenity value
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm[2] Minor loss of fishery Calculated risk of serious pollution incident >0.5% annually[3] Slight reduction in amenity value
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level Calculated risk of serious pollution incident <0.5% annually[3]
Minor Beneficial	Results in minor improvement of attribute quality	Reduction in predicted peak flood level >10mm[2] Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually[3]

[2] Refer to Annex 1, Methods E and F, Annex 1 of HA216/06

[3] Refer to Appendix B3 / Annex 1, Method D, Annex 1 of HA216/06

Importance	Criteria	Typical Example
Moderate Beneficial	Results in moderate improvement of attribute quality	Reduction in predicted peak flood level >50mm[2] Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually[3]
Major Beneficial	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm[3]

Table 12.3: Rating of significant environmental effects at EIA stage. Source: NRA/TII, 2009.

Importance of attribute	Magnitude of Impact[4]			
	Negligible	**Small**	**Moderate**	**Large**
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
High	Imperceptible	Moderate / Slight	Significant / Moderate	Severe / Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

The EPA guidance (EPA, 2022) uses the same terminology to describe the significance of the effect as the TII guidelines. In line with the EPA guidance (EPA, 2022), each likely significant effect has been described in terms of its quality, significance, duration, and type.

This Chapter includes an assessment of the likely significant effects on water quality and local hydrology. The results of the Flood Risk Assessment (FRA) are summarised here while the full assessment is included in Appendix 12.1. The results of the Hydromophology assessment are summarised here while the full assessment is included in Appendix 12.2. Due to the interconnected nature of water, there are linkages to ecological receptors and groundwater as defined in Chapter 11 (Biodiversity) and Chapter 13 (Land, Soils and Geology chapter respectively). These have been incorporated where relevant.

12.3 Baseline Environment

The following Section describes the baseline environment in terms of surface water, drainage systems and attenuation.

12.3.1 Climate

The Status of Ireland's Climate 2020 (EPA, 2021) provides several observations of Irelands climate and emerging trends. Of greatest significance for the purposes of the Proposed Development are the changing rainfall patterns across Ireland. Annual precipitation was 6% higher in the period 1989 to 2018, compared to the 30-year period 1961 to 1990. In addition, the period from 2006 to 2015 was the wettest decade on record, with some evidence pointing towards an increase in winter rainfall and a decrease in summer rainfall. The EPA (2019) Irish Climate Futures: Data for Decision Making report states that weather extremes will become more likely and more frequent with future climate change.

Precipitation changes are particularly important for the construction and operation of the new stream alignment where extreme flows or rapid changes in flow velocity or water runoff quality may impact aquatic habitats.

12.3.2 Surface Water

The Proposed Development lies within the Liffey and Dublin Bay WFD Catchment, which covers an area of 1,624 km^2 (Figure 12.1). The Liffey and Dublin Bay Catchment Summary (Liffey and Dublin Bay Catchment Report HA 09) (EPA, 2021) describes this catchment as including the area drained by the River Liffey and by all streams entering tidal water between Sea Mount and Sorrento Point in County Dublin. The River Liffey and Dublin Bay catchment contains the largest population (approximately 1,255,000) of any catchment in Ireland and is characterised by a densely populated, upland south-eastern area underlain by granites and a densely populated flat, low lying limestone area over the remainder of the catchment basin (CSO, 2022). The catchment area is heavily urbanised and industrialised.

The Liffey River originates in the Wicklow Mountains, approximately 19 km south of Dublin city. It meanders for more than 129 km before reaching Dublin Bay, where it flows into the sea (EPA, 2021). Consideration of the surface water bodies that could be directly impacted by the Proposed Development through the EPA online tool indicated that the Proposed Development site has an impact pathway with the WFD Sub Catchment: Liffey SC 090 and WFD Sub-Basin Liffey 170 (EPA, 2021). The main waterbody within Liffey_170 is the Griffeen River. Griffeen River originates in the Saggart Hill in South Dublin. It flows towards Lucan until it reaches the Griffeen Valley Park (Figure 12.2). After leaving the park it flows towards the Liffey River at the Lucan Weir.

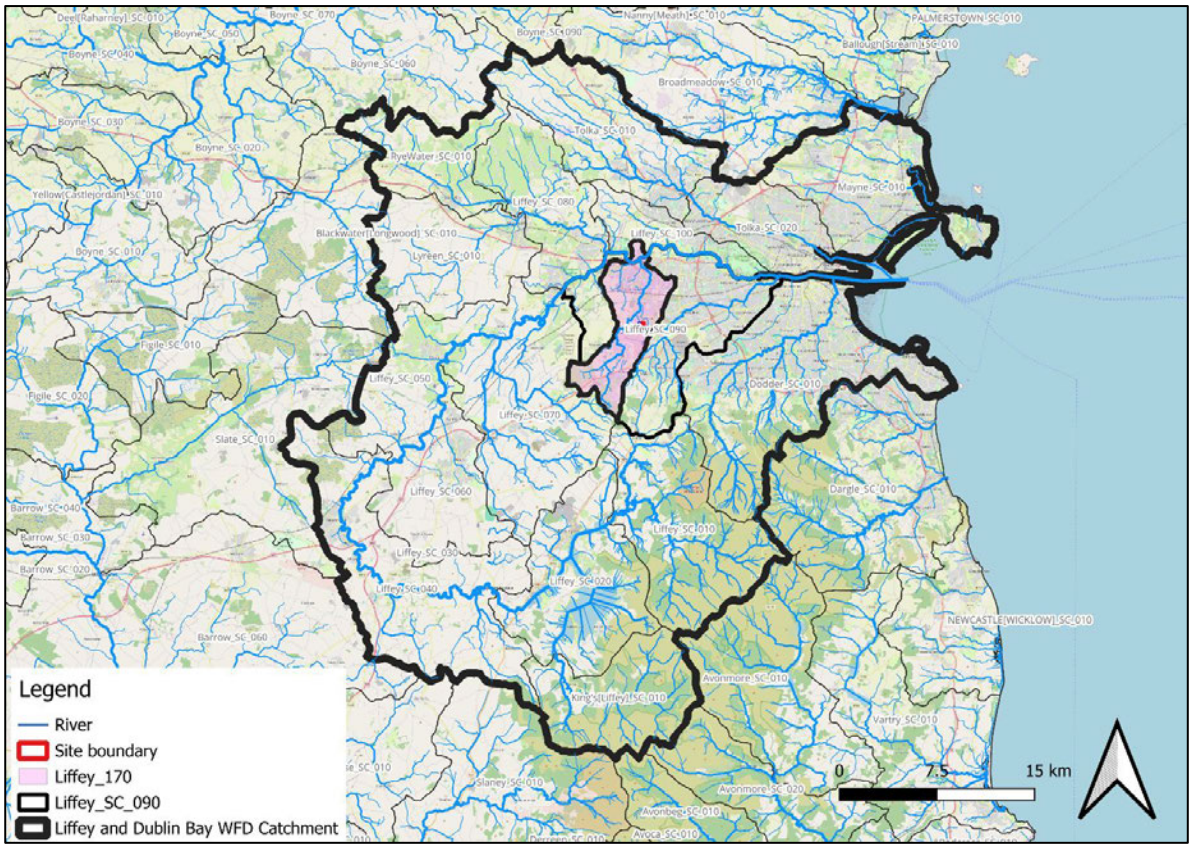

Figure 12.1: Location of site within the WFD catchments. Source: EPA, 2021.

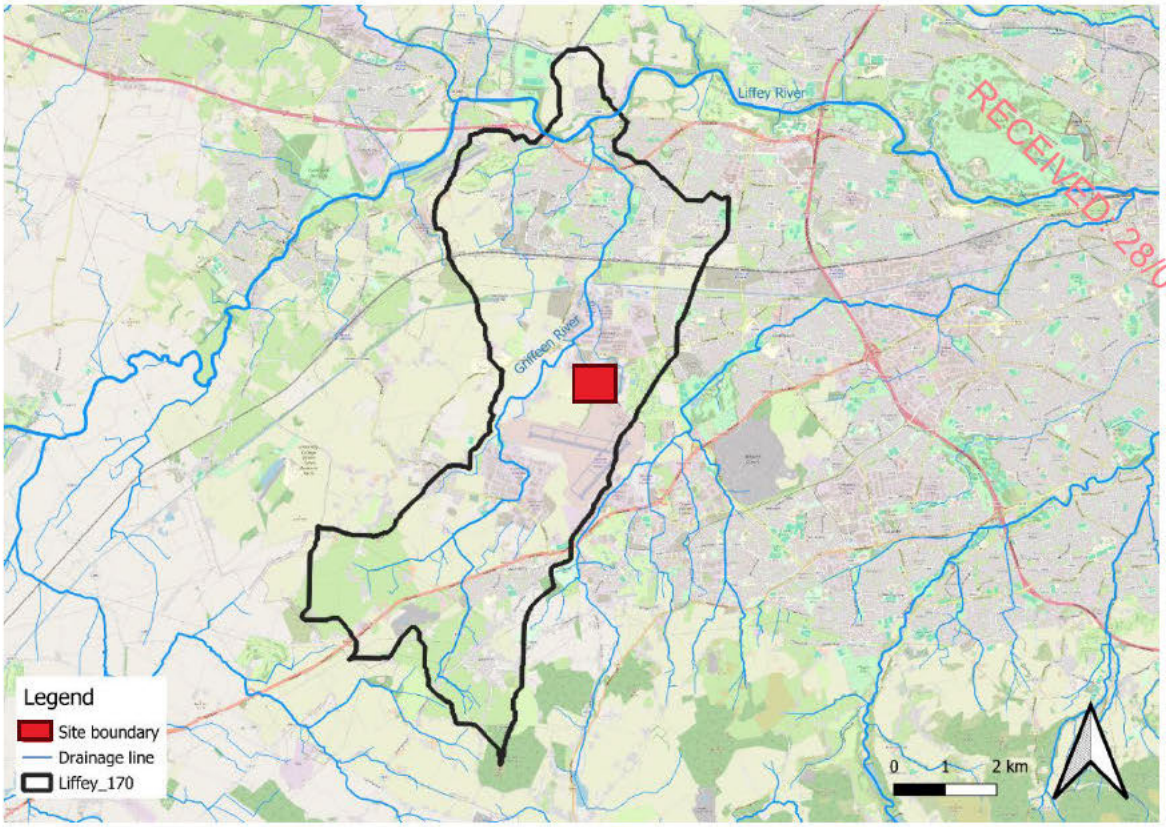

Figure 12.2: Site location within Liffey_170 WFD river subbasin. Source: EPA, 2021.

12.3.2.1 Receiving Waters of the Proposed Development

The Griffeen River flows about 500m to the west of the Proposed Development and the Baldonnell Stream flows about 120m to the east of the Proposed Development (Figure 12.3). Another stream, noted as Milltown 09, originating at the boundary to the north of the Proposed Development flows towards the Griffeen River and it enters the Griffeen River at the point east of townland Milltown, to the south of the Nangor Road. Within the Proposed Development, there is an open channel watercourse that transitions into a culverted watercourse beneath the existing DC1 building at the northern side of the Proposed Development. It emerges from the northern side of the Proposed Development and continues in a northerly direction. The watercourse ultimately connects with Baldonnell Stream to the north of the Proposed Development.

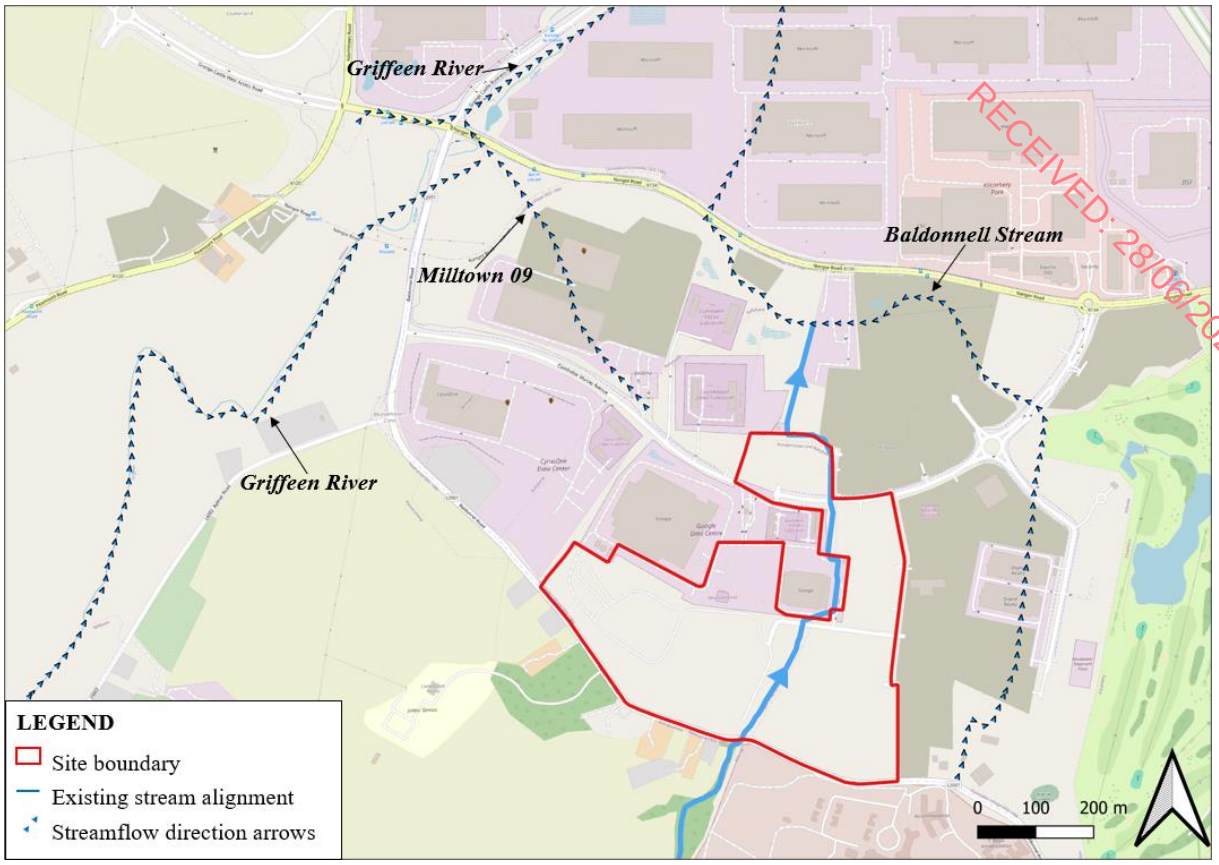

Figure 12.3: Surrounding surface waterbodies at the site location. Source: EPA, 2021.

12.3.2.2 WFD Waterbody Risk and Status

The Proposed Development site discharges water into Liffey_170 WFD river waterbody. According to the WFD, this waterbody is classified as 'At Risk' (Figure 12.4). The ecological status of this waterbody has degraded from 2013-2018 'Moderate' status to 2016-2021 'Poor' status (Table 12.4). The chemical surface water status has changed from 'Good' to 'Pass'. The significant pressure categories in the sub catchment and Liffey_170 are mainly urban wastewater: combined sewer overflows and urban runoff: diffuse sources runoff (EPA, 2018).

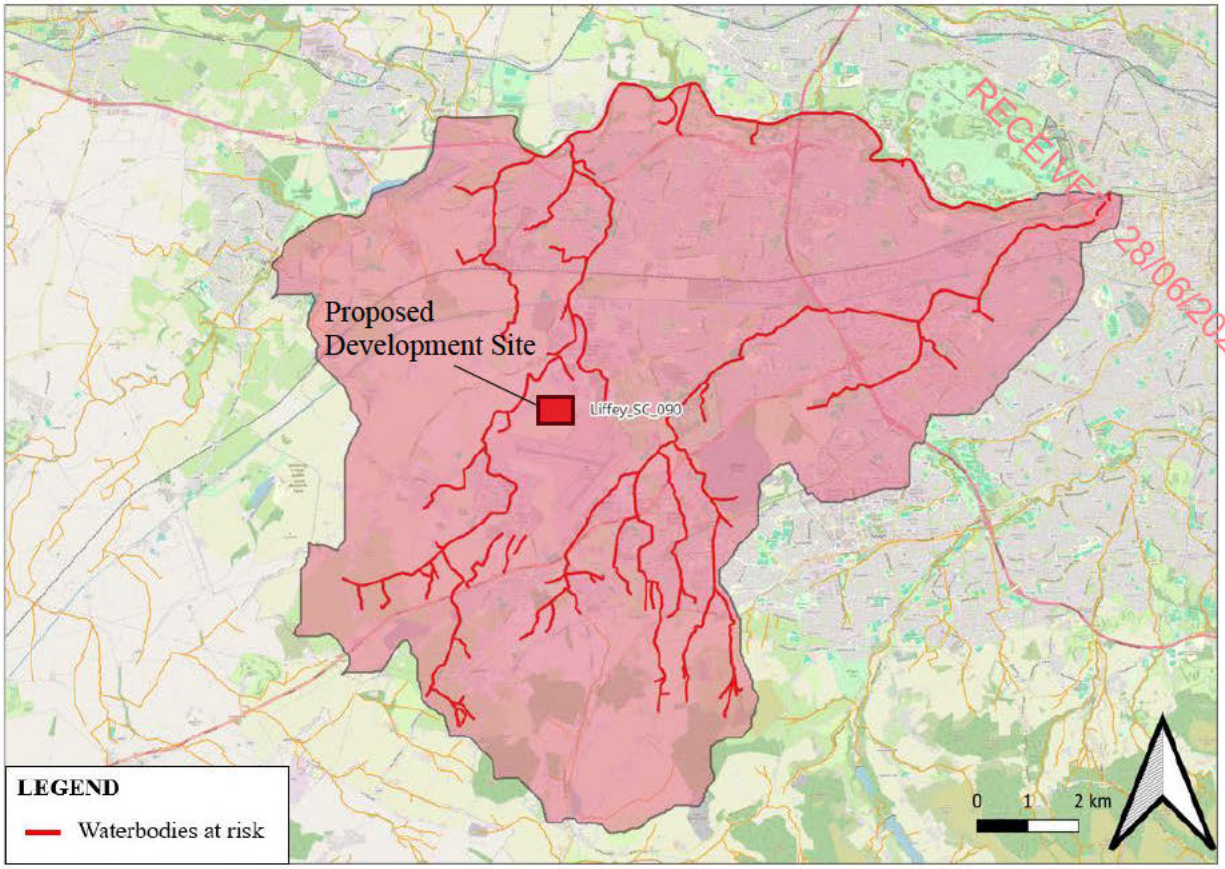

Figure 12.4: River waterbodies inside Liffey_SC_090 that are at risk. Source: EPA, 2021.

Table 12.4: Summary information on Liffey_SC_090. Source: EPA, 2018.

Sub Catchment	Waterbody Name	Waterbody Area (km^2)	Waterbody Type	Risk	Status (2013-2018)	Status (2016-2021)	Significant Pressure Categories
Liffey_SC_090	Liffey_170	43.77	River	At risk	Moderate	Poor	Urban Run-off, Urban Wastewater

12.3.2.3 Protected Areas

Within the Liffey and Dublin Bay catchments there are no drinking water abstractions associated with surface waters. There are no designated economically significant aquatic species hydrologically connected to the Proposed Development. There are no designated nutrient sensitive water sites connected to the Proposed Development. There is a hydrological connection to downstream SPA and SACs (i.e. South Dublin Bay and River Tolka Estuary SPA; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA; North Dublin Bay SAC; South Dublin Bay SAC). The receiving WFD water body, Liffey_170, is approximately 20 km away from these protected areas.

12.3.2.4 Water Quality

Water quality monitoring stations RS09G010600, RS09G010500, RS09G010200 were assessed for availability and quality of chemical and biological quality elements along the Griffeen River (Table 12.5). The most recent River Q values indicated 'unsatisfactory poor' ecological conditions in Lucan in June 2022 (EPA River Quality Surveys: Biological, 2022).

Table 12.5: Information about the monitoring stations for Liffey_170.

Distance From Site	Waterbody	Entity Name	Station Name	Station Number	Easting	Northing	Chemical Monitoring	River Q Monitoring
4.5km downstream	Liffey_170	Griffeen River	Lucan Br	RS09G010600	303497.53	235516.95	Yes	Yes
4km downstream	Liffey_170	Griffeen River	Griffeen-Esker Br	RS09G010500	303951.46	234305.47	No	Yes
300m upstream from confluence with Milltown	Liffey_170	Griffeen River	Griffeen-First Bridge E. of Milltown	RS09G010200	302760.47	230973.06	No	Yes

12.3.2.5 Existing Pressure

An Industrial Emissions (IE) Licence regulating emissions to Stormwater under the Licence Registration Number P1189-01 was granted on the 16th May 2023.

There are no direct process emissions (i.e. trade effluent) to surface waters from the installation.. There are two sewer emission points – one for each building. Discharge from DC1 consists of wastewater from domestic use only. Discharge from DC2 consists of wastewater from domestic uses, canteen waste and condensate from internal air handling units. The emissions to sewer are discharged to the public foul water sewer network in Grange Castle and treated at Ringsend Wastewater Treatment Plant (D0034-01).

The current stormwater management system at the Proposed Development site ensures no emissions to groundwater. There are two storm water discharge points – SW1 associated with DC1 and SW2 associated with DC2 (Table 12.6). Storm water discharges includes storm water from roofs, the road network, transformer bunds and hardstanding areas. A small amount of condensate from the air handling units in the office areas in DC1 (approximately 3.5 m^3/year), consisting of clean water, is also discharged via SW1. There are a number of additional Class-1 interceptors across the stormwater drainage network, including Class 1 by-pass interceptors at the discharge points. Runoff from fuel unloading areas and transformer bunds at the HV compound pass through Class 1 full retention oil interceptors. Shut-off valves are installed on the drainage system in the fuel unloading areas. Stormwater in the two transformer bunds is manually pumped from a sump into a gully through a full retention oil separator and into the stormwater system, if found to be uncontaminated during inspection.

Table 12.6: Existing stormwater discharge points for DC1 and DC2.

Discharge Point Code	Easting	Northing	Discharge To	Description of Discharge Point and Controls	Receiving Water Code
SW-1[5]	303562	230424	Ditch	Oil interceptors used throughout site and prior to final discharge point. Attenuation is provided by 2 attenuation tanks and 2 over sized pipes. SW discharge rate is controlled by a hydrobrake flow control device. Stormwater controlled at greenfield runoff rate of 4l/s/ha.	EA_09_242
SW-2[6]	303288	230602	Storm sewer	Stormwater attenuation is provided for the DC1 by the attenuation pond in the northwest of the site. Oil interceptors used throughout site and prior to final discharge point.	EA_09_242

[5] Manual shut off valves in fuel unloading areas for both SW1 and SW.

[6] Automatic sluice gate valve fitted to SW2 that can be shut off.

Discharge Point Code	Easting	Northing	Discharge To	Description of Discharge Point and Controls	Receiving Water Code
				There is a penstock valve at the discharge from the stormwater pond which is operated by local hardwired interlock with the Fire Alarm System, independently of the Building Management System. Stormwater controlled at greenfield runoff rate of 4l/s/ha.	

The IE Licence requires the applicant to maintain the storm water drainage system and conduct daily visual inspections and monitoring for temperature, conductivity, total organic carbon (TOC) and pH, and any other parameters as required by the EPA (Table 12.7). This monitoring is required to be carried out during periods of discharge.

Table 12.7: Monitoring of existing stormwater discharge points for DC1 and DC2.

Discharge Point Code	Parameter	Frequency	Analysis method
SW-1	pH	Weekly	pH electrode/meter
	TOC	Weekly	Standard method
	Temperature	Weekly	Temperature probe
	Conductivity	Weekly	Conductivity probe
	Visual inspection	Daily	Sample and examine for colour and odour
SW-2	pH	Weekly	pH electrode/meter
	TOC	Weekly	Standard method
	Temperature	Weekly	Temperature probe
	Conductivity	Continuous	Conductivity probe with recorder
	Visual inspection	Daily	Sample and examine for colour and odour

12.3.3 Groundwater

12.3.3.1 Receiving groundwater of the Proposed Development

The Proposed Development site is underlain by the Lucan formation, which is overlain by a thin layer of till (1-3m) which is in turn variably overlain by topsoil or made ground. The lower permeability till soils which overlay the bedrock (boulder clay) mean slow infiltration and restricted recharge to bedrock aquifers.

Groundwater bodies (GWBs) have been delineated and described by the GSI (GSI, 2024) as Water Framework Directive (WFD) groundwater management units to manage and protect groundwater and linked surface waters. There is one GWB present which covers the Proposed Development study area:

- Dublin GWB, European code IE_EA_G_008.

The Dublin GWB primarily covers the Lucan Formation. According to the GWB description, the majority of groundwater flow will be a rapid flow in upper weathered zone but flow in conduits is commonly recorded at depths of 30 to 50 m below ground level. The flow will be through fractures. The aquifer parameters GSI Aquifer Handbook (Kelly C et al, 2015) reports relatively low average permeability of the Lucan Formation of 9.3 x 10^{-7} m/s.

12.3.3.2 WFD Waterbody Risk and Status

The groundwater flow direction in the Dublin GWB is towards the coast and also the River Liffey, however the aquifer is not expected to maintain regional flow paths. The EPA records show the WFD overall status of the groundwater body within the Proposed Development study area is 'Good' and is currently 'Under Review' regarding the risk of not maintaining that status.

12.3.3.3 Protected Areas

There are no designated environmentally protected sites within the Proposed Development site which would be considered sensitive to groundwater contribution. The nearest SAC, Rye Water Valley/Carton SAC, is located 5.8km from the Proposed Development site, whereas the nearest SPA, Wicklow Mountains SPA, is located approximately 13km from the Proposed Development site.

12.3.4 Flood Risk

A Flood Risk Assessment (FRA) has been conducted to assess risk of flooding to the Proposed Development site from fluvial, coastal, pluvial and groundwater flooding for the baseline environment. The FRA is included in Appendix 12.1 of this EIAR. Coastal flooding was screened out due to the distance of the site from the sea and elevation above sea level (see Section 3.1 of Appendix 12.1).

12.3.4.1 Past Flood Risk

According to the OPW National Flood Hazard Mapping (floodinfo.ie) there was a singular flood incident, approximately 1km northwest from the Proposed Development. The recorded flood occurrence at Peamount is dated November 5th, 2000, with the origin of this event remaining unidentified. Synthetic Aperture Radar Seasonal flood maps provided by Geological Society Ireland maps indicate no occurrence of flooding within the Proposed Development site, however the maps indicate historic flooding in the surrounding area.

12.3.4.2 Existing Flood Risk

The Eastern Catchment Flood Risk Assessment and Management Study has produced flood maps for the site of the Proposed Development (Section 4.1.1 of Appendix 12.1). These flood maps are considered outdated and as such, hydrological and hydraulic modelling were undertaken to update the flood maps. According to the modelling, the Proposed Development site is at risk of fluvial flooding during the 1 in 100 year (or 1% AEP) and 1 in 1000 year (or 0.1% AEP) flood events. These are classified as Flood Zone A and B respectively, in accordance with the Planning System and Flood Risk Management Guidelines (2009). These are associated with the small watercourse, tributary of the Baldonnell Stream, that flows from south to north of the Proposed Development site and joins Baldonnell Stream to the north.

With regard to surface water flooding, review of the topography of the Proposed Development site and surrounds concluded that there are no significant ponding areas within the Proposed Development site and there are no overland flows coming from outside the Proposed Development area into the Proposed Development area. The likelihood of significant pluvial flooding to the Proposed Development site is therefore low.

The site of the Proposed Development is not underlaid by any regionally important aquifer (GSI Groundwater resources maps) and the GSI groundwater flood maps do not indicate any groundwater flood extents at the Proposed Development. It is considered that the risk of groundwater flooding in the Proposed Development site is low.

12.4 Characteristics of the Proposed Development

The Proposed Development will include a Data Storage Facility and Site Infrastructure. Water use and wastewater demands are covered in Chapter 17: Material Assets. The Site Infrastructure includes localised alterations to the landscape. A watercourse which flows to Baldonnell Stream from the Proposed Development site is proposed to be realigned around the DC3 building as demonstrated in Figure 12.5. The figure shows the existing and proposed arrangements of the watercourse. Two reports related to this realignment (i.e. Flood Risk Assessment and Hydromorphological Assessment) have been considered as part of this Chapter and are included as Appendices 12.1 and 12.2 of this EIAR.

Within the Proposed Development site, two short 600mm culverts (Culverts 2 and the northern part of Culvert 3) provide pinch points to flow and cause overland flooding to the Proposed Development site. These will be removed. Two new large culverts (Culvert A: 1.5m x 1m box culvert, Culvert B: 1.05m diameter circular culvert) and an open stream will replace the removed culverts and allow realignment of the watercourse at the southeast part of the site (around the Data Centre Building), providing additional conveyance capacity. Parts of Culvert 3, which is located within DC1, will be maintained in place as per current arrangement, with a part of Culvert 3 diverted and realigned around the proposed HV compound (Culvert C). Downstream of the proposed HV compound, along Profile Park Road, the existing culvert will be opened up and de-culverted within the biodiversity area. Overall, the watercourse within the site will comprise of two open stream sections of total length of 262.7m (compared to 187.8m presently), with 2 long culverts at the south and north of the data hall building (Culvert A and B to C) of total length of 641.6m (compared to 403.6m culverted watercourse presently on site) (refer to **Error! Reference source not found.**). The total length of the watercourse due to the realignment works will increase by 312.9m.

Table 12.8 Proposed changes to the length of culvert and open watercourse

	Baseline Length (m)	Proposed Length (m)
Culvert	403.6	641.6
Open watercourse	187.8	262.7

A step-pool arrangement is proposed at the end of the open stream before connecting to the northern culvert to allow a steep fall of 2m. The step-pools achieve the 2m vertical transition and hence allow the design of a relatively shallow and gentle open stream directly upstream that can slow down flows and encourage habitat creation. Appendix 12.1 of this EIAR includes further information on the design process followed to develop the watercourse realignment shown in Figure 12.5.

The finished floor levels of all buildings are raised above the 1 in 100 year flood event with a 30% allowance for climate change and an appropriate freeboard.

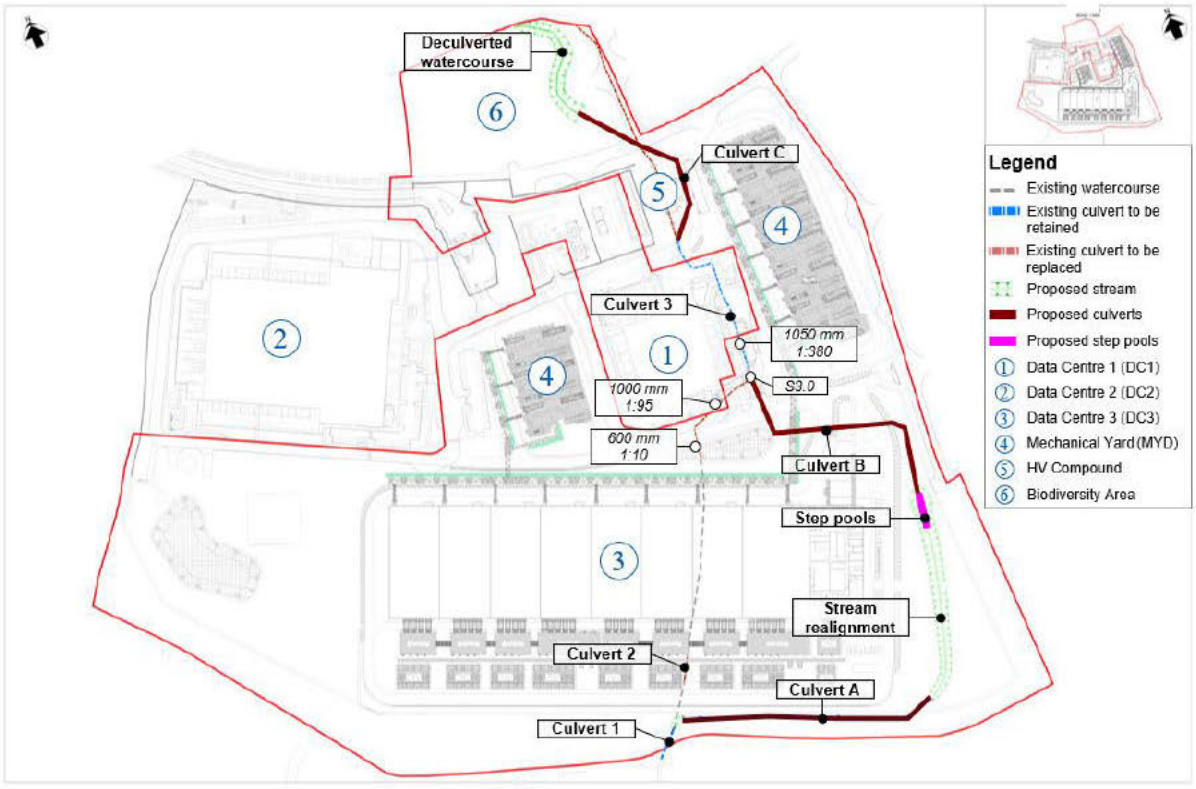

Figure 12.5: Proposed watercourse structures and re-alignment.

Chapter 5 (Construction) sets out the Construction Strategy for the Proposed Development and the key activities that would be undertaken during the works. The works are anticipated to be undertaken over a period of 27 months and will be completed in multiple phases.

12.4.1 Activities concerning the Planning and Development Act

The site is regulated by the EPA under an IE licence (P1189-01). As such, the Proposed Development is considered highly vulnerable to flooding, in accordance with the Planning System and Flood Risk Management Guidelines (2009) and a Flood Risk Assessment (FRA) (Appendix 12.1) was prepared for the Proposed Development.

12.4.2 Activities concerning the Arterial Drainage Act

The design and construction of culverts should be such that flood risks are not increased, or, where no other viable options exist, are restricted to acceptable levels, and should comply with any flood risk management objectives and plans established for the area. Under the Arterial Drainage Act (1945) the consent of the OPW is required to carry out construction/alteration works on culverts. A 'Section 50' application has been applied for the proposed culverts within the Proposed Development.

12.4.3 Activities concerning the Water Framework Directive

Assessment for WFD compliance requires five assessment stages including a screening assessment or baseline to assess the impact pathways to WFD waterbodies. The screening assessment was based on a qualitative assessment utilising expert knowledge and stakeholder engagement with SDCC and Inland Fisheries Ireland (IFI) to assess the potential risks from elements of the Proposed Development to WFD objectives. Waterbodies with quality elements scoped into the impact assessment were taken forward for a detailed assessment (refer to the Hydromorphological Assessment (Appendix 12.2) and mitigation measures were identified.

12.4.3.1 WFD Screening

The water bodies identified under the baseline were assessed for potential effect of the Proposed Development (Table 12.9). There is a possible direct causal mechanism with the hydromorphology and biological quality supporting elements of Liffey_170. There are also indirect causal mechanisms for physico-chemical and chemical supporting elements of Leffey_170. Although there is a hydrological connection with downstream protected areas, the Proposed Development occurs more than 20km away therefore it is not screened into the scoping assessment. There is no direct or indirect causal mechanism with Dublin GWB.

Table 12.9: WFD screening assessment for rivers and groundwater

WFD Waterbody	Supporting Element	WFD Element	Direct Causal Mechanism	Indirect Causal Mechanism
Liffey_170	Hydromorphology	Hydrology: quantity and dynamics of flow	Yes	Yes
		Hydrology: connections to groundwaters	Yes	Yes
		River continuity	Yes	Yes
		Morphology: river depth and width	Yes	Yes
		Morphology: riverbed structure, substrate	Yes	Yes
		Morphology: riparian zone structure	Yes	Yes
	Physico-chemical	Thermal conditions	No	Yes

WFD Waterbody	Supporting Element	WFD Element	Direct Causal Mechanism	Indirect Causal Mechanism
		Oxygenation	No	Yes
		Salinity	No	Yes
		Acidification	No	Yes
		Nutrient conditions	No	Yes
		Specific synthetic pollutants	No	Yes
		Specific non-synthetic pollutants	No	Yes
	Biological quality	Phytoplankton	Yes	Yes
		Macrophytes and phytobenthos	Yes	Yes
		Benthic invertebrates fauna	Yes	Yes
		Fish fauna	Yes	Yes
	Chemical status	Priority substances	No	Yes
		Priority hazardous	No	Yes
	Protected areas	South Dublin Bay and River Tolka Estuary SPA; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA;	No	Yes
		North Dublin Bay SAC; South Dublin Bay SAC	No	Yes
Dublin GWB	Quantitative status	Available groundwater resource	No	No
		Groundwater dependent surface water bodies	No	No
		Groundwater dependent terrestrial ecosystems	No	No
		Saline or other intrusions	No	No
	Groundwater chemical status		No	No
	Protected areas	None identified	No	No

12.4.3.2 WFD Scoping

The Liffey_170 WFD waterbody was taken forward to scoping to determine which WFD element should be investigated. Assessment considers the timeframe (i.e. recovery time of the waterbody); insignificance (i.e. insignificance in the context or scale of the water body); and in-combination (i.e. components in the programme of works, or two/more different projects might cause deterioration or affect the ability of the waterbody to achieve its WFD objectives) effects.

Realignment of a watercourse will result in not temporary, insignificant effects to hydromorphology and biological quality (fish) supporting elements (Table 12.10). The impact is insignificant when considered the baseline condition of the watercourse (i.e. existing culverts will likely already limit fish movement and the Proposed Development will have an impact on 1.5% of the WFD waterbody). Further investigation for impacts on hydromorphology and biological quality supporting elements was required. A hydromorphology assessment (Appendix 12.2) indicated that under natural conditions the watercourse would be a 'low land meandering river type'. A history of channel straightening, surrounding land use change and channel modifications has meant that the current hydromorphological condition is 'poor'.

Table 12.10: WFD scoping assessment for rivers.

WFD Waterbody	Supporting Element	WFD Element	Timeframe	Insignificance	In-combination
Liffey_170	Hydromorphology	Hydrology: quantity and dynamics of flow	Not temporary	Insignificant	Yes
		Hydrology: connection to groundwaters	Temporary	Insignificant	None
		River continuity	Temporary	Insignificant	None
		Morphology: river depth and width	Not temporary	Insignificant when considering the scale of the impact (i.e. Proposed Development impacts 1.5% of waterbody)	Yes
		Morphology: riverbed structure, substrate	Not temporary	Insignificant when considering the scale of the impact (i.e. Proposed Development impacts 1.5% of waterbody)	Yes
		Morphology: riparian zone structure	Not temporary	Insignificant when considering the scale of the impact (i.e. Proposed Development impacts 1.5% of waterbody)	Yes
	Physico-chemical	Thermal conditions	Temporary	Insignificant	None
		Oxygenation	Temporary	Insignificant	None
		Salinity	Temporary	Insignificant	None
		Acidification	Temporary	Insignificant	None
		Nutrient conditions	Temporary	Insignificant	None
		Specific synthetic pollutants	Temporary	Insignificant	None
		Specific non-synthetic pollutants	Temporary	Insignificant	None
	Biological quality	Phytoplankton	Not temporary	Insignificant	Yes
		Macrophytes and phytobenthos	Not temporary	Insignificant	Yes
		Benthic invertebrates fauna	Not temporary	Insignificant	Yes

WFD Waterbody	Supporting Element	WFD Element	Timeframe	Insignificance	In-combination
		Fish fauna	Not temporary	Insignificant when considering baseline culvert extent (i.e. fish movement unlikely)	Yes
	Chemical status	Priority substances	Temporary	Insignificant	None
		Priority hazardous	Temporary	Insignificant	None
	Protected areas	South Dublin Bay and River Tolka Estuary SPA; North Bull Island SPA; South Dublin Bay and River Tolka Estuary SPA;	Temporary	Insignificant	None
		North Dublin Bay SAC; South Dublin Bay SAC	Temporary	Insignificant	None

12.5 Potential Effects

12.5.1 'Do Nothing' Scenario

In the scenario where the Proposed Development did not proceed, none of the construction, operational or decommissioning effects set out in this Chapter would occur, potentially resulting in an overall Neutral effect.

12.5.2 Construction Phase

Chapter 5 (Construction) outlines the strategy to construct the Proposed Development and includes details of duration and phasing during construction and methodologies to undertake construction activities. In addition, the chapter details the location of Contractor compounds, the traffic management plan, hours of working and numbers of personnel involved.

There are several potential hydrological effects related to the Construction Phase of the Proposed Development which are detailed in the following sections. The nature of the likely significant effects of these varies depending on construction stage and activity.

12.5.2.1 Potential Effects on Surface Water: Flood Risk

The following risks may arise during the Construction Phase:

- Potential effects on the downstream and upstream hydraulic structures through realignment of the existing open channel, including the deposition of sediments and erosion in new areas, potential for scouring and streambank destabilisation and establishment of new flow paths.
- Potential effects on the hydraulic characteristics of water features through modifications to the watercourse channel dimensions during construction of new channel and culverts.
- Potential risk of flooding to open trenches during excavations, which can expose construction staff to health risks.
- Potential for increased flood risk to upstream or downstream receptors, such as residential and commercial properties that are located adjacent to the watercourse, during in-stream works.

- Change in the natural hydrological regime due to an increase in discharge because of dewatering activities during construction; potential for temporary increase in hard standing areas and / or soil compaction during construction works which could result in increased runoff rates to the watercourse and as such increase in flood levels.
- Accumulated excess backfill material resulting in an increase of flood risk; and
- Potential for disrupting local drainage systems due to construction works at watercourse.

The flood risk receptor based on the above potential risks, is any potential properties in the flood plain of the watercourse that crosses the site (estimated as 1 residential or commercial property) and as such the receptor has low sensitivity (Table 12.1). The potential effect due to an increased risk in in-channel flood levels of up to 50mm has the potential to result in Negative, Slight and Short-term effects, as the Construction Phase and instream works are short term.

12.5.2.2 Potential Effects on Surface Water: Water Quality

The following risks may arise during the Construction Phase:

- Although SPA and SAC sites are hydrologically connected to the Proposed Development, the sites are further than 20km away therefore the effect is considered insignificant. There will be a temporary, insignificant effect on downstream protected areas.
- Silty water runoff containing high loads of suspended solids from construction activities such as stockpiles may impact watercourses and surface WFD waterbodies. There will be a temporary, insignificant effect on WFD waterbodies.
- Contamination of waterbodies and subsurface strata in proximity to waterbodies with anthropogenic substances (e.g., oil spills, grease, concrete) or effluents generated during construction; There will be a temporary, insignificant effect on WFD waterbodies.
- Re-exposure of historic contaminants within or near to waterbodies because of working within or in proximity to the waterbody. Historic contaminants have been identified in Chapter 13 (Land, Soils, Geology and Hydrogeology). There will be a temporary, insignificant effect on WFD waterbodies.

The WFD waterbody has a low sensitivity. Based on these risks, the potential effects on water quality during the Construction Phase are predicted to be Negative, Slight and Short-Term.

12.5.2.3 Potential Effects on Surface Water: Hydromorphology

The following risks may arise during the Construction Phase:

- Change in flow regime during construction. There will be a long-term, insignificant effect on flow regime.
- Change in morphology: river depth and width. There will be a long-term, significant effect on morphology: river depth and width.
- Change in morphology: riverbed structure and substrate. There will be a long-term, significant effect on morphology: riverbed structure and substrate; and
- Change in morphology: riparian zone structure. There will be a long-term, significant effect on morphology: riparian zone structure.

The WFD waterbody has a low sensitivity and the hydromorphology supporting element has a low sensitivity (according to Appendix 12.2: Hydromorphology Assessment). Based on these risks, the potential effect rating on hydromorphology during the Construction Phase is large but the importance of the watercourse is low. This has the potential to result in a Negative, Slight / Moderate and Long-Term effects.

12.5.2.4 Potential Effects on Groundwater

The assessment of potential effects is provided in Chapter 13 (Land, Soils, Geology and Hydrogeology). The following risks may arise during the Construction Phase:

- Lowering of groundwater level during earthworks. The significance of this likely effect on the groundwater aquifer is Negligible.
- Risk to surface water from discharge of removed groundwater during earthworks. The significance of this likely effect on the groundwater aquifer is Negative, Slight and Short-Term.

12.5.3 Operational Phase

There are several potential hydrological effects related to the Operational Phase of the Proposed Development which are detailed in the following sections.

12.5.3.1 Potential Effects on Surface Water: Flood Risk

The following risks may arise during the Operational Phase:

Surface water runoff from the drainage systems will be limited to greenfield runoff rates and thus the potential effect on flood risk is Imperceptible.

The existing culverted watercourse will be rerouted via new culverts and open channel route around the data centre building before rejoining Baldonnell stream. Security screens to prevent trespassing to the site will be placed at the inlet or outlet of the new culverts. There is the unlikely risk that the security screens could accumulate debris, causing partial blockage and subsequently cause flooding to the Proposed Development site or upstream properties. Modelling of the blockage scenario has shown that the increase in levels due to a 33% blockage of the culvert causes 25mm increase in flood level upstream of the site (Section 6.4.4 in Appendix 12.1). This increase is not expected to cause increased flood risk to the upstream property, as it lies at much higher level.

The effect of the proposed culverts and stream diversion on water levels outside the site boundary has been assessed by hydraulic modelling, as described in Appendix 12.1. In the proposed scenario, water levels upstream of the site (south) are locally reduced on average by 100mm compared to the existing conditions, returning to existing scenario levels 115m upstream. At the downstream end of the model, water levels locally increase by 30mm directly downstream of the site and return to pre-development (existing) levels 75m downstream of the site. It should be noted this increase in levels is only local and occurs during the 1%AEP +20% climate change allowance. There is no impact during the 1% AEP.

12.5.3.2 Potential Effects on Surface Water: Water Quality

The following risks may arise during the Operational Phase:

Surface water volume will increase by the construction of new impermeable surfaces via the new building footprints and car parks, as infiltration will not occur as per existing conditions. However, this additional volume is proposed to be stored in 2 attenuation ponds and as such the rates of runoff from the Proposed Development to the stream are maintained to greenfield (existing). It is expected that the effects on surface water quality during operation will be Imperceptible and Long-Term.

12.5.3.3 Potential Effects on Surface Water: Hydromorphology

The following risks may arise during the Operational Phase:

Based on these potential risks, the potential effect rating on hydromorphology during the Operational Phase is large but the importance of the watercourse is low (according to the hydromorphological assessment). This results in potential Negative, Slight / Moderate and Long-Term effects.

12.5.3.4 Potential Effects on Groundwater

The assessment of potential effects is provided in Chapter 13 (Land, Soils, Geology and Hydrogeology). The following risks may arise during the Operational Phase:

- Lowering of groundwater level due to permanent drainage beneath proposed buildings; and
- Pollution of water environment.

The significance of these likely effects on the groundwater aquifer is Negligible.

12.5.4 Decommissioning Phase

During the Decommissioning Phase of the Proposed Development, the potential effects of the Proposed Development on water quantity and quality are likely to be similar to those arising during the Construction Phase, refer to Section 12.5.1. The watercourse will remain in place.

12.6 Mitigation and Monitoring Measures

As part of the Proposed Development, best practice construction methods will be implemented that will ensure the Construction, Operational and Decommissioning Phase related effects are avoided or reduced to a minimum as much as practicable. This section outlines this best practice and mitigation measures that will be implemented to mitigate the potential effects identified in Section 12.5.

12.6.1 Construction Phase

12.6.1.1 Project Wide Mitigation Measures

Industry good practice guidance will be followed by the appointed Contractors during construction including, where relevant, those listed in the guidance below (refer to the Construction Environmental Management Plan (CEMP) included in Appendix 5.1):

- Construction Industry Research and Information Association (CIRIA), (CIRIA, 2001). C532 Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.
- C650 Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (CIRIA, 2005).
- BPGCS005, Oil Storage Guidelines.
- Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition projects, (EPA, 2021).
- The SuDS Manual, CIRIA (C753)
- Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters, (IFI, 2016); and
- The Management of Waste from National Road Construction Projects, GE-ENV-01101, (TII, 2017).

The appointed Contractors will be required to put in place a Surface Water Management Plan (SWMP) to protect the water environment during construction. This will include all mitigation measures listed in this Chapter and any other water related mitigation measures listed in other chapters including but not limited to the Chapter 11 (Biodiversity) and Chapter 13 (Land, Soils, Geology and Hydrogeology).

At a minimum, the Surface Water Management Plan (SWMP) will detail control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Development. The appointed Contractors immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to planning conditions imposed by any grant of approval.

At a minimum, all the control and management measures set out in the SWMP will be implemented. This includes measures relating to:

- A requirement for a Pollution Incident Response Plan
- Construction Compound management including the storage of fuels and materials
- Control of sediment
- Use of concrete
- Management of vehicles and plant including refuelling and wheel wash facilities; and
- Monitoring.

12.6.1.2 Specific Mitigation Measures

Other specific water pollution and flooding mitigation and / or monitoring measures include:

Works to manage flooding

The Contractors will be required to put in place a Flood Risk Management Plan (FRMP) to minimise damage to the construction works in case of flooding and to reduce risk of flooding to nearby properties. As part of the FRMP, the following will be included:

- The work near or associated with the watercourse will be planned to be undertaken at appropriate periods when low flow is expected.
- Weather warning notifications will be issued, and the weather forecast checked regularly when working near areas at risk of flooding.
- A flood warning system and management plan will be implemented.
- The Contractor will construct the large majority of the diversions prior to any works on the existing stream. The connection between the existing watercourse and the new diversions will be undertaken once the diversion works are finished and within few days.

Surface water quality monitoring

- A suitably qualified Environmental Clerk of Works (EnCoW) and Ecological Clerk of Works (ECoW) will be appointed prior to commencement of works and employed when/where appropriate during the Construction Phase. The duties of these will be to monitor the efficacy of mitigation measures implemented by the contractors and to report on the application and success of these measures. The EnCoW and ECoW will be responsible for water quality monitoring.
- Water quality monitoring will be undertaken by a qualified person once in advance of construction to establish baseline levels of potential contaminants in an upstream and downstream location along the watercourse within the boundaries of the Proposed Development site.
- At the upstream culvert location background samples (i.e. baseline) will be collected in the same season as the watercourse construction will occur to ensure the results are representative.
- The downstream background samples will be tested at a laboratory for a range of parameters that occur naturally and for pollutants[7] including temperature, Electrical Conductivity (EC), pH, Dissolved Oxygen (DO), Turbidity, Total Petroleum Hydrocarbon (TPH) and Diesel Range Organics (DRO).

[7] According to CIRIA (2001) pollutants are defined as substances that occur either in a location where it is not naturally occurring or in an abnormally high concentration.

- Water pollution trigger levels will be determined against baseline monitoring results. The baseline monitoring results will present naturally occurring water quality conditions. Any abnormally high concentrations, when compared against baseline will be monitored by the EnCoW during construction and will flag for construction to be stopped.
- During construction within the watercourse, field parameters (temperature, pH, turbidity, DO and EC) will be monitored upstream and downstream of the construction works twice a day. Visual inspections of the watercourse at these locations will be conducted daily during construction to identify any plumes of sediment or sheens of oil which may indicate spillages. If these are identified, works will stop until the source has been identified and remediated.
- In the event of pollution occurring or the potential to occur, the EnCoW and ECoW have a 'Stop Works' authority to ensure measures to stop a pollution event are implemented immediately.

Prevention of release of hydrocarbons and contaminants

During construction, the Contractors will be required to implement the following specific mitigation measures to prevent the release of hydrocarbons, polluting chemicals, sediment/silt:

- Storage of sand/gravel/soil will be as far as practicable from watercourses and grading adjacent to these stockpiles kept to a minimum.
- Surface water run-off from temporary works area to be collected in silt/gravel traps prior to discharge to the surface water drainage network.
- Silt fences (to Hy-Tex Premium specification or similar) and silt traps will be installed prior to commencement of works and will be inspected daily to inform adaptive management as required. The locations of same will be determined by the EnCoW.
- All refuelling to take place in bunded enclosures and a minimum of 50m from any watercourse.
- Visual checks of the working areas and all silt/gravel traps will be carried out during weekly audits and maintenance works undertaken, if required.
- All chemical/fuel etc. will be stored in bunded containers and all storage will have sufficient bunding for all liquids stored (110% of the capacity of the largest drum).
- Spill kits will be maintained on sites and works areas.
- The Contractors will prepare a spill response procedure and implement it, if required.
- Spill incidents will be reported to the EnCoW.
- Oil interceptors will be installed on surface water drainage network at the Proposed Development works areas for the Construction Phase.
- No foul sewer discharge will be allowed to enter the surface water drainage network; and
- Toolbox talks for all staff will be carried out by the Contractors before work commences to identify environmental issues.

Protection of watercourses

- The majority of the diversions will be undertaken prior to any works on the existing stream. The connection between the existing watercourse and the new diversions will be undertaken once the diversion works are finished and within few days. The sequencing of the new re-aligned channel and culverts and subsequent connection of the existing watercourse to this channel shall ensure limited increase in water levels upstream or downstream of the Proposed Development site.
- For works occurring within 50m of the open watercourse, weather forecasts will be monitored prior to and during works to avoid working in adverse weather conditions such as heavy rains.

No excavations for watercourse crossings will take place during a yellow, or higher, issued rain warning by Met Eireann.

- Excavated material will be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses.
- An ECoW will be present for the entire duration of any instream works and monitoring will be conducted in line with the monitoring requirements above.
- Settlement tanks, silt traps / bags and bunds will be used where required to remove silt from surface water runoff. Sizing of the tanks will be based on best available guidelines. Any construction work within a 10m buffer zone of the watercourse edge will be provided with these measures to minimise sediment discharge to a watercourse.
- Where over pumping of water is required, flow will be discharged back to the watercourse at a downstream location to maintain continuity and avoid flooding and water quality impacts.
- Surface water generated on site will be diverted to on-site attenuation facilities. The outfall from these to be in agreement with the OPW.
- All machinery will have been suitably serviced and inspected prior to site delivery. A hydrocarbon/oil boom will be available at working areas for immediate deployment within the watercourse in the event of any hydrocarbon spillage at the Proposed Development site. A fuel spillage will be considered to be any loss of fuel, oil or lubricant, including hydraulic oil and spot leakage.
- Deposition areas for spoil will be enclosed with silt fencing to prevent mobilisation of solids during adverse weather conditions and no drainage from these areas will be directed into the temporary drainage systems. A SuDS will be implemented to allow controls to be designed for the retention of large volumes of water that may arise from spoil deposition areas.
- Silt traps and fencing to be placed in working areas that have the potential to carry silt laden material from the working area to aquatic environments. Silt traps and fences will not be erected within flowing watercourses as these can act as a barrier for movement of species.
- Re-seeding of all areas of bare ground or the placement of jute matting will take place as soon as practicable to prevent run-off.
- All onsite welfare facilities will be installed and managed as per regulations to prevent nutrient overloading of aquatic environments.
- Mitigation measures in relation to soil stripping, earth removal, stockpiling are detailed in Chapter 13 (Land, Soils, Geology and Hydrogeology).

12.6.2 Operational Phase

Operational Phase mitigation measures are described as follows:

Surface water quality and flooding management

- The attenuation basins (included in the design of the Proposed Development) will ensure that the instantaneous surface water runoff rate from the Proposed Development site will not exceed the greenfield runoff rate. Water quality will be managed by controlling the volume and treating the discharge in line with SuDS principles.
- The IE Licence requires the applicant to maintain the storm water drainage system; and conduct daily visual inspections and monitoring for temperature, conductivity, TOC and pH, and any other parameters as required by the EPA. There shall be no emissions to water of environmental significance.

- Any accidental spill that may occur during operation will be responded to in accordance with the requirements of the revised IE Licence under the Emergency Response Procedure; and
- Inspection of security screens at the new culvert inlets for any debris accumulation and prompt removal.

12.6.3 Decommissioning Phase

During the Decommissioning Phase of the Proposed Development, the mitigation and monitoring measures employed to mitigate the potential effects of the Proposed Development on water quantity and quality are likely to be similar to those arising during the Construction Phase, refer to Section 12.6.1.

12.7 Residual Effects

12.7.1 Construction Phase

Following implementation of the mitigation measures outlined in the Section 12.6.1, there will be no likely significant residual effects on water quality or quantity as a result of the construction of the Proposed Development.

12.7.1.1 Residual Effects on Surface Water: Flood risk

The flood risk receptor of any potential properties in the flood plain of the watercourse that crosses the site has low sensitivity (Table 12.1). The potential effect due to an increased risk in in-channel flood levels of up to 50mm is reduced through design and mitigation measures to Imperceptible and Short-term.

12.7.1.2 Residual Effects on Surface Water: Water quality

Residual effects on surface water quality include:

- A temporary, insignificant effect on downstream protected areas
- A temporary, insignificant effect on watercourses and WFD waterbodies through silty water runoff and contamination from hazardous substances
- A temporary, insignificant effect on watercourses and WFD waterbodies through re-exposure of historic contaminants

The WFD waterbody has a low sensitivity. The potential effects on water quality during the Construction Phase are predicted to be Negative, Slight and Short-Term. Through mitigation measures the significance of the effect will be reduced to Imperceptible and Short-Term.

12.7.1.3 Residual Effects on Surface Water: Hydromorphology

The potential effects on hydromorphology relates to the stream realignment through a change in flow regime and change in morphology. The potential effect rating on hydromorphology during the Construction Phase is large but the importance of the watercourse is low. This has the potential to result in a Negative, Slight / Moderate and Long-Term effects. Design measures have aimed to improve the baseline hydromorphological condition of the watercourse from ‘poor’ to ‘moderate’ through improved channel vegetation, substrate condition, bank structure and stability, bank vegetation and floodplain connectivity. Design measures include introduction of open channel flow at two sections, which have improved vegetation and substrate conditions. There is also opportunity for lateral floodplain connectivity through introduction of a floodplain bench to the watercourse design. All culverts will have appropriate design measures to limit biodiversity impacts. Through the design measures and mitigation described herein, the significance of the effect on hydromorphology will be reduced to Imperceptible and Short-Term.

12.7.1.4 Residual Effects on Groundwater

On application of mitigation measures, the identified likely effects during the Construction Phase, as identified in Chapter 13 (Land, Soils, Geology and Hydrogeology), would be Imperceptible and Short-term on all hydrogeological features of concern.

12.7.2 Operational Phase

12.7.2.1 Residual Effects on Surface Water: Flood risk

According to the Planning System and Flood Risk Management Guidelines (2009), the Proposed Development is considered highly vulnerable to flooding (an IE site), which is appropriate in areas at low risk of flooding (Flood Zone C). As the Proposed Development is proposed within Flood Zone A (1 in 100 year flood event), a Justification Test is required.

The Justification Test is adopted by a planning authority when developments vulnerable to flooding are proposed in areas at moderate or high risk of flooding (Flood Zones A and B). Prior to granting permission for the development, the planning authority must be satisfied that the development meets the criteria set out in the Development Management Justification Test in the Planning System and Flood Risk Management Guidelines.

The site is zoned under the South Dublin Development Plan for 'Objective EE': to provide for enterprise and employment related uses. The Proposed Development is a data centre, which is compatible with the zoning of providing enterprise and employment. The Proposed Development will not increase flood risk to other sites and includes measures to mitigate risk of flooding to people, property and the economy. Residual risks are managed to acceptable levels through the mitigation measures outlined in Appendix 12.1. The Proposed Development satisfies the criteria of the Justification Test. More information is included in Appendix 12.1. There will be no likely Significant residual effects on flooding risk as a result of the operation of the Proposed Development, as the modelling undertaken has demonstrated no significant increases in flood levels due to the proposals offsite.

12.7.2.2 Residual Effects on Surface Water: Water Quality

The monitoring conditions of the IE Licence (P1189-01) will continue to be met through daily inspection and continued water quality monitoring at SW-1 and SW-2. The Emergency Response Procedure required by the IE Licence will allow for any accidental spill that may occur during operation to be minimised and acted upon. Given that the Proposed Development site surface water drainage will be managed by controlling and treating the discharge in line with SuDS principles, and regular inspections of the security screens are done for debris accumulation, no Significant residual effects are anticipated during the Operational Phase of the Proposed Development. There will be no likely Significant residual effects on water quality as a result of the operation of the Proposed Development.

12.7.2.3 Residual Effects on Surface Water: Hydromorphology

Based on potential risks, the potential effect rating on hydromorphology during the Operational Phase is large but the importance of the watercourse is low (according to the hydromorphological assessment). This results in potential Negative, Slight / Moderate and Long-Term effects. Through the design measures of improved channel vegetation, substrate condition, bank structure and stability, bank vegetation and floodplain connectivity described herein, the significance of the effect will be reduced to Imperceptible and Short-Term.

12.7.2.4 Residual Effects on Groundwater

No significant operational effects are likely to arise.

12.7.3 Decommissioning Phase

During the Decommissioning Phase of the Proposed Development, the likely residual effects of the Proposed Development on water quantity and quality are likely to be similar to those arising during the Construction Phase, refer to Section 12.7.1.

As outlined in Section 5.7, decommissioning activities will need to be undertaken in accordance with the requirements of the IE licence.

12.8 Summary

As a result of the nature, scale and design of the project and prevention and mitigation measures to be taken, there is not likely to be a significant effect on surface water and groundwater quantity and quality from the Proposed Development. The project will not cause a deterioration in surface water or groundwater quality status or compromise the ability of any surface water or groundwater to meet the objectives of the WFD, that there are not likely to be any significant discharges of pollutants from priority or other polluting substances to groundwater or surface water so that the chemical status of the surface water and groundwater will not deteriorate. Moreover, the ecological status of surface waters is not likely to be significantly affected by any discharge to surface waters or water abstraction and there is not likely to be a significant effect on any protected site.

12.9 References

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