16. Resource and Waste Management

16.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and assesses the likely direct and indirect significant effects on resource and waste management 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 resource and waste effects associated with the Proposed Development have been assessed. This included resource and waste effects associated with construction activities such as site clearance and excavation, general construction and excavation.

During the Operational Phase, the potential resource and waste effects associated with municipal and construction type waste generated from the operation and maintenance of the Proposed Development 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 undertaken throughout the alternatives assessment and design development process have been considered, where appropriate.

Context for waste management in this Chapter is set out at local, regional, and national level, however the effects of the Proposed Development are assessed in line with the regional baseline environment, as included in Section 16.3. Mitigation measures are identified, where necessary, to reduce the effect of the use of resources and generation of waste by the Proposed Development during the Construction, Operational, and Decommissioning Phases. This Chapter was prepared by Janet Lynch and Hannah Lesbirel. Details of Janet and Hannah's relevant qualifications and experience are included in Appendix 1.1.

Other topics and indirect impacts related to resource and waste management, such as Construction Phase traffic effects, water quality effect and mineral resources are considered in the following Chapters:

- Construction Phase traffic effects - Chapter 6 (Traffic and Transport);
- Emissions associated with transportation of waste are considered in Chapter 7 (Air Quality);
- Impacts from embodied carbon of construction materials and emissions associated with treatment of waste are considered in Chapter 8 (Climate);
- Water usage, water quality and pollution risk is considered in Chapter 12 (Water); and
- Mineral resources are considered in Chapter 13 (Land, Soils, Geology and Hydrogeology).

16.2 Assessment Methodology

16.2.1 Proposed Development Study Area

The Proposed Development will form part of the existing GIL Campus which is located in Grange Castle Business Park South, Dublin 22, between the N7 and N4 motorways (Irish Grid Reference: O 03546 30294).

Two study areas are proposed for the assessment of resource and waste management:

- The Proposed Development study area comprising the Proposed Development footprint (the Red Line Boundary, refer to Figure 1.2 in Chapter 1 (Introduction)) which includes the area where waste and materials will be generated and consumed; and
- The wider Proposed Development study area is defined as the region where treatment capacity or resource availability may be affected. In this case the wider study area has been defined as the Eastern and Midlands Waste Region (EMWR) (refer to Figure 16.1).

Waste from the Proposed Development may be accepted at sites nationally and internationally (which have the appropriate waste authorisation for the waste volume and type), for treatment, recycling, recovery and / or disposal. However, as waste management planning in Ireland takes place on a regional basis, the wider Proposed Development study area for waste treatment, recycling, recovery and disposal will comprise the EMWR, which includes the following 12 Local Authority regions (refer to Figure 16.1):

- Dublin City;
- Fingal;
- South Dublin;
- Dún-Laoghaire Rathdown;
- Kildare;
- Laois;
- Longford;
- Louth;
- Meath;
- Offaly;
- Westmeath; and
- Wicklow.

The Proposed Development study area comprises the EMWR. Where data is available at a local authority or regional level this data has been incorporated. National and international data is used where this is the only available level at which statistics and data is published.

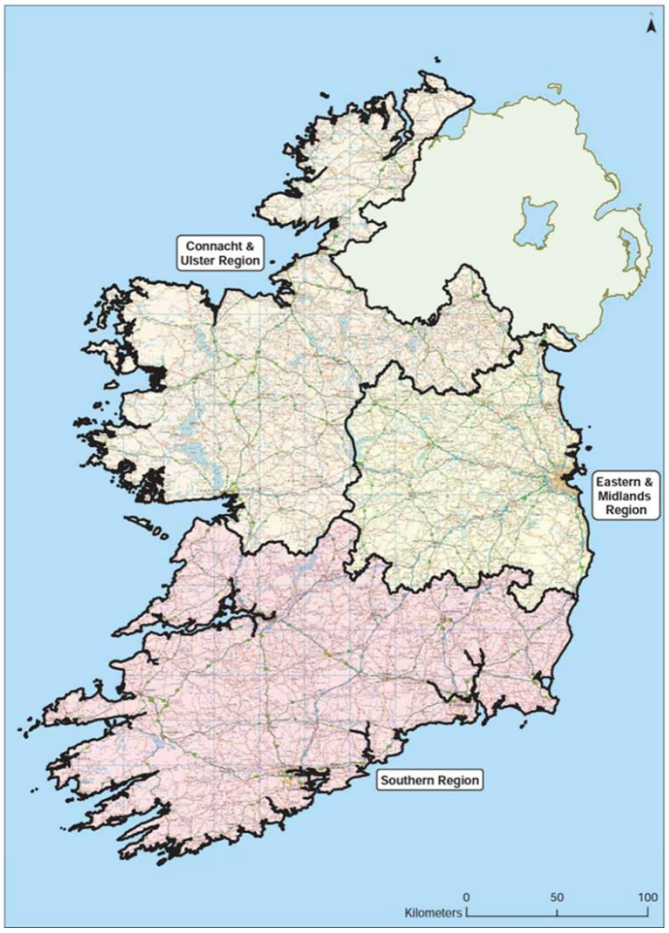

Figure 16.1: Waste regions of Ireland. Source: EMWRA, 2015.

16.2.2 Policy and Guidelines

The following policy and guidelines documents were considered when undertaking the resource and waste management assessment:

- RWMPO (2024). National Waste Management Plan for a Circular Economy 2024-2030 (RWMPO, 2024);
- Department of Communications, Climate Action and Environment (DCCAE) (2020). A Waste Action Plan for a Circular Economy: Ireland's National Waste Policy 2020-2025 (DCCAE, 2020);
- DECC (2024). Climate Action Plan 2024 (DECC, 2024);
- Department of the Environment, Climate and Communications (DECC) (2021). Whole of Government Circular Economy Strategy 2022-2023 (DECC, 2021);
- DECC (2019). Consultation on the Transposition of the Circular Economy Waste Package (DECC, 2019);
- Eastern-Midlands Waste Regional Authority (2015). Eastern-Midlands Region Waste Management Plan 2015-2021 (EMWRA, 2015);
- Environmental Protection Agency (EPA) (2023a). Construction and Demolition Waste Statistics for Ireland (EPA,2023a);
- EPA (2024a). Hazardous Waste Statistics for Ireland (EPA, 2024a);
- EPA (2023c). Municipal Waste Statistics for Ireland (EPA, 2023c);
- EPA (2023d). Biodegradable municipal waste to landfill (EPA, 2023d);

- EPA (2022a). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports ('the EPA Guidelines') (EPA, 2022a);
- EPA (2021a). Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects (EPA, 2021a);
- EPA (2021b). Circular Economy Programme 2021-2027 (EPA, 2021b);
- EPA (2020a). By-Product – Guidance Note. A guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulations, 2011 (EPA,2020a);
- EPA (2020b). Guidance to Planners, Planning Authorities and An Bord Pleanála on the Management of Excess Soil and Stone from Developments (EPA, 2020b);
- EPA (2019). Guidance on Soil and Stone By-products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011 (EPA, 2019);
- EPA (2018). Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-hazardous (EPA, 2018);
- EPA (2015a). Designing out waste: Preparation of Waste Reduction Factsheets for Design Teams (EPA, 2015a);
- European Commission (EC) (2020). Circular Economy Action Plan for a Cleaner and More Competitive Europe (EC, 2020);
- European Commission (2018). EU Construction and Demolition Waste Management Protocol and Guidelines (EC, 2018);
- European Commission (2015). Closing the Loop: An EU Action Plan for the Circular Economy (EC, 2015);
- South Dublin County Development Plan (SDCC) (2022). South Dublin County Development Plan 2022-2028 (SDCC, 2022);
- BRE (2012). SMARTWaste Data and Reporting;
- The Institute of Environmental Management & Assessment (IEMA) (2020). IEMA guide to: Materials and Waste in Environmental Impact Assessment (the 'IEMA' Guidelines);
- Regional Waste Management Planning Offices (RWMPO) (2024). National Waste Management Plan for a Circular Economy 2024-2030; and
- Regional Waste Management Office (RWMO) (2020). Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity.

16.2.3 Legislation

This assessment has been undertaken in accordance inter alia with 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 ('the EIA Directive').

In addition, the following European and National legislation was considered when undertaking the resource and waste management assessment:

- Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (the 'Waste Framework Directive (WFD)');
- Number 26 of 2022 – Circular Economy and Miscellaneous Provisions Act 2022;
- Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste ('the Landfill Directive');
- Number 10 of 1996 – The Waste Management Act 1996, as amended ('the Waste Management Act');

- S.I. No. 821/2007 – Waste Management (Facility Permit and Registration) Regulations 2007, as amended;
- S.I. No. 820/2007 – Waste Management (Collection Permit) Regulations 2007, as amended;
- S.I. No. 419/2007 – Waste Management (Shipments of Waste) Regulations 2007;
- SI 250/2019 – Waste Management (Facility Permit and Registration) (Amendment) Regulations 2019;
- S.I. No. 126/2011 – European Communities (Waste Directive) Regulations 2011, as amended; and
- S.I. No. 323/2020 – European Union (Waste Directive) Regulations 2020 ('the Waste Directive Regulations').

A summary of key legislation, policy and guidelines is included in Appendix 16.1. Additionally, a List of Waste (LoW) codes for typical C&D wastes are included in Appendix 16.2.

16.2.4 Assessments of Effects Methodology

The potential environmental effects of solid waste generation and resource use and management associated with the Proposed Development were assessed with respect to the Construction, Operational and Decommissioning Phases. These effects may be neutral, positive or negative, and are dependent on the measures employed to prevent and / or manage the resources used and waste generated.

16.2.4.1 Assessment Methodology

The likely effects are assessed by describing wastes and by-products generation from the Proposed Development, during the Construction, Operational and Decommissioning Phases, and comparing to the waste and by-product management baseline in the EMWR. The assessment of effects and waste management options have been considered with regard to the waste hierarchy and the WFD. Similarly, for the assessment of resources the estimated consumption from the Proposed Development was compared to the resource availability for the appropriate study area.

The following information was considered when determining the significance of the effects of the Proposed Development on waste and materials treatment capacity and resource availability:

- Desk study of current practices for waste and by-product management in Ireland;
- Data gathered on the types and quantities of waste and by-product generation and management from the Proposed Development at all stages;
- An assessment of the resources required for the Proposed Development against regional and / or national stock levels;
- The surplus material and waste infrastructure capacity in the wider study area; in this case the EMWR;
- Significance criteria and guidance prepared by the Institute for Environmental Management and Assessment (IEMA) (see Section 16.2.5 for further details); and
- A review of the Proposed Development in the context of the waste hierarchy and CE principles to guide mitigation measures, should they be required.

16.2.5 Significance Criteria

The criteria used to categorise waste and resources effects is based on the IEMA guidance (IEMA, 2020). The 'IEMA guide to: Materials and Waste in Environmental Impact Assessment' sets out a standard approach to undertaking waste assessments for EIA. The EPA guidelines are complemented by the more detailed approach set out in the IEMA guidelines.

The IEMA guidance sets out that the receptor for waste relates to availability of regional (and where appropriate, national) landfill void capacity baseline data collected on the availability and capacity of non-landfill waste management infrastructure (in conjunction with any identified trends) may be used to provide a more comprehensive context for assessing the magnitude of effects.

As set out in the baseline (Section 16.3), Ireland's construction and demolition waste is predominately managed through backfilling material[1] (85%), 8% is recycled and only 7% is managed through disposal routes (EPA, 2023). Therefore, in conjunction with identified trends nationally and in the region, it is considered appropriate to use regional authorised waste management infrastructure intake capacity as the receptor. Significance criteria from the IEMA guidelines are used in order establish the resource and waste management significance criteria, as presented in Table 16.1.

Table 16.1: Significance criteria from IEMA guidelines for significance of effects for waste management and resource use.

Assessment of effects topic	No change	Negligible	Minor	Moderate	Major
Waste Management	Zero waste generation and disposal from the Proposed Development	Waste generated by the Proposed Development will reduce regional authorised waste management infrastructure intake capacity by <1%	Waste generated by the Proposed Development will reduce regional authorised waste management infrastructure intake capacity by 1-5%	Waste generated by the Proposed Development will reduce regional authorised waste management infrastructure intake capacity by 6-10%	Waste generated by the Proposed Development will reduce regional authorised waste management infrastructure intake capacity by >10%
Resource Use	No materials required	No individual material type is equal to or greater than 1% by volume of the regional baseline availability	One or more materials is between 1-5% by volume of the regional baseline availability	One or more materials is between 6-10% by volume of the regional* baseline availability;	One or more materials is >10% by volume of the regional* baseline availability;

The approach of the IEMA guidance was supplemented by the EPA guidance in order establish the resource and waste management significance criteria for this assessment of resource and waste management. To align the IEMA criteria with the EPA guidance, the following is assumed:

- No change = Imperceptible;
- Negligible = Not Significant;
- Minor = Slight;
- Moderate = Moderate, and
- Major = Significant; Very Significant, Profound.

An effect which has a rating of as moderate or above is considered significant.

16.2.6 Data Collection and Collation

A desk study was undertaken which comprised the collection and review of the following:

- Relevant legislation and policy which creates the legal framework for resource and waste management in Ireland;
- Estimated surplus materials and by-product generation from the Construction, Operational and Decommissioning Phases of the Proposed Development;

[1] Backfilling means any recovery operation where suitable non-hazardous waste is used for purposes of reclamation in excavated areas or for engineering purposes in landscaping (EPA, 2019)

- Types, quantities and management of Construction and Demolition (C&D), municipal and hazardous waste arisings generated in EMWR and Ireland where necessary; and
- Availability (type and capacity) of waste infrastructure within the EMWR and Ireland where necessary.

16.2.7 Sustainable Resource and Waste Management Principles

Sustainable resource and waste management, as well as circular economy principles have been considered throughout the design process and this assessment of effects. These principles are applied as best practice and are implemented across industry currently and therefore are considered embedded mitigation. Further examples of how these have been applied to the Proposed Development are set out in Section 16.6.

16.2.7.1 Circular Economy (CE)

The principal objective of sustainable resource and waste management is to use material resources more efficiently, where the value of products, material and resources is maintained in the economy for as long as possible such that the generation of waste is minimised. To achieve resource efficiency, there is a need to move from a traditional linear economy to a Circular Economy (CE), as outlined in Figure 16.2.

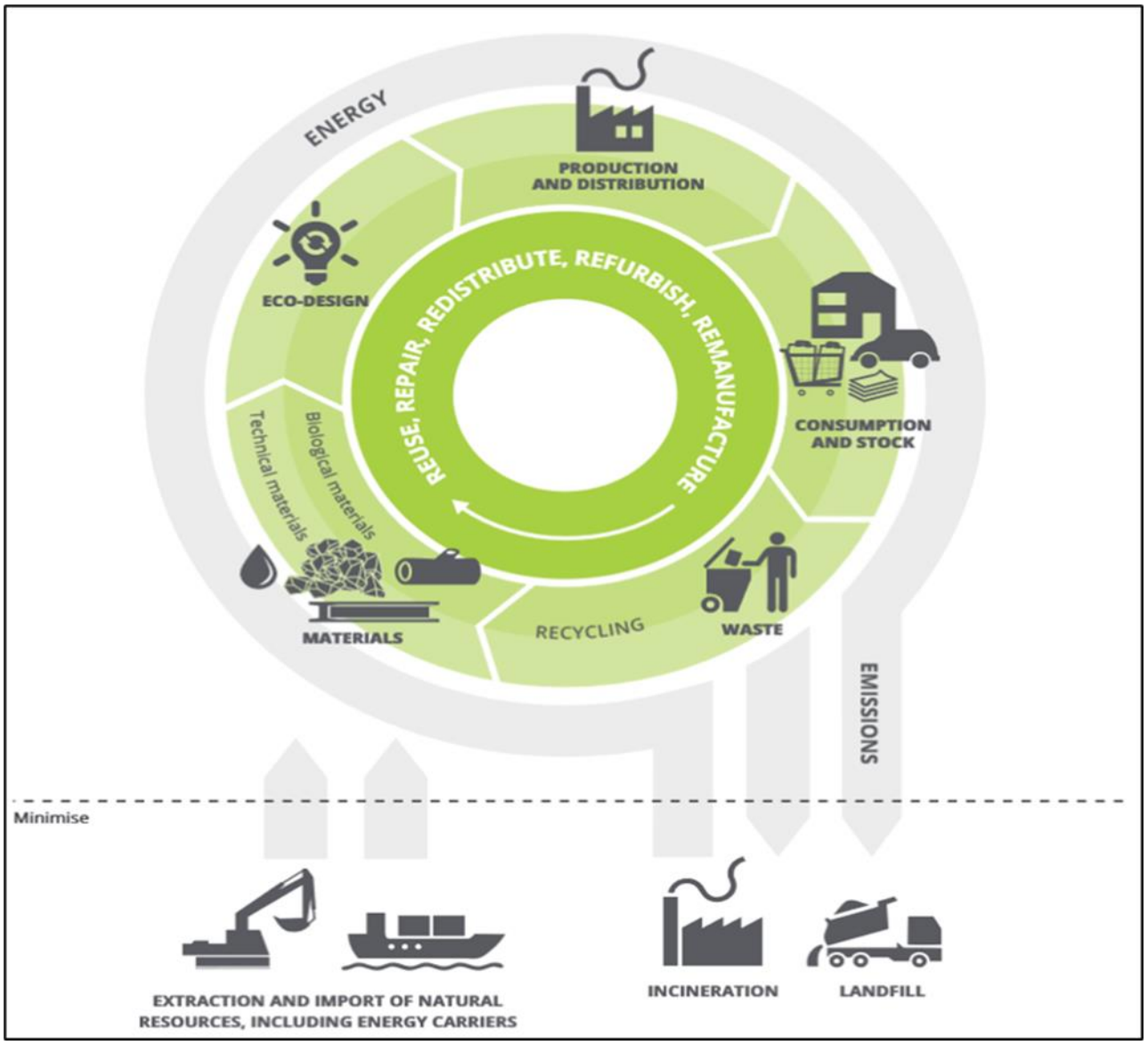

Figure 16.2: Simplified model of the circular economy for materials and energy. Source: EEA, 2016.

The Circular Economy and Miscellaneous Provisions Act 2022 (GoI, 2022) defines the CE as:

"An economic model and the policies and practices which give effect to that model in which:

- *Production and distribution processes in respect of goods, products and materials are designed so as to minimise the consumption of raw materials associated with the production and use of those goods, products and materials,*
- *The delivery of services is designed so as to reduce the consumption of raw materials.*
- *Goods, products and materials are kept in use for as long as possible thereby further reducing the consumption of raw materials and impacts harmful to the environment,*
- *The maximum economic value is extracted from goods, products, and materials by the persons using them, and*
- *Goods, products and materials are recovered and regenerated at the end of their useful life".*

The European Union (EU) Circular Economy Action Plan (European Commission, 2020) notes that: *"…the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance toward keepings its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade."*

The European Commission (2020) has adopted a new Circular Economy Action Plan - one of the main blocks of the European Green Deal, Europe's new agenda for sustainable growth. The Plan identifies construction as a key area where there are opportunities for resource efficiency and circularity.

The Department of the Environment, Climate and Communications (DECC) published the Whole of Government Circular Economy Strategy 2022-2023 in December 2021 (DECC, 2021). The Strategy aims to support and implement measures that significantly reduce Ireland's circularity gap (for example, a measurement of the total amounts of (re)cycled materials as a proportion of the total material inputs into the global economy each year (DECC, 2021), so that Ireland's rate is above the EU average by 2030.

In July 2022, the Oireachtas enacted the Circular Economy and Miscellaneous Provisions Act, 2022 (GoI, 2022). This Act places the Strategy and the commitment to a CE on a clear statutory footing. It underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, which retains the value of resources in our economy for as long as possible and which will significantly reduce our greenhouse gas emissions. The Act is a key step in the successful transition of Ireland's economy to a CE and is evidence of the State's commitment to the achievement of that goal.

The most recent of CE publications is the National Waste Management Plan for a Circular Economy 2024-2030 which was published in February 2024 (RWMPO, 2024). This Plan seeks *"to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation"*. The National Waste Management Plan includes specific targets, policies, and actions to enable the waste and resource sector to meet the circularity challenge in Ireland. The Plan was also prepared to support and supplement the wider circular policy base and accelerate Ireland's transition to a CE. Construction and demolition (C&D) waste targets and measures have been covered in the plan. A main focus in the plan is for materials to be recycled, increasing C&D waste recycle and increasing recycled product use. A specific target is for 70% of all C&D non-hazardous waste by weight to be recycled.

16.2.7.2 The Waste Hierarchy

Where waste is generated, it should be managed in line with the principles of the waste hierarchy (as illustrated in Figure 16.3) and set out in Directive 2008/98/EC on waste and repealing certain Directives and Directive 2018/851 of the European Parliament (European Parliament and of the Council, 2018) and as implemented by the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011), as amended.

The waste hierarchy supports the need to achieve efficient use of material resources, minimise the amount of waste produced (or otherwise increase its value as a resource) and reduce, as far as possible, the amount of waste that is disposed of in landfill.

Figure 16.3: Waste hierarchy as set out in the waste framework directive (WFD). Source: EC, 2024.

The consideration of resources in the context of this assessment includes a review of the potential for beneficial reuse of materials arising from the construction of the Proposed Development (for example, excavated soil and stones).

The following principles of the waste hierarchy (refer to Figure 16.3), in line with the WFD, will be taken cognisance of by the appointed Contractors during the Construction Phase of the Proposed Development:

- Waste prevention and minimisation are the most environmentally sustainable means of managing surplus materials. The principles of prevention and minimisation of waste are inherent in the design of the Proposed Development, including, for example, consideration of the use of sustainable construction materials and the re-use of excavated materials, where possible; and
- Where surplus materials are generated that cannot be reused, these will be regarded as waste and will be delivered to recycling, recovery or disposal facilities authorised in accordance with the Waste Management Act, 1996, as amended, which hold a certificate of registration, waste facility permit and / or EPA licence.

All wastes removed from the Proposed Development site will be transported by the holder of an appropriate waste collection permit, granted in accordance with the S.I. No. 820/2007 – Waste Management (Collection Permit) Regulations 2007, as amended.

The option of disposal is the least desirable outcome for surplus material generated by the Proposed Development and will only be considered where it is not possible to deliver wastes for recycling or recovery to appropriately permitted / licenced facilities for reuse / recycling purposes.

In addition, where waste facility capacity does not exist within Ireland for management of specific waste streams, such as hazardous soils, these will be transported by the holder of an appropriate waste collection permit, granted in accordance with S.I. No. 820/2007 – Waste Management (Collection Permit) Regulations 2007, as amended, and subsequently exported for treatment, recovery or disposal in accordance with the provisions of S.I. No. 419/2007 – Waste Management (Shipments of Waste) Regulations 2007, and in accordance with all other relevant legislation in Ireland.

It will be the responsibility of the appointed Contractors, under the Waste Management Act 1996, as amended, to ensure that all material delivered to authorised waste facilities is correctly classified and will meet the waste acceptance criteria of the receiving site.

It will be the responsibility of the appointed Contractors to secure agreements for reuse, recycling or disposal of surplus materials from the Proposed Development in construction projects or authorised facilities, where appropriate, in accordance with the Waste Management Act 1996, as amended, and associated regulations.

Where feasible, recycled components or materials will be used in the Proposed Development in place of virgin materials. The use of recycled components or materials are subject to the provisions of the Waste Management Act 1996, as amended, and Regulation 28 of the European Union (Waste Directive) Regulations 2011 (as amended).

16.3 Baseline Environment

16.3.1 Construction Waste

In 2021, the latest year for which there are published statistics available, 9 million tonnes of Construction and Demolition (C&D) waste was generated, an increase of 0.8 million tonnes from 2020 (EPA, 2023b). Of this waste, 7.7 million tonnes comprised soil and stones, making up 85% of the material waste stream.

Data issued by the EPA, demonstrates that final treatment operations (backfilling, recycling, energy recovery, disposal) of C&D waste materials in Ireland varies greatly between material streams. 85% of C&D waste in Ireland was used for backfilling (a recovery operation), which mainly reflects the dominance of soil and stones in the overall composition mix.

Under the WFD, Member States must achieve 70% of material recovery of non-hazardous, non-soil-and-stone C&D waste by 2020. A summary of the number of permitted waste facilities for the EMWR, active at the time of preparation of this assessment, is provided in Table 16.2. Many permit holders are authorised to accept more than one waste type. Table 16.2 sets out the number of waste facility permit sites in the EMWR and the capacity of these sites for each waste type. The figures set out the waste facilities accepting the specified waste type only.

Table 16.2: Summary of EMWR waste facility permit data. Source: RWMO, 2022.

Waste Type	Number of Waste Facilities	Capacity of Waste Facilities Permit Sites in the EMWR (tonnes per year)
Soil and Stones	68	1,532,405
Wood	1	5,000
Concrete	5	195,999
Bituminous mixtures	2	74,500
Other Construction Wastes or Combinations of the above	148	3,529,011

Regulation 27 of the European Union (Waste Directive) Regulations 2011, as amended, allows a material producer to determine, under prescribed circumstances, that a material is a by-product and not a waste and so can be reused onsite or offsite within the industry. The number of Regulation 27 notifications made to the EPA between 2017 and 2020 are set out in Table 16.3.

On receipt of Regulation 27 notifications to the EPA, materials can be determined as a waste or a by-product. In some cases, no determination has been issued by the EPA, meaning the material has not been determined as a waste. In 2021, the EPA received by-product notifications for approximately 12.5 million tonnes of soil and stones material (EPA, 2023a). The EPA determined that 459,836 tonnes of the soil and stone notified were by-product, as notified, and 600 tonnes were waste. Notifications for 152,400 tonnes were withdrawn. The estimated quantity of soil and stone material notified in 2021 for which no determination was made was approximately 11.9 million tonnes. Regulation 27 notification data obtained from the EPA, shows that there were 2,504,482 tonnes of material notified in the EMWR in 2020.

Table 16.3: Number of regulation 27 notifications (2017 to 2020).

Waste Type	2017	2018	2019	2020
Soil and stones	92	153	214	172
Bituminous mixtures/ road plannings	10	109	175	186

Waste Type	2017	2018	2019	2020
Concrete/ demolition concrete	9	24	8	5

A summary of waste licence facilities and corresponding capacity for the EMWR, including both C&D waste and municipal waste management facilities, is set out in Table 16.4.

Table 16.4: Summary of EMWR waste licence capacity. Source: EPA, 2022b.

Facility Description	Number of Waste Licensed Facilities (February 2021)	Annual Capacity (Tonnes)
Co-incineration of waste	3	342,875
Composting and anaerobic digestion	10	282,000
Hazardous	12	295,998
Incineration	2	835,000
Integrated waste management facilities	8	1,872,200
Material recovery facilities (MRF)	7	1,450,000
Non-hazardous landfill	3	470,000
Soil recovery facilities	10	3,893,800
Total	55	9,441,873

Hazardous waste types include wastes from contaminated soils, waste treatment, solvents, and hazardous elements of waste electrical and electronic equipment. In 2022, the EPA noted that 57% of hazardous waste was treated abroad and 43% was treated in Ireland (EPA, 2024a).

The Regional Waste Management Offices (RWMO) published a Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity Report in 2020 (RWMO, 2020) which states that:

"*Licenced capacity is most prominent in the EMWR which has a healthy supply of active capacity and substantial new capacity due to come on stream. The Region contains 80% of the national capacity.*"

Table 16.5 sets out the baseline (summary) for construction waste, permitted and licensed, capacity and Regulation 27 notifications for 2020. This data has been used to establish a baseline for 2020. The available C&D waste and by-product capacity in EMWR for 2020 is approximately 11.7 million tonnes based on the following assumptions:

- Using the available capacity for permitted facilities for construction and demolition wastes;
- Including only licensed facilities accepting soil and stones; and
- Including all Regulation 27 notifications dated 2020 in the EMWR.

Table 16.5: C&D waste management baseline for EMWR, 2020 (Permitted, Licensed and Regulation 27 Notifications).

C&D Waste Management Baseline for 2020	Capacity / Annual Intake (Tonnes)
Permitted capacity (Regional Waste Management Office (Offaly County Council 2022)	5,336,915
Licenced annual intake (soil and stone facilities) (EPA, 2022b)	3,893,800
Regulation 27 (by-product) notifications (EPA, 2020)	2,504,482
Total	11,735,197

16.3.2 Municipal Waste

Municipal waste will be generated in small quantities during the Construction, Operational and Decommissioning Phases of the Proposed Development. National data is used as this is the only available level at which statistics and data is published.

Municipal waste in Ireland is made up of household waste as well as commercial and other waste that, because of its nature of composition, is similar to household waste. According to the EPA, Ireland generated 3.17 million tonnes of municipal waste in 2021 (EPA, 2023c).

Of the 3.17 million tonnes of municipal waste generated in Ireland in 2021, 41% was used in energy recovery, 26% was used in material recycling, 16% was landfilled, 15% was used in composting / anaerobic digestion and 1% was unmanaged. Of the 3.17 million tonnes of municipal waste, 57% is estimated to be from households and 43% is estimated to be from commercial and public service sources. Since 2001, significant changes have occurred in the management of municipal waste in Ireland, notably the dramatic decline in landfilling over this period, accompanied by increased levels of recycling in the early 2000s and subsequently an increase in the share of municipal waste sent for energy recovery since 2011.

Packaging is used in Ireland and across the globe to protect products during transport, provide product information, and maintain product freshness. However, as soon as the products are unpacked, the packaging then becomes municipal waste. Packaging usually comes in the form of paper, cardboard or plastic but can also include glass, wood, or metal. In Ireland, the largest component of packaging waste is paper, and cardboard followed by plastic, glass, wood, metal. In 2021, Ireland generated 1.2 million tonnes of packaging waste.

According to the EPA, packaging waste has been on an increasing trend of almost 25% from 2016 (base year). In 2021, there was an increase of 120,000 tonnes in packaging waste generated in comparison to 2020. The recycling of packaging is, however, also increasing at a rate of 8% from 2016 (EPA, 2023e). The Climate Action Plan (CAP) 2024 includes measures for the CE, measures as they relate to the recycling of plastic packaging has been listed as follows:

- recycle 70% of packaging waste by 2030; and
- recycle 55% of plastic packaging waste by 2030 (DECC, 2024).

As part of the 2nd European Union (EU) Circular Economy Action Plan (CEAP), the WFD was amended in 2018 by Directive (EU) 2018/851 and transposed into Irish legislation under S.I. No. 323 of 2020 European Union (Waste Directive) Regulations, 2020. The amendments require Member States to improve waste management systems, efficiency of resource use and to ensure waste is valued as a resource. Key points as they relate to municipal waste include, new municipal waste recycling targets being set and by 2025, at least 55% of municipal waste by weight will have to be recycled. This target is then set to rise to 60% by 2030 and 65% by 2035 (RWMPO, 2024).

Biodegradable municipal waste (BMW) comprises those elements of the municipal waste stream that will degrade biologically, for example food waste, garden and parks waste, wastepaper and cardboard. Under the Landfill Directive, Ireland is committed to meeting targets for the diversion of BMW from disposal to landfill. The quantity of BMW disposed to landfill in 2022 was 129,572 tonnes (EPA, 2023d).

A summary of waste licence facilities and corresponding capacity for the EMWR are provided in Table 16.4. Capacity from composting and anaerobic digestion, municipal waste landfill, Material Recovery Facilities (MRFs), integrated waste management facilities, municipal waste incinerators and cement kilns accepting wastes for co-incineration can all be used to treat municipal waste, which was calculated to be 5,548,073 tonnes per year.

16.3.3 Resource Use

Resources availability will be used as the baseline to assess the effect of resource use from the Proposed Development. National data is used as this is the only available level at which statistics and data is published.

A report entitled Essential Aggregates: Providing for Ireland's Needs to 2040 (Irish Concrete Federation, 2019) was published in 2019 which details and quantifies Ireland's natural aggregate reserves.

At the time of publication of that report, Ireland had approximately 500 active large commercial quarries, approximately 220 ready mixed concrete plants, 20 large scale precast concrete plants and 40 plants producing bitumen bound road surfacing materials.

The Irish Concrete Federation quantifies the annual production of these materials in Ireland on their website (Irish Concrete Federation, 2024), with the 2022 figures (the most recent available). A summary the annual production of these materials has been included in Table 16.6.

Table 16.6: Irish Concrete Federation annual production of materials in Ireland. Source: Irish Concrete Federation, 2024.

Material Type	Annual Production
Ready-mixed concrete	5,000,000 cubic metres (m^3)
Concrete blocks	135,000,000 (number of blocks)
Aggregates	38,000,000 tonnes
Bituminous road surfacing materials	2,000,000 tonnes
Paving products	2,000,000 square metres (m^2)

It is acknowledged that additional resources, (for example, steel, plastic, glass, aluminium and gypsum) will be required during the Construction Phase and maintenance during the Operational Phase of the Proposed Development. However, national data / statistics is not presently available on the annual production of these materials in Ireland.

16.4 Characteristics of the Proposed Development

This Section outlines the characteristics of the Proposed Development that are relevant to the identification and assessment of effects from resource and waste management during each Phase of the project.

Further details relating to the Proposed Development is provided in the Chapter 4 (Description of the Proposed Development) and Chapter 5 (Construction).

It is estimated that within the scheme design, approximately 190,000 tonnes of fill material will be reused onsite from the excavated quantities, reducing the need for transportation of excavation material offsite and transportation of fill material onsite for the Proposed Development.

Surplus materials are likely to be generated during the following activities:

- Excavation - excavation of below-ground material such as soil and stones and the removal of the existing local high points on site resulting from topsoil or subsoil mounds from previous construction activities;
- Construction - materials generated from and in relation to the construction of new buildings / infrastructure, small quantities of municipal waste will be generated by construction workers and small quantities of green waste will be generated from site clearance works of the Proposed Development;
- Operation - municipal waste generated from the operation of the Proposed Development and maintenance activities; and
- Decommissioning - waste will also be generated at the end of the Proposed Development's lifespan during any decommissioning works. Wastes will be generated in particular from the decommissioning of the Data Centre building and ancillary infrastructure, such as the office block, loading dock, mechanical yards, the electrical yard, elevated ductworks conveyor system.

Resources consumption will take place predominantly within the Construction Phase, however small quantities will be consumed during maintenance activities during operation. Limited material resources are likely to be used during Decommissioning Phase.

16.5 Potential Effects

This Section presents the likely significant 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 should this be required (refer to Section 16.6). Residual effects taking into account any proposed mitigation is then presented in Section 16.7.

16.5.1 Do-Nothing Effect

In the scenario where the Proposed Development does not proceed, the resource and waste management effects described in this Chapter would not arise. The resource and waste effect would be Neutral.

16.5.2 Construction Phase – Waste

This Section presents the likely significant effects that may occur due to the Proposed Development, in the absence of mitigation in relation to waste generated from the Construction Phase.

16.5.2.1 Introduction

Aspects considered in the assessment of waste management from infrastructure during the Construction Phase included the following:

- Demolition - there is no demolition proposed and therefore no waste will be generated during the Demolition Phase;
- Excavation - excavation of below-ground material such as soil and rock and the removal of the existing local high points on site resulting from topsoil or subsoil mounds from previous construction activities;
- Construction - materials generated from and in relation to the construction of the new data centre, office block, mechanical yard and electrical yard.

16.5.2.2 Excavation Waste

The most environmentally sustainable means of managing excavated material is its prevention and minimisation which are embedded in the design of the Proposed Development. Excavated material generated as part of the construction works for the Proposed Development will generally consist of:

- Topsoil and subsoil;
- Dublin Boulder Clay; and
- Rock.

A summary of the excavated materials requiring offsite treatment or disposal associated with the construction of the Proposed Development is provided in Table 16.7. The table only contains the quantities of excavated material which will be taken offsite for disposal. Unbulked earthworks volumes for the permanent works have been calculated by developing subformation and formation build up requirements for the individual proposals on the site. The subformation and formation elevations have been compared against proposed finished floor and ground level to determine net import and export requirements. For the purposes of assessing quantities being sent offsite for disposal or treatment, densities for earthwork materials have been defined based on available ground investigation information, supported by literature where necessary. In total, it is estimated that approximately 532,860 tonnes of material will be excavated to facilitate construction of the Proposed Development which will be exported from the Proposed Development site for offsite treatment and/or management. All earthwork quantities are for permanent works with an assumed allowance for temporary works. The quantities presented in Table 16.7 are rounded to the nearest 10.

Table 16.7: Excavation materials and quantities requiring offsite treatment or disposal.

Material	Total Quantity (tonnes)
Topsoil and Subsoil	214,700
Dublin boulder clay	184,300

Material	Total Quantity (tonnes)
Rock	133,860

In line with current practice in Ireland, surplus materials and wastes from the excavation works will be managed as follows:

- Where reasonably practicable, naturally occurring (uncontaminated soils) excavated material will be reused within construction in the Proposed Development in accordance with Article 3 of the Waste Management Act 1996, as amended;
- Excavation material will be used as engineering material within the Proposed Development and on other projects requiring the types of materials generated to the maximum possible extent, through Regulation 27. Reuse of topsoil and excavated material within the Proposed Development is proposed, where practicable. The material will also be subject to testing to ensure it is suitable for its proposed end use;
- Should material require recycling prior to reuse in accordance with the law, it will be delivered to facilities which are authorised under the Waste Management Act 1996, as amended (i.e., which hold a certificate of registration, waste facility permit and / or EPA waste licence as appropriate). Examples of recycling / recovery activities for excavation material include:
  - Processing of stone to produce construction aggregate;
  - Backfilling of quarries; and
  - Raising land for site improvement or development.
- Any hazardous waste arising will be managed by the appointed Contractors in accordance with the applicable legislation;
- Screening of material may be undertaken for the Proposed Development, which will be a decision for the appointed Contractors; and
- In accordance with the law, all wastes removed from site will be transported by the holder of the appropriate waste collection permit, granted in accordance with S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007.

Material that is not contaminated will be reused as general fill material in the construction works under the provisions of Regulation 27 of the European Union (Waste Directive) Regulations 2011 (as amended). Where material is proposed to be reused on site, it will be stored prior to its reuse. Material that meets the necessary acceptance criteria but is not required on site will be delivered to an authorised soil recovery facility.

Material that requires recycling will be sent to authorised waste facilities and will be used in accordance with Regulation 28 of the European Union (Waste Directive) Regulations 2011 (as amended). Regulation 28 sets the criteria which must be complied with, and which the EPA must use to determine if a waste reaches ‘end of waste’ status and becomes a material.

All material from the excavation works will need to be tested by the appointed Contractors for quality and contamination. During excavation works, there is the potential for encountering contaminated material. However, WAC analysis conducted during the completed GI (2019) has revealed both the made ground and till are suitable for disposal at a Non-Hazardous landfill. 57% (4 out of 7) of made ground samples were recorded as suitable for disposal at waste inert facilities. As for the till, 34% (2 out of 6) of samples were recorded as suitable for inert disposal. See Chapter 13 (Land, Soils, Geology and Hydrogeology) for further information.

Where excavated material containing hazardous substances is discovered as part of the Proposed Development, this will be delivered to a facility authorised to accept hazardous wastes. It may also be exported from Ireland for treatment, recovery or disposal. Export of hazardous waste from the Proposed Development outside of the State is subject to a Europe-wide control system founded on Regulation (EC) No. 1013/2006 of the European Parliament and of the Council of 14 June 2006 on Shipments of Waste (‘the Transfrontier Shipment Regulations’).

This legislation is supplemented by the Waste Management (Shipments of Waste) Regulations 2007, as amended (S.I. No. 419 of 2007), which makes Dublin City Council responsible for the enforcement of this regulatory system throughout Ireland. Export of hazardous waste from site outside the state will comply with the procedures set out in this legislation.

Considering the estimated quantity of excavated material to be exported from the site during the excavation phase, the significance criteria presented in Table 16.1 and the available treatment capacity for the C&D waste generated (refer to Section 16.3.1), the potential effects of the excavation works, in the absence of mitigation, is Negative, Minor and Short-Term, which is Not Significant in EIA terms.

16.5.2.3 Construction Waste

Construction works, site offices and temporary works facilities are also likely to generate construction waste.

General construction waste can vary significantly from site to site but typically would include the following non-hazardous fractions:

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Asphalt / tar;
- Metals; and
- Liquid wastes (wheel-wash run-off, sanitary waste from portable toilets).

The hazardous waste streams which could arise from construction activities will include the following:

- Bituminous material;
- Waste electrical and electronic components;
- Cable materials;
- Batteries;
- Asbestos;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

In the case of the Proposed Development, the most likely type of general construction waste arising from the construction of the onshore infrastructure will be bituminous material from road excavation, surplus concrete and unusable or damaged ducting segments which will arise on the Proposed Development site. Quantities of these materials are set out in Table 16.8. Quantities have been estimated using BRE Smart Waste benchmarks for construction waste and quantities (BRE, 2022).

Table 16.8: Construction waste materials and quantities.

Waste Type	Quantity (tonnes)
Bricks	43
Tiles and Ceramics	1
Concrete	426
Inert	339
Insulation materials	3
Mixed metals	54
Packaging Materials	25

Waste Type	Quantity (tonnes)
Plasterboard / Gypsum	21
Binders	3
Plastic (excluding packaging waste)	15
Timber	142
Canteen/Office/Adhoc waste	-
Liquids	-
Oils (fuel oil and diesel)	-
Bituminous mixtures	1
Other construction and demolition wastes containing hazardous substances	42
Other waste	3
Mixed construction and/or demolition waste	2
Total	72

Liquid wastes (such as sanitary waste or oils / lubricants) will be contained and dispatched off-site for disposal at appropriately licensed or permitted facilities.

There will also be potential effects associated with the removal of waste material off site through the requirement for the use of heavy goods vehicles. Effects on other environmental aspects are addressed in Chapter 6 (Traffic and Transport), Chapter 9 (Noise and Vibration), Chapter 7 (Air Quality) and Chapter 8 (Climate).

Considering the minor quantities of construction waste set out in Table 16.8, that will be generated during the Construction Phase, the significance criteria presented in Table 16.1, and the available treatment capacity for the C&D waste generated (refer to Section 16.3.1), the potential effect of construction waste, in the absence of mitigation is Negative, Negligible and Short-Term, which is Not Significant in EIA terms.

16.5.2.4 Municipal Waste

Minor quantities of municipal waste will be generated by construction workers during the Construction Phase (e.g., from site offices and welfare facilities). Segregation facilities will be provided at all working areas, if necessary, to ensure that recovery and recycling of such wastes is maximised.

Considering the minor quantities of municipal waste that will be generated during the Construction Phase, the significance criteria presented in Table 16.1, and the available treatment capacity for municipal waste, the potential effect of municipal waste, in the absence of mitigation, is Negative, Negligible and Short-Term, which is Not Significant in EIA terms.

16.5.2.5 Summary of Potential Construction Phase Effects (Waste)

A summary of the potential (pre-mitigation) effects during the Construction Phase is set out in Table 16.9. The Construction Phase of the Proposed Development is expected to generate 491,891 tonnes of waste.

Table 16.9: Summary of potential Construction Phase effects, in the absence of mitigation.

Assessment Topic	Potential Effect
Demolition waste	No change
Excavation waste	Negative, Minor and Short-Term
Construction waste	Negative, Negligible and Short-Term
Municipal waste	Negative, Negligible and Short-Term

16.5.3 Construction Phase – Resource Use

This Section presents the likely significant effects that may occur due to the Proposed Development, in the absence of mitigation in relation to resource use from the Construction Phase. It is considered that resources will be required for the Construction Phase of the Proposed Development.

16.5.3.1 Introduction

Aspects considered in the assessment of resource use from materials during the Construction Phase include the following:

- Aluminium;
- Ceramics;
- Fibreglass;
- Glass;
- Gypsum;
- Inert;
- Plastic;
- Ready-mixed concrete;
- Steel;
- Stone wool; and
- Timber.

16.5.3.2 Construction Phase Resource Use

The construction of the Proposed Development will require the importation of several key construction materials. This material will include items such as concrete, crushed stone, road paving materials, steel and power cables.

The estimated quantity of construction materials required are presented in Table 16.10.

Table 16.10: Summary of material and material quantities.

Material	Estimated Quantity	Unit
Aluminium	55	m^2
Ceramics	1	m^3
Fibreglass	5,643	m^3
Glass	7,684	m^2
Gypsum	4,251	m^2
Inert	434	kg
Plastic	37,196	m^2
Ready-mixed concrete	39,284	m^3
Steel	25,848,672	kg
Stone wool	19,720	m^2
Timber	9,986	m^2

The quantities of materials listed in Table 16.10 represent a very small proportion of the Irish quantities manufactured per year. As an example, the estimated quantity of concrete required for the construction of the Proposed Development represents less than one percent of the total quantity produced in Ireland per annum (refer to Section 16.3.3).

Importation of material to the Proposed Development site will occur throughout the Construction Phase, with different materials being required at different times. The main direct potential effects associated with the importation of construction materials arise from the gathering / manufacture of the materials, and that once the materials are used within the Proposed Development, they are no longer available for other uses. There will also be potential effects associated with the importation of materials through the requirement for the use of heavy goods vehicles for delivery of the material and the use of materials. Potential effects on other environmental aspects are addressed in Chapter 6 (Traffic and Transport), Chapter 9 (Noise and Vibration), Chapter 7 (Air Quality) and Chapter 8 (Climate).

The majority of construction materials will be locally and nationally sourced, with a ready supply available. As the materials required for the Construction Phase of the Proposed Development are generally readily available and the quantities of the materials required constitute a small proportion of the quantities produced per annum in Ireland, the potential effect associated with resource use, in the absence of mitigation, is Negative, Negligible and Long-Term, which is Not Significant in EIA terms.

16.5.3.3 Summary of Potential Construction Phase Effects (Resource Use)

A summary of the predicted (pre-mitigation) effects during the Construction Phase is set out in Table 16.11. The Construction Phase of the Proposed Development is expected to use less than one percent of the available resource in Ireland and is therefore considered to be Not Significant.

Table 16.11: Summary of potential Construction Phase effects, in the absence of mitigation.

Assessment Topic	Potential Effect
Construction resources	Negative, Negligible and Long-Term

16.5.4 Operational Phase – Waste

This Section presents the likely effects that may occur due to the Proposed Development, in the absence of mitigation in relation to waste generated from the Operational Phase.

16.5.4.1 Municipal Waste

Municipal waste is the waste type that will be most relevant to the Operational Phase of the Proposed Development. Municipal waste includes the following waste types:

- Residual (‘black bin’) waste;
- Dry mixed waste;
- Organic (‘brown bin’) waste, for example, food and garden waste;
- Paper;
- Glass;
- Waste from electrical and electronic equipment (WEEE);
- Commercial and industrial waste; and
- Oil.

During the Operational Phase, municipal waste will be generated from the following uses within the Proposed Development:

- Data centre; and
- Office.

Minor quantities of municipal waste will be generated by employees, Contractors and visitors during the Operational Phase, quantities are set out in Table 16.12. The main municipal waste produced on-site will be WEEE, accounting for almost half of overall municipal waste. The quantities were calculated using benchmarks for similar data centre developments.

Table 16.12: Summary of operational waste types and quantities.

Waste Type	Waste Generated (tonnes)
General	13.4
Dry Mixed	5.0
Food	5.8
Paper	1.2
Batteries	6.9
WEEE	35.3
Commercial and Industrial	3.8
Oil	3.1
Total	74.5

Considering the minor quantities of municipal waste that will be generated during the Operational Phase and the significance criteria presented in Table 16.1, and the available treatment capacity for municipal waste, the potential effect of municipal waste, in the absence of mitigation, is Negative, Negligible and Short-Term, which is Not Significant in EIA terms.

16.5.4.2 Construction Waste during Maintenance

Minor maintenance activities to buildings and infrastructure are likely to occur during the Operational Phase. However, these activities will be infrequent and will generate only minor quantities of waste. Therefore, the predicted effect of operational construction waste is Negative, Negligible and Short-Term which is Not Significant in EIA terms.

16.5.4.3 Summary of Potential Operational Phase Effects (Waste)

A summary of the potential (pre-mitigation) effects likely during the Operational Phase is set out in Table 16.13.

Table 16.13: Summary of potential Operational Phase effects in the absence of mitigation.

Assessment Topic	Potential Effect
Municipal waste	Negative, Negligible and Short-Term
Construction waste during maintenance	Negative, Negligible and Short-Term

16.5.5 Operational Phase - Resource Use

This Section presents the likely significant effects that may occur due to the Proposed Development, in the absence of mitigation in relation to resource use during the Operational Phase.

Minor quantities of resources (e.g., glass, plastic, timber) will be required for operational and maintenance activities during the Operational Phase. Most materials will be required due to the replacement of components. The majority of the materials required will be locally and nationally sourced, with a ready supply available.

As the materials required for the Operational Phase are generally readily available and the quantities of the materials required will constitute a small proportion of the quantities produced per annum in Ireland, the potential effects associated with resource use, in the absence of mitigation, is Negative, Negligible and Long-Term, which is Not Significant in EIA terms.

16.5.5.1 Summary of Potential Operational Phase Effects (Resource Use)

A summary of the potential (pre-mitigation) effects during the Operational Phase is set out in Table 16.14. The Operational Phase of the Proposed Development is Not Significant.

Table 16.14: Summary of potential Operational Phase effects, in the absence of mitigation.

Assessment Topic	Potential Effect
Operational resources	Negative, Negligible and Long-Term

16.5.6 Decommissioning Phase – Waste

This Section presents the likely effects that may occur due to the Proposed Development, in relation to waste generated from the Decommissioning Phase.

The materials and waste likely to be generated during decommissioning predominantly include typical construction materials, such as metals, plastics, concrete, masonry and other inert materials. It is not possible to quantify this waste at this point given the expected 50 year lifespan of the Proposed Development. However, the majority of waste materials expected to be generated currently have high recycling and recovery rates. A pre-demolition audit will be carried out for the development, prior to decommissioning and waste and by products will be managed in accordance with the Waste Management Act. Therefore, the effect on waste from decommissioning has been determined to be Negative, Negligible and Short-Term, which is Not Significant in EIA terms.

16.5.6.1 Summary of Potential Decomissioning Phase Effects (Waste)

A summary of the potential (pre-mitigation) effects during the Decommissioning Phase is set out in Table 16.15. The Decommissioning Phase of the Proposed Development is Not Significant.

Table 16.15: Summary of predicted Decommissioning Phase effects, in the absence of mitigation.

Assessment Topic	Potential Effect
Construction waste from decommissioning	Negative, Negligible and Short-Term,

16.6 Mitigation and Monitoring Measures

No Significant Negative effects are anticipated during either the Construction Phase, the Operational Phase or the Decommissioning Phase of the Proposed Development. Nonetheless, a suite of mitigation and monitoring measures is outlined below. These measures will ensure that the sustainable resource and waste management principles outlined in Section 16.2.7, including CE principles related to the use of resources and adherence to the waste hierarchy, are implemented.

16.6.1 Construction Phase

A CDRWMP is included in the CEMP (Chapter 5 (Construction), Appendix 5.1). These plans meet the requirements outlined in the Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects (EPA, 2021). The Project Supervisor Construction Stage (PSCS) and the appointed Contractors will be obliged to further develop, implement and maintain the waste management plan and CDRWMP during the Construction Phase.

The key principles underlying the waste management plan and the CDRWMP will be to minimise waste generation and to segregate waste at source. The measures to achieve these which are relevant to the Proposed Development include:

- Where waste generation cannot be avoided, waste disposal will be minimised;
- Where possible, recyclable material will be segregated and removed off site to a permitted / licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation by clearly labelling waste types;
- All staff on-site will be trained on how to minimise waste (i.e., training, induction, inspections and meetings);
- Materials on-site will be correctly and securely stored;

- Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility;
- Excavated material not required for the construction of the Proposed Development, will be screened by the appointed Contractors for suitable end uses;
- The appointed Contractors will record the quantity in tonnes and types of waste and materials leaving the site during the Construction Phase. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered, which is recycled and which is disposed of;
- Any hazardous waste arising will be managed by the appointed Contractors in accordance with the applicable legislation;
- Waste generated from on-site offices will be source separated at least into residual waste, dry mixed recyclables and organic waste; and
- The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., certificate of registration, waste facility permit and / or EPA waste licence).

16.6.1.1 Best Practice Waste Management

Table 16.16 sets out a list of best practice waste management measures which will be implemented as industry standard best practice by the PSCS and the appointed Contractors, where practicable during the scheme construction in accordance with the waste hierarchy.

Table 16.16: List of waste management best practice actions (Construction Phase).

Stage in Hierarchy	Action
General	Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility.
General	The appointed Contractors will ensure that any off-site interim storage facilities for excavated material have the appropriate waste licences or waste facility permits in place.
Prevention	Paints, sealants and hazardous chemicals will be stored in secure, bunded locations.
Prevention	Take back schemes should be opted into where feasible for surplus products to be returned to suppliers.
Prevention	Maximising size of berms, stabilising and grading material for reuse.
Prevention	The site will be maintained to prevent litter and regular litter picking will take place throughout the site.
Prevention	'Just-in-time' delivery will be used as where practicable to minimise material wastage (Building Research Establishment (BRE) 2012; EPA 2015a)
Prevention	All hazardous waste will be separately stored in appropriate lockable containers prior to removal from site by an appropriate waste collection holder.
Prevention	All staff on-site will be trained on how to minimise waste (for example, training, induction, inspections and meetings).
Prevention	Materials on-site will be correctly and securely stored (BRE 2012).
Prevention / Recycling	Segregated skips will be used on-site if space permits (particularly for hazardous, gypsum, metal, timber, inert waste and general waste) (BRE 2012).
Recycling	Where possible, metal, timber, glass and other recyclable material will be segregated and removed off site to a permitted / licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation.

Stage in Hierarchy	Action
Recycling	On-site office and food waste arising will be source separated at least into dry mixed recyclables, biodegradable and residual wastes.
Recycling	Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain, including photographs as appropriate.

16.6.1.2 Measures to support a CE

Measures to support a CE have been included in Table 16.17 with reference to CE Objectives in the South Dublin County Development Plan 2022-2028. EDE7 Objective 2 of this Plan details *"measures to support the just transition to a circular economy*".

Table 16.17: Design strategies to support the CE

Design Strategy	Description
Building in layers	Ensuring different parts of the building are accessible, can be maintained and can be replaced as necessary.
Designing out waste	Ensuring waste reduction is accounted for from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials
Component or material reuse	Using a product in its original form with minimal reprocessing.
Designing for adaptability	Accommodating future structural changes and conditions, to prolong lifespan.
Flexibility	Accommodating changes in building use and occupant requirements.
Replaceability	Facilitate easy removal and upgrade.
Designing for disassembly	Designing to enable easy assembly or deconstruction of the building/layers with minimal damage to facilitate reuse or recycling.
Design for longevity	Avoiding a premature end of life for all components, considering durability and maintenance.
Use of systems, elements or materials that can be reused and recycled	Use of a product in its original form with minimal reprocessing. Preparation for reuse involves checking, cleaning, or repairing materials so that they can be used again for their original purpose. Materials can be reused as a whole; redeployed as modules; or reused as a kit of parts on one or more different sites.

The Proposed Development aspires to incorporate CE principles into the whole life cycle of the development. The design principles align with the Climate Neutral Data Centre Pact (refer to Appendix 1.2).

The Proposed Development will be built and operated in accordance with European Union, National and Regional waste policy.

16.6.2 Operational Phase

Resources and waste will be managed in accordance with the Circular Economy targets set in Google Inc. Environmental Report which includes achieving Zero Waste to Landfill for all global data centre operations (refer to 2023 Environmental Report - Google Sustainability). GIL aims to focus on designing out waste from the start, keeping materials in use for as long as possible, and promoting healthy materials.

Materials will be reused and recycled throughout the Proposed Development site and resources required will be locally and nationally sourced, to the maximum extent possible, thereby minimising potential effects. The sustainable resource and waste management principles detailed in Section 16.2.7 will be implemented to ensure that circular economy principles are met and that the waste hierarchy is adhered to.

No additional mitigation or monitoring measures are considered necessary.

16.6.3 Decommissioning

The mitigation and monitoring measures outlined herein for the Construction Phase, will be applied as appropriate, during the Decommissioning Phase.

In advance of the Decommissioning Phase, a Rehabilitation Schedule will be prepared. The Rehabilitation Schedule will cover the same topics and will be based on the same general principles as those included in the Construction Phase CDRWMP included in the CEMP (Chapter 5 (Construction), Appendix 5.1).

16.7 Residual Effects

16.7.1 Construction Phase

The Construction Phase of the Proposed Development is not predicted to give rise to any Significant residual effects with the adoption of sustainable resource and waste management principles. Nonetheless, appropriate mitigation measures have been identified to further ensure that the sustainable resource and waste management principles outlined in Section 16.2.7, including circular economy principles related to the use of resources and adherence to the waste hierarchy, are implemented.

A summary of the predicted (post-mitigation) effects during the Construction Phase is set out in Table 16.18. The Construction Phase effects of the Proposed Development are considered to be Not Significant.

Table 16.18: Summary of predicted residual Construction Phase effects.

Assessment Topic	Potential Effect (Pre-Mitigation and Monitoring)	Residual Effect (Post-Mitigation)
Demolition waste	No change	No change
Excavation waste	Negative, Minor and Short-Term	Negative, Minor and Short-Term
Construction waste	Negative, Minor and Short-Term	Negative, Minor and Short-Term
Municipal waste	Negative, Negligible and Short-Term	Negative, Negligible and Short-Term
Construction resource use	Negative, Negligible and Long-Term	Negative, Negligible and Long-Term

16.7.2 Operational Phase

The Operational Phase of the Proposed Development is not predicted to give rise to any Significant residual effects with the adoption of sustainable resource and waste management principles. Nonetheless, appropriate mitigation measures have been identified to further ensure that the sustainable resource and waste management principles outlined in Section 16.2.7, including CE principles related to the use of resources and adherence to the waste hierarchy, are implemented.

A summary of the predicted (post-mitigation) effects during the Operational Phase is set out Table 16.19.

Table 16.19: Summary of predicted residual Operational Phase effects.

Assessment Topic	Potential Effect (Pre-Mitigation and Monitoring)	Residual Effect (Post-Mitigation)
Construction waste	Negative, Negligible and Short-Term	Negative, Negligible and Short-Term
Municipal waste	Negative, Negligible and Short-Term	Negative, Negligible and Short-Term
Operational resource use	Negative, Negligible and Long-Term	Negative, Negligible and Long-Term

16.7.3 Decommissioning

The Decommissioning Phase of the Proposed Development is not predicted to give rise to any Significant residual effects with the adoption of sustainable resource and waste management principles. Nonetheless, appropriate mitigation measures have been identified to further ensure that the sustainable resource and waste management principles outlined in Section 16.2.7, including CE principles related to the use of resources and adherence to the waste hierarchy, are implemented.

A summary of the predicted residual effects during the Decommissioning Phase, following the implementation of the appropriate mitigation measures, is set out in Table 16.20.

Table 16.20: Summary of predicted residual Decommissioning Phase effects.

Assessment Topic	Potential Effect (Pre-Mitigation and Monitoring)	Residual Effect (Post-Mitigation)
Decommissioning waste	Negative, Negligible and Short-Term	Negative, Negligible and Short-Term

16.8 References

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17. Material Assets

17.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and assesses the likely direct and indirect significant effects on material assets during 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 and Decommissioning Phases, the potential effects on material assets associated with the Proposed Development have been assessed. This includes construction activities such as foul and stormwater drainage for the temporary construction facilities and works, and power for site lighting and on-site accommodation.

During the Operational Phase, the potential effects on material assets associated with increased power, water and telecommunication requirements 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. In addition, feedback received from consultation undertaken throughout the alternatives assessment and design development process have been considered.

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.

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

17.2 Assessment Methodology

The Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022) (hereafter referred to as the 'EPA EIAR Guidelines') discuss material assets as follows:

"In Directive 2011/92/EU this factor included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils."

The EPA EIAR Guidelines specifically list built services, roads and traffic, and waste management as topics which fall into the category of material assets. Furthermore, the Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017) references buildings, other structures, mineral resources, and water resources as material assets.

The purpose of this assessment is therefore to consider the likely significant effects of the Proposed Development on the surrounding existing built services, including electricity, telecommunications, water supply, foul and stormwater drainage.

References to other chapters of this EIAR have been made throughout this Chapter where the material asset has been dealt with. Those chapters include:

- Chapter 6 (Traffic and Transport)
- Chapter 12 (Water)
- Chapter 14 (Archaeology, Architectural and Cultural Heritage); and

- Chapter 16 (Resource and Waste Management).

17.2.1 Proposed Development Study Area

The Proposed Development study area with regard to material assets comprises all areas within the Proposed Development boundary, refer to Figure 1.2 in Chapter 1 (Introduction). The assessment also considers the potential effects on utility supply outside of the Proposed Development site boundary.

17.2.2 Relevant Guidelines, Policy, and Legislation

This Chapter has been prepared in accordance with the following guidance:

- Guidelines on the Information to be Contained in Environmental Impacts Assessment Reports (EPA, 2022); and
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017).

17.2.3 Summary of Data Sources

Existing utility information was requested from utility companies and service providers. The following service providers supplied information for the study area of the Proposed Development:

- Electricity Supply Board (ESB) Networks / EirGrid
- Gas Networks Ireland (GNI)
- Uisce Eireann; and
- Telecommunications providers.

17.2.4 Assessment of Effects Methodology

The assessment of the potential effects of the Proposed Development on material assets has been undertaken using the guidelines listed in Section 17.2.2. The following potential issues have been considered as part of the assessment of effects:

- Potential for effects on public utilities and the need to adequately protect them during the Construction Phase; and
- Requirement for connections to public utilities by the Proposed Development during both the Construction and Operational Phases.

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).

Table 17.1 provides the significance criteria used to identify the significance of effects on utilities. For the purposes of assessing the effects on utilities, an effect is deemed to be Not Significant from a rating of Imperceptible to Moderate, and Significant from Significant to Profound.

Table 17.1: Significance criteria for utilities. Source: EPA, 2022.

Significance Level	Criteria
Profound	• Where there is a continuous utility interruption of more than a week; and • Where additional demand on a utility would consume all remaining capacity.
Very Significant	• Where there is a continuous utility interruption of more than 48 hours; and • Where additional demand on a utility would significantly reduce the available capacity of that utility.

Significance Level	Criteria
Significant	• Where there is a continuous utility interruption of more than 24 hours; and • Where there is significant additional demand on a utility.
Moderate	• Where there are discrete utility interruptions of no more than eight hours for up to seven consecutive days; and • Where the additional demand on a utility is relatively large.
Slight	• Where there are discrete utility interruptions of no more than eight hours for up to three days; and • Where additional demand on a utility is relatively small.
Not Significant	• Where there is a utility interruption of no more than eight hours on a single day; and • Where additional demand on a utility is quantifiable but is too small to have any effect on capacity.
Imperceptible	• Where there is no utility interruption during diversion works; and • Where additional demand on a utility has no material change.

17.3 Baseline Environment

17.3.1 Land Ownership

The Proposed Development site and area of application as described in Chapter 4 (Description of the Proposed Development) is fully owned by Google Ireland Limited (GIL) with the exception of a section of road in ownership of Grange Castle Business Park located to the north of the Proposed Development. Written consent from the Grange Castle Business Park owners was given to allow development of the section of the road not under GIL's ownership. This proof of consent forms part of the planning application for this Proposed Development.

The existing GIL Campus is composed of two data centre buildings operated by GIL which were granted planning permission by SDCC between 2011 and 2014 (Planning ref. SD11A/0121, SD14A/0023 & SD14A/0284). These data centres, known as DC1 and DC2 are connected to utilities such as water, power, and telecommunications.

17.3.2 Adjoining Settlements

The nearest significant settlement to the Proposed Development is Clondalkin Village c. 3.5km to the east with Saggart, Newcastle and Rathcoole located at similar distances south of the Proposed Development. Lucan and Tallaght are significant settlements c. 4.5km and 6.2km from the Proposed Development, respectively. There are a small number of occupied residential properties along the Baldonnel Road which borders the southern and southeastern boundaries of the Proposed Development. Further details on the nature of local settlements are presented in Chapter 10 (Population and Human Health).

17.3.3 Public Utilities

Details on existing public utilities are provided for power, telecommunications, gas and water in the following sections.

17.3.3.1 Power Supply

There is an existing high voltage (HV) power supply and Branakyle substation which provide power to DC1 and DC2 through an existing Eirgrid grid connection.

The energy demand in Ireland has increased substantially in recent years due in part to increased data centre development and the rise in population. According to The Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (Government of Ireland, 2022);

"Despite significant success in accommodating a large data centre sector and helping to position Ireland as a technology sector 'hub', electricity grid development has not been able to keep up with the pace of demand growth in recent years. In the Greater Dublin region, the transmission system has been extended to cater for additional demand, in particular from data centres, with new substations and associated transmission circuits built."

17.3.3.2 Telecommunications

Telecommunication services are provided to DC1 and DC2 as part of the existing GIL Campus.

17.3.3.3 Natural Gas Supply

There is no existing natural gas supply to DC1 and DC2. It is not proposed to include any connection to the natural gas network and gas supply is not considered further.

17.3.3.4 Water

Water Supply

The existing GIL Campus has three water supply connections; 1) DC1 is supplied from the existing 110mm Uisce Eireann main located in Profile Park, 2) DC2 is supplied from a 160mm diameter Uisce Eireann main located at the main site entrance, and 3) the existing Branakyle substation is supplied from the same 160mm diameter Uisce Eireann main located at the main site entrance.

The existing peak design flow rate on site is 5.6L/Sec for the operation of DC1 and DC2. The DC1 and DC2 facilities include a cold water storage tank which is supplied with water from the Uisce Eireann watermain. The watermain is also used to supply water to two on-site firefighting water storage tanks which feed a fire ring main providing water to external fire hydrants and internal sprinkler systems on the existing Proposed Development site.

Under the information provided to the EPA as part of the application for IE licence P1189-01 the existing water usage is in the region of 2,600m^3/yr.

Foul Water Discharge

Foul water discharge generated in the existing GIL Campus is discharged via a connection to the foul water drainage system where a separate gravity foul drainage system also connects. The existing foul water discharge volumes for DC1 and DC2 is equal to 3.0L/Sec. This system also connects to the public sewer in Grange Castle, before ultimately being discharged to Ringsend Urban Waste Water Treatment Plant. The Urban Waste Water Treatment Plant in Ringsend (Licence No. D0034) has a design capacity of 1.64 million population equivalent (pe), however, in 2022, it reached a peak load of 2.2 million pe. In June 2023, Uisce Eireann applied for a Waste-water discharge licence to upgrade the plant to an increased design capacity of 2.4 million pe to accommodate the demand in the Greater Dublin Area. This licence application is currently under consideration by the EPA.

Stormwater Discharge

The GIL Campus currently has two stormwater discharge points which receive all wastewater produced on site. SW-1, as shown in Figure 17.1, located north of DC1 discharges surface water at a controlled rate to the tributary of the Baldonnell Stream at the culvert adjacent to DC1 which in turn drains to the public stormwater sewer in accordance with SDCC and is ultimately discharged to the Griffeen River. SW-2 is located north of DC2 along Conchobar Murray Avenue and discharges to a stormwater drainage system that was constructed as part of the Milltown Access Road scheme. SE-1 is also shown in Figure 17.1 as a wastewater discharge point.

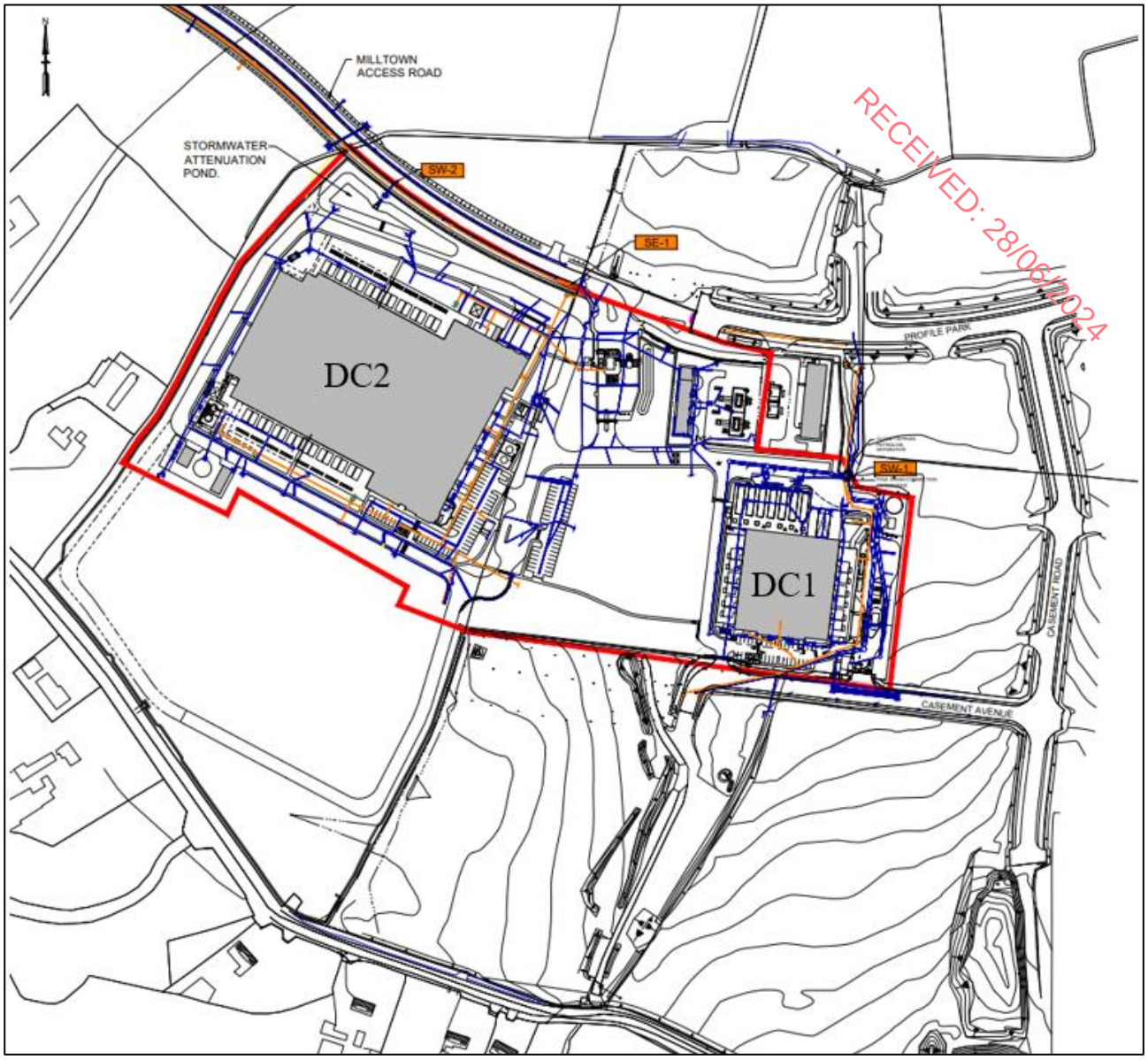

Figure 17.1: Locations of existing stormwater discharge points. Source: EPA IEL P1189-01.

17.4 Characteristics of the Proposed Development

A detailed description of the Proposed Development is provided in Chapter 4 (Description of the Proposed Development) of this EIAR. Chapter 5 (Construction) provides details of the construction methodology to be employed. The assessment in this Chapter considers the potential effects on materials assets due to the Proposed Development during Construction, Operational and Decommissioning Phases.

17.5 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 (refer to Section 17.6). Predicted residual effects taking into account any proposed mitigation is then presented in Section 17.7.

17.5.1 Construction Phase

It is expected that the Construction Phase of the Proposed Development will commence in Quarter 4, 2024 (subject to planning approval being granted). The works are anticipated to be undertaken over a period of 27 months, with a completion target of Quarter 2 in 2027.

17.5.1.1 Power Supply

During construction, contractors working on site will require power for the lighting of the construction site and power for onsite welfare facilities. In addition, some on site equipment/plant will require power. A temporary connection to the on-site power supply will be installed to power the Construction Phase of the Proposed Development. The demand is expected to be relatively minor during the Construction Phase and expected to result in Negative, Imperceptible, Short-Term effects on power supply.

17.5.1.2 Telecommunications

The demand is expected to be relatively minor during the Construction Phase and expected to result in Negative, Imperceptible, Short-Term effects on telecommunication services.

17.5.1.3 Water

Water Supply

A water supply will be required for the Construction Phase for certain activities such as dust suppression and to operate welfare facilities (canteens, toilets etc.). The water supply requirements for the Construction Phase will be provided by the existing water supply network to the GIL Campus. The demand is expected to be relatively minor during the Construction Phase and expected to result in Negative, Not Significant, Short-Term effects on water supply.

Foul Water Discharge

The existing foul water discharge system of the GIL Campus will be used for the Construction Phase to support welfare facilities (canteens, toilets etc.). Temporary welfare facilities will be provided onsite for construction staff which will either connect to the existing foul water discharge network or a temporary foul tank water storage tank. The demand is expected to be relatively minor during the Construction Phase and expected to result in Negative, Not Significant, Short-Term effects on foul water discharge infrastructure.

Stormwater Discharge

Stormwater discharge during the Construction Phase may contain increased silt levels or be polluted. Stormwater discharge containing large amounts of silt can cause damage to stormwater systems and receiving watercourses. Silt water can arise from dewatering excavations, exposed ground, stockpiles and access roads.

During the Construction Phase there is potential for a slight increase in stormwater discharge due to the introduction of impermeable surfaces and the compaction of soils. This may reduce the infiltration capacity and increase the rate and volume of direct stormwater discharge. The potential effect of this is an increase in confined flow rates, leading to increases in stormwater discharge and sediment loading. This could potentially result in Negative, Not Significant and Short-Term effects on stormwater discharge infrastructure. The potential effects on water quality are addressed in Chapter 12 (Water).

17.5.2 Operational Phase

17.5.2.1 Power Supply

The Proposed Development includes the installation of a HV Compound to support DC3. The existing power grid connection with Eirgrid is sufficient to operate the full campus including DC1, DC2 and DC3. The total annual energy consumption (assuming 100% IT load every hour of the year) is expected to be approximately 883GWh per annum during the Operational Phase potentially resulting in Negative, Significant and Long-Term effects on power supply due to the current energy demands in Ireland resulting in a sensitive baseline environment.

17.5.2.2 Telecommunications

The Proposed Development will be important infrastructure which will assist in enabling an open modern economy, facilitating digital transformation and associated productivity and competitiveness gains in Ireland.

By responding to increasing digital demands, the Proposed Development is expected to result in Positive, Moderate and Long-Term effects on the telecommunications provision.

17.5.2.3 Water

Water Supply

The Proposed Development will connect to the existing potable water supply on the GIL Campus. The Proposed Development is expected to have an average hourly demand of 0.6L/Sec and a peak hourly demand of 2.1L/Sec which will be supplied to DC3 by the internal tie-in point through an underground 110mm pipe network to connection points within the main building and mechanical yards. We can confirm that Uisce Eireann have processed the DC3 Pre-Connection Application for both Water Supply and Foul Water Discharge and have confirmed that their networks can cater for the Proposed Development without an Infrastructure Upgrade. The demand is expected to result in Negative, Not Significant, Long-Term effects on water supply.

Foul Water Discharge

All foul water discharge is conveyed through a gravity pipe network to a foul water discharge pumping station where it is then pumped to the existing site gravity foul water discharge network, which in turn discharges to the Uisce Eireann's external foul water network. Foul water will be primarily generated from the welfare facilities within the Facility Support Area (FSA), which is the primary administration area. The peak foul water discharge for the Proposed Development is expected to be circa 3.0L/Sec. While there will be Industrial Water (consisting of condensate discharge only) generated from the various FSA, Data Centre Halls, Electrical Yards and Mechanical Yards the flows will be minor in nature.

Uisce Eireann has confirmed that there is sufficient capacity in their external foul water network to accommodate the operation of Proposed Development. They noted that South Dublin County Council will need to assess the capacity of the Grange Castle Foul Water Pumping station. Therefore, during the Operational Phase, Negative, Not Significant, Long-Term effects on foul water discharge infrastructure is expected.

Stormwater Discharge

The Proposed Development is expected to result in an increase in stormwater runoff from the GIL Campus to a total of 1,810L/Sec as peak flow to the proposed stormwater network prior to being restricted by flow controls.

The stormwater discharge carrier pipes have been designed as gravity systems. Stormwater from the car parking areas will utilise porous paving with a high level overflow to the stormwater drainage system which will be attenuated on site prior to being discharged at a controlled rate to the tributary of the Baldonnell Stream which in turn discharges to the Griffeen River. The demand during the Operational Phase is predicted to result in Negative, Not Significant and Long-Term effects on stormwater discharge infrastructure.

Firewater Retention

An underground Firewater Retention Tank with a capacity of 3,236m^3 will be developed as part of the Proposed Development. This tank has been sized in accordance with the requirements of the Guidance on Retention Requirements for Firewater Runoff (EPA, 2019). The firewater will be held in the firewater retention tank until it is tested to understand the water quality and the disposal option, i.e. either foul or stormwater discharge. If the water quality is outside the discharge standards for both, then it will be collected and disposed off site by a licensed contractor to an approved facility.

17.5.3 Decommissioning Phase

It is likely that the potential effects of the Decommissioning Phase of the Proposed Development will be equivalent to those effects expected from the Construction Phase. Refer to Section 17.5.1 for the potential effects of the Construction Phase.

17.6 Mitigation and Monitoring Measures

This Section describes and assesses the mitigation and monitoring measures which will be implemented during the Construction, Operational and Decommissioning Phases of the Proposed Development.

17.6.1 Construction Phase

17.6.1.1 Power Supply and Telecommunications

No specific mitigation or monitoring measures are required as no Significant Adverse effects are likely to arise.

17.6.1.2 Water

No specific mitigation or monitoring measures are required as no Significant Adverse effects are likely to arise. Refer to Chapter 12 (Water) and the CEMP (Appendix 5.1) for measures to prevent surface water contamination with silt, and also control surface water runoff during construction.

17.6.2 Operational Phase

The Proposed Development will operate under an IEL and as such will have prescribed Operational Phase monitoring measures set by the EPA (as DC1 and DC2 currently operate). These controls and monitoring measures will require to be complied with by GIL in order to operate the Proposed Development if consented.

17.6.2.1 Power Supply

The design of the Proposed Development includes measures to mitigate the effects caused by the demand on power required during the Operational Phase. The design includes roof-mounted photovoltaic (PV) panels on part of DC3 to provide on-site renewable power to the Proposed Development. This is expected to generate 20% of the energy need of that occupied space through the use of renewable power.

In Ireland, GIL has signed a 14-year Power Purchase Agreement (PPA) (with the possibility of a five year extension) with Power Capital Renewable Energy for 58 megawatts (MW) of new-to-the grid capacity from the Tullabeg Solar Farm through an existing grid connection. This agreement has allowed the development of a new renewable energy project which was granted planning in 2022 is currently under construction. It will add new renewable energy to the grid that GIL's offices and data centres run on, contributing to the decarbonisation of Ireland's electricity system and of their operations.

The Proposed Development has been designed to facilitate district heating where surplus heat is produced. This system has the potential to deliver heat for both space heating and water heating needs to buildings external to the site through a network of insulated underground pipelines. This will be realised once a suitable off taker is available and the adequate critical load is achieved.

17.6.2.2 Telecommunications

There are no mitigation measures required for telecommunication services as no Significant Adverse effects are likely to arise.

17.6.2.3 Water

The DC building incorporates a parapet which includes a rainfall collection system including gutters and downpipes which collect and convey rainfall to the sitewide underground stormwater drainage network.

The IE Licence requires the applicant to maintain the storm water drainage system and conduct water quality monitoring as required by the EPA. These requirements will continue to be complied with. There shall be no emissions to water of environmental significance. The water quality monitoring programme operates so as to prevent the Proposed Development from having a negative effect on the water quality of the nearest Water Framework Directive waterbody, the Griffeen River. The two existing stormwater discharge points will continue to be used to drain to both the stream on site (SW-1 as per Figure 17.1) and to a stormwater drainage system that was constructed as part of the Milltown Access Road scheme (SW-2 as per Figure 17.1).

Monitoring of pH, Total Organic Carbon (TOC), Temperature, and Conductivity will continue weekly at these locations. GIL will continue to comply with the IE Licence by continuing to monitor these parameters at the frequency determined by the EPA and will meet any further requirements of any amended IE Licence which will require to be applied for prior to commencement of operation of DC3 if consented.

Uisce Eireann has processed the DC3 Pre-Connection Application for both water supply and foul water discharge and has confirmed that their networks can cater for the Proposed Development without an Infrastructure Upgrade.

17.6.3 Decommissioning Phase

It is likely that the potential effects of the Decommissioning Phase of the Proposed Development will be less than those effects expected from the Construction Phase. Refer to Section 17.5.1 for the required mitigation measures to be implemented during the Decommissioning Phase.

17.7 Residual Effects

17.7.1 Construction Phase

No Significant Adverse residual effects on water, power and telecommunications are likely to arise during the Construction Phase.

17.7.2 Operational Phase

The Proposed Development is likely to have Negative, Moderate and Long-Term residual effects on power supply during the Operational Phase following the implementation of mitigation measures.

No Significant Adverse residual effects on water supply are likely to arise during the Operational Phase.

The Proposed Development is likely to result in a Positive, Moderate and Long-Term effects on telecommunications provision.

17.7.3 Decommissioning Phase

There will be no likely Significant Adverse residual effects on material assets post mitigation during the Decommissioning Phase. As outlined in Section 5.7, decommissioning activities will need to be undertaken in accordance with the requirements of the IE licence.

17.8 References

European Commission (2017) *Guidance on the Preparation of the Environmental Impact Assessment Report*

Environmental Protection Agency (2022) *Guidelines on the Information to be contained in Environmental Impact Assessment Reports*

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

EPA (2019) *Guidance on Retention Requirements for Firewater Runoff*

18. Major Accidents and/or Disasters

18.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and assesses the likely direct and indirect significant effects on major accidents and/or disasters 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).

The assessment of the vulnerability of the Proposed Development to major accidents and disasters is carried out in accordance with the amended EIA Directive that entered into force on 16 May 2017 (2014/52/EU) which states the need to assess:

"the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned"

The underlying objective of this assessment is to ensure that appropriate precautionary actions are taken for any development projects which *"because of their vulnerability to major accidents and/or natural disasters, are likely to have significant adverse effects on the environment".*

Based on the requirements of the EIA Directive, this Chapter seeks to determine:

- The relevant major accidents and/or disasters, if any, that the Proposed Development could be vulnerable to;
- The potential for major accidents and/or disasters onsite to result in likely significant adverse environmental effect(s); and
- The measures that are in place, or need to be in place, to prevent or mitigate the potential significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

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. A detailed description of the Proposed Development is provided in Chapter 4 (Description of the Proposed Development) and Chapter 5 (Construction) provides a description of the construction and demolition activities.

Major accidents and/or disasters are hazards that have the potential to affect and be affected by the Proposed Development. These include accidents during the Construction and Operational Phases caused by operational failure and/or natural hazards.

The underlying objective of considering the risk of major accidents and/or natural disasters is to ensure that appropriate precautionary measures are taken for those projects with a likelihood of creating 'significant environmental impacts' (Environmental Protection Agency (EPA) 2022) and with a focus on 'low likelihood but potentially high consequence events' in accordance with guidance provided by the Institute of Environmental Management and Assessment (IEMA 2020). A further objective is to ensure that the EIAR identifies measures to mitigate harm that could arise from those unlikely scenarios and ensure that it addresses preparedness and response planning.

The scope and methodology of this assessment is centred on the understanding that the Proposed Development has been designed and will be built and maintained in line with best international current practice and in compliance with the relevant health and safety standards.

Notwithstanding the above, a risk analysis-based methodology that covers the identification, likelihood and consequence of major accidents and/or disasters has been used for this assessment. The scope and methodology presented in the following sections is based on the provisions of the EIA Directive, the EPA Guidelines (EPA, 2022) and guidance documents and other published risk assessment methodologies as described in Section 18.2.

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

18.2 Assessment Methodology

18.2.1 Guidance and Legislation

18.2.1.1 Legislation

The following paragraphs are set out in the EIA Directive in relation to major accidents and/or disasters.

Recital 15 of the EIA Directive states that:

"In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment. In order to avoid duplications, it should be possible to use any relevant information available and obtained through risk assessments carried out pursuant to Union legislation, such as Directive 2012/18/EU of the European Parliament and the Council and Council Directive 2009/71/Euratom, or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met."[1]

Article 3 of the EIA Directive provides that the EIAR shall identify, describe and assess in the appropriate manner, the direct and indirect significant effects on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape deriving from (amongst other things) the "*vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned*".

Specifically, the information relevant to major accidents and/or disasters to be included in the EIAR is set out in Section 8 of Annex IV of the EIA Directive as follows:

"(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".

18.2.1.2 Guidance Documents

Several guidance documents and published plans have been reviewed and considered in order to inform this assessment, as required under the EIA Directive, as described in the following sections.

[1] Directive 2012/18/EU is the directive on the control of major-accident hazards involving dangerous substances, referred to as the COMAH or Seveso III Directive.

Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)

The European Commission Guidance outlines the legislative and key considerations that should be taken into account in the preparation of EIARs with respect to major accidents and/or disasters.

The Guidance lists the following issues which EIARs should address relative to disaster and accident risk:

- What can go wrong with a Project?
- What adverse consequences might occur to human health and to the environment?
- What is the range of magnitude of adverse consequences?
- How likely are these consequences?
- What is the Project's state of preparedness in case of an accident/disaster?
- Is there a plan for an emergency situation?

Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)

The EPA guidelines refer to major accidents and/or disasters in several sections including:

Recital (13) of Directive 2014/52/EU - Under Climate: *"The list of environmental factors which needed to be addressed under Directive 2011/92/EU included climate.*

The amended Directive also requires the vulnerability of a project to climate change to be addressed, particularly 'the risk of major accidents and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge".

Annex III (3) of the amended Directive – under Likelihood of Effects: *"To ensure that the EIA adds value to the consent process it is necessary to focus on those effects that are probable or likely to occur. However, to be prudent, the EIAR also attempts to identify a reasonably foreseeable worst-case scenario as a context for 'likely significant effects.*

With competent scoping, it should be possible to greatly narrow down the key areas of concern and to derive a list confined to 'effects' that may reasonably be seen as 'likely'. Likely or probable effects can be described as those which are planned to take place (e.g. the projected emissions, the proposed earthmoving etc.) and those which can be reasonably foreseen to be inevitable consequences of the normal construction and operation of the project.

To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other legislation e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.

The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required."

Under APPENDIX II – Annex IV 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 – "*A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met.*

Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies."

Guidance on Assessing and Costing Environmental Liabilities (EPA, 2014)

The EPA has developed guidance that presents a systematic approach for assessing and costing environmental liabilities associated with the closure, restoration/aftercare and incidents associated with licensed facilities. This guidance is targeted at activities governed by EPA authorisations including Industrial Emissions Directive (IED), Integrated Pollution Prevention and Control (IPPC), Wastewater Discharge Authorisations (WWDA) and Dumping at Sea (DaS) regimes.

Specifically, this document provides guidance on the identification and quantification of risks, focusing on unplanned, but possible and plausible events that may occur during the Construction and Operational Phases of projects. Guidance is also provided on a range of risk assessment and evaluation techniques that could be employed.

A Framework for Major Emergency Management Guidance Document 1-A Guide to Risk Assessment in Major Emergency Management (Government of Ireland, 2010)

The Department of the Environment, Heritage and Local Government (DoEHLG), as it then was, published a guidance note in January 2010 on best practice in the area of risk assessment for major emergency management.

This Guidance sets out a risk assessment procedure that should be applied and documented by the principal response agencies as a basis for major emergency management. The risk assessment procedure underpins work in the later stages of the emergency management cycle. A significant benefit of the risk assessment process is that it can help establish confidence in the Major Emergency Management system, by showing it to be both realistic and logical.

This document describes the various stages of the risk assessment process and how it should be employed to inform mitigation and detailed planning during major emergency situations. Part 1 of the guidance sets out the risk assessment process and defines criteria for classifying effect and likelihood scenarios, as well as a process for recording the risk assessment.

National Risk Assessment for Ireland 2023 (Government of Ireland, 2023)

The most recent National Risk Assessment forms a critical subset of the strategic process ('National Risk Assessment: Overview of Strategic Risks') undertaken by the Government on an annual basis to assess national risks. The purpose of the assessment is to identify national hazards across a broad range of emergencies, to assess the likelihood and effect of these risks and to inform actions at national level aimed at mitigating such risks, including the allocation of resources.

South Dublin County Council Major Emergency Plan 2016 (SDCC, 2016)

As a designated Principal Response Agency (PRA) SDCC has an ongoing major emergency management programme in place

As part of this ongoing programme and in accordance with the requirements of 'A Framework for Major Emergency Management' (2010), this Major Emergency Plan has been prepared to facilitate the response to, and recovery from, major emergencies by SDCC and to ensure that the Council's arrangements are co-ordinated with those of the other two designated Principal Response Agencies, the Health Service Executive and An Garda Síochána.

Institute for Environmental Management and Assessment (2020) Major Accidents and Disasters in EIA – A Primer

The Major Accidents and Disasters in EIA - A Primer (the IEMA Primer), produced by IEMA and Arup, provides an assessment methodology for major accidents and disasters based on known current practice in the UK to date and provides definitions of key terminology. It offers a methodology for a proportionate assessment approach to determine a project's vulnerability.

While this guidance document was prepared for the UK, it is relevant in the Irish context as it is based on the EIA Directive 2014/52/EU requirements and is considered relevant to the current assessment.

18.2.2 Categorisation of the Baseline Environment

A desk-based study has been undertaken to establish the baseline environment relevant to the risk assessment, as this will influence both the likelihood and the effect of a major accident and/or disaster.

Establishing the local and regional context, prior to completion of the risk assessment, enables a better understanding of the vulnerability and resilience of the area to emergency situations, and of the potential for the surrounding environment to pose a risk of a major accident or disaster, which could affect the Proposed Development. Section 18.3 provides an overview of the baseline environment that has been considered for this assessment.

18.2.3 Assessment of Effects Methodology

18.2.3.1 Key Definitions

At the time of undertaking this assessment, there are no clear definitions for the terms 'major accident' or 'disaster' in the context of the EIA Directive. For the purpose of this assessment, key terms used in This Chapter are set out below and are based on Institute for Environmental Management and Assessment (IEMA) Major Accidents and Disasters in EIA – A Primer (IEMA, 2020):

- Accident – something that happens by chance or without expectation;
- Disaster – a natural hazard (e.g. earthquake) or a man-made external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident;
- Major Accident – events that threaten immediate or delayed serious environmental effects to human health, welfare and / or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events;
- Risk – the likelihood of an effect occurring, combined with the effect or consequence(s) of the effect on a receptor if it does occur;
- Risk event – an identified, unplanned event, which is considered relevant to the Proposed Development and has the potential to result in a major accident and / or disaster, subject to assessment of its potential to result in a significant adverse effect on an environmental receptor;
- Vulnerability – describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to 'exposure and resilience' of the Proposed Development to the risk of a major accident and / or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of effect; and
- Significant environmental effect (in relation to a major accident and / or disaster assessment) – includes the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.

Refer to Section 18.2.6 Risk Assessment Methodology for significance criteria relating to the assessment of risk.

The assessment of major accidents and disasters reported in this Chapter considers the occurrence of extreme and highly unlikely incidences. As such, it considers accident scenarios that would not reasonably be covered by the specialist topic chapters.

18.2.3.2 General

As discussed above, the scope and methodology of this assessment is based on GIL's design and build approach that accords with best international practice and in accordance with Irish legal requirements, as such, the vulnerability of the Proposed Development to risks of major accidents and/or disasters is considered to be low.

Certain potential unplanned events, such as pollution incidents to ground and watercourses and flooding events, are addressed in detail in the relevant environmental assessment chapters. These include Chapter 13 (Land, Soils, Geology and Hydrogeology) and Chapter 12 (Water).

18.2.4 Study Area

The Proposed Development boundary (Figure 1.2 of Chapter 1 (Introduction)) consists of the southern side of the GIL Campus, south of the existing DC1 and DC2 sites, the northeastern boundary and central section of the GIL Campus as well as a small section on the western boundary, south west of DC2. However, the study area for this Chapter extends beyond the Proposed Development boundary to include potential offsite risks, refer to Section 18.3.4.2 for further details.

18.2.5 Data Collection and Collation

A desk-based study has been undertaken in order to establish the baseline environment for the risk assessment.

As outlined in the guidance, establishing the local, regional and national context prior to completion of the risk assessment enables a better understanding of the vulnerability and resilience of the area to emergency situations. Section 18.3 provides an overview of the baseline environment that has been considered for this assessment.

18.2.6 Risk Assessment Methodology

This Chapter of the EIAR differs from the other specialist chapters of the EIAR, which identify the potential for “likely significant effects” of the Proposed Development on the environment. This Chapter deals with risk events that have a low likelihood of occurrence but have a potentially high consequence for the environment, human health, infrastructure and/or cultural heritage.

The IEMA Primer (IEMA, 2020) definition of ‘significant environmental effect’, presented in Section 18.2.3 above has been adopted for the purposes of this assessment.

The site-specific risk assessment identifies and quantifies risks focusing on unplanned, but possible and plausible events occurring during the construction, operation and decommissioning of the Proposed Development. The following steps were undertaken as part of the site-specific risk assessment:

- Risk event identification;
- Risk classification, likelihood, and consequence; and
- Risk evaluation.

18.2.6.1 Identification of Potential Risk Events

In accordance with the European Commission Guidance (2017), potential risk events are identified in respect of the Proposed Development, focused on:

1. Potential vulnerability to major accident and/or disasters; and
2. Potential to cause accidents and/or disasters.

The identification of potential risk events has focused on non-standard but plausible incidents, which could occur at the Proposed Development during construction, operation and decommissioning, and which could cause a significant effect on the environment. Similarly, if an off-site event could cause the Proposed Development to have a non-trivial effect on the environment, this was also classified as a plausible risk event. The list of potential risk events and their potential effect are presented in Table 18.4.

The potential effects in this Section assume a worst-case scenario, which does not consider the implementation of mitigation measures or emergency plans which would be put in place to reduce the likelihood and potential effect of any major accidents and / or disasters.

18.2.6.2 Likelihood Classification

After initial identification of the potential risk events, the likelihood of occurrence of each risk event has been assessed. An analysis of safety procedures and proposed environmental controls was considered when estimating the likelihood of identified potential risk events occurring. Table 18.1 indicates the likelihood ratings that have been applied. The rating criteria adopted for the assessment as presented in Table 18.1 follows that used in the DoEHLG 2010 guide.

The approach adopted has assumed a 'risk likelihood' where one or more aspects of the likelihood description are met. Any risk event associated with the Proposed Development, with a likelihood of occurrence which is less than 'extremely unlikely', has been excluded from the assessment.

Table 18.1: Risk classification table – likelihood. Source: DoEHLG.

Rating	Classification	Effect Description
1	Extremely unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communities; and/or little opportunity, reason or means to occur; may occur once every 100-500 years.
3	Unlikely	May occur at some time; and/or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisation's worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years
5	Very likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Classification of Consequence

The EPA Guidelines (EPA, 2022) state that the risk assessment must be based on a 'worst-case' scenario. Therefore, the consequence rating assigned to each potential risk event has assumed that mitigation measures and/or safety procedures have failed to prevent an effect on the environment. The consequence rating of the effect, if the incident occurs, is indicated in Table 18.2. The classification of consequence, taken from the DoEHLG 2010 guide, is provided in Table 18.2.

Table 18.2: Risk classification table – consequence. Source: DoEHLG, 2010.

Rating	Consequence	Effect	Description
1	Minor	Life, Health, Welfare Environment Infrastructure Social	• Small number of people affected; no fatalities and small number of minor injuries with first aid treatment; • No contamination, localised effects; • <0.5 million euro (in terms of costs of property/infrastructure damage as well as recovery costs or loss of economic production); and • Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare Environment Infrastructure Social	• Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required; Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements; • Simple contamination, localised effects of short duration; • 0.5 million to 3 million euro (in terms of costs of property/infrastructure damage as well as recovery costs or loss of economic production); and • Normal community functioning with some inconvenience.

Rating	Consequence	Effect	Description
3	Serious	Life, Health, Welfare Environment Infrastructure Social	• Significant number of people in affected area affected with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support; • Simple contamination, widespread effects or extended duration; • 3 million to 10 million euro (in terms of costs of property/infrastructure damage as well as recovery costs or loss of economic production); and • Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare Environment Infrastructure Social	• 5 to 50 fatalities, up to 100 serious injuries, up to 2,000 evacuated; • Heavy contamination, localised effects or extended duration; • 10 million to 25 million euro (in terms of costs of property/infrastructure damage as well as recovery costs or loss of economic production); and • Community functioning poorly, minimal services available.
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	• Large numbers of people affected with a significant number of fatalities (>50), injuries in the hundreds, more than 2000 evacuated; • Very heavy contamination, widespread effects of extended duration; • >25 million euro (in terms of costs of property/infrastructure damage as well as recovery costs or loss of economic production); and • Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged periods. Community unable to function without significant support.

18.2.6.3 Risk Evaluation

In accordance with the DEHLG 2010 guidance, a risk matrix was used to determine the level of significance of each risk event. The risk matrix has three categories:

- High Risk – events that have an evaluation score of 15 to 25, as indicated by the red zones in Table 18.3;
- Medium Risk – events that have an evaluation score of 8 to 12, as indicated by the amber zone in Table 18.3; and
- Low Risk – events that have an evaluation score of 1 to 6, as indicated by the green zone in Table 18.3.

Major accident and/disaster risk events that fall in the amber or red zones ('Medium' or 'High' risk events) are considered to present a risk of significant effects, as defined in Section 18.2.3, and are brought forward for further consideration and assessment for mitigation.

Table 18.3: Risk matrix. Source: DoEHLG.

Likelihood	5 - Very Likely					
	4 - Likely					
	3 - Unlikely					
	2 - Very Unlikely					
	1 - Extremely Unlikely					
		1 - Minor	2 - Limited	3 - Serious	4 - Very Serious	5 - Catastrophic
	Consequence of Effect					

18.3 Baseline Environment

Refer to Chapter 9 (Noise and Vibration) and Chapter 11 (Biodiversity) for sensitive receptors that may be vulnerable to major risks and / disasters.

18.3.1 Natural Disasters

According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are 'normal' in terms of seismicity in Ireland. These are known as microearthquakes. They are not commonly felt by people and are generally recorded only on local seismographs.

With events of this magnitude, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity. Ireland has no active volcanoes and volcanic activity is not expected.

The geographic position of Ireland means that tsunamis, which might pose a risk to developments of such as the Proposed Development in other locations, are less likely to occur and less likely to be of significant magnitude.

18.3.2 Severe Weather and Climate Change Predictions

There has been a recent increase in the number of severe weather events in Ireland, including those leading to flash flooding, snow, both lower and higher temperatures than usual and strong winds. An historic timeline of severe weather events in South Dublin as noted in the South Dublin County Council Climate Action Plan 2024 – 2029 (SDCC, 2024) is presented in Figure 18.1.

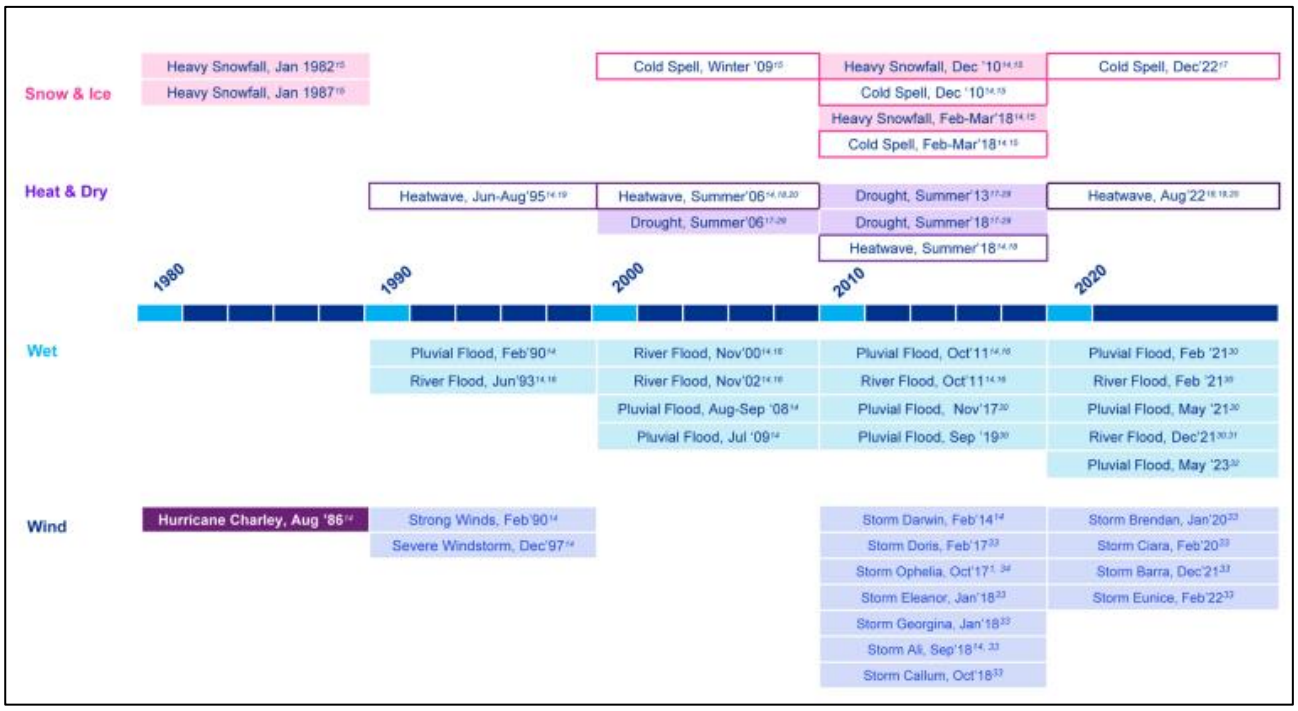

Figure 18.1: Overview of the hazard events which have affected south Dublin 1982 - 2023. Source: SDCC, 2024.

EPA research (EPA, 2020) shows an overall reduction in the number of less intense storms affecting Ireland and suggests an eastward extension of the more severe storms over Ireland and the UK from the middle of the century, as a result of climate change. However, the research notes that this should be taken with some caution as extreme storms are rare events. Refer also to Chapter 8 (Climate).

18.3.3 Flooding

A flood risk assessment was undertaken for the Proposed Development, refer to Chapter 12 (Water) for baseline flood conditions, past and existing flood risk and refer to the Flood Risk Assessment (FRA) in Appendix 12.1 of this EIAR for further details on flooding. The flood risk assessment has demonstrated that the risks relating to flooding can be managed and mitigated to acceptable levels and therefore comply with DoEHLG / OPW and South Dublin County Council planning guidance.

18.3.4 Major Accidents and/ or Disasters

18.3.4.1 Seveso Sites

A review of Upper Tier and Lower Tier Seveso sites within 1km of the Proposed Development site was undertaken and one lower tier Seveso site was identified. This is considered a reasonable extent for consideration as effects of other developments on the Proposed Development.

Microsoft Ireland Operations Limited site is located approximately 800m north of the Proposed Development site, and is considered a lower tier Seveso site, according to the Health and Safety Authority of Ireland who published a list in February 2024 of the Higher and Lower Tier Seveso sites (HSA, 2024). The Microsoft site was not included in the list of Seveso sites in the SDCC County Development Plan 2022-2028 as the site had not applied for planning permission prior to the publication of the Plan.

18.3.4.2 Industrial Emissions Licences

The GIL Campus currently operates under an Industrial Emissions Licence (IEL), Licence Reg. P1189-01. However, the IEL will need to be reviewed to include the new Proposed Development.

The GIL Campus is located within a heavily industrialised part of South Dublin, with many industrially licensed sites within a 1.8km radius. There are five industrial sites within 500m of the Proposed Development area, which operate under Directive 2010/75/EU (the Industrial Emissions Directive) licences from the EPA and are therefore considered to be major industrial facilities. These are:

- Amazon Data Services Ireland Limited CyrusOne Development is located approximately 180m west of the Proposed Development (Licence No. P1184-01);
- Amazon Data Services Ireland Limited Grange Castle South Development is located approximately 230m northwest of the Proposed Development (Licence No. P1170-01);
- Microsoft Ireland Operations Limited Data Centre Developments are located approximately 350m north of the Proposed Development (Licence No. s P1187-01 and P1191-01);
- Vantage Data Centres Dub11 Limited is located approximately 50m northeast of the Proposed Development (Licence No. P1203-01); and
- Profile Park Power Plant is located approximately 100m east of the Proposed Development (Licence No. P1196-01).

18.4 Potential Effects

18.4.1 Do-Nothing Scenario

If the Proposed Development does not proceed, there will be no increase in the likelihood of major accidents occurring, or indeed the consequences should a major accident occur. There will be no change to the likelihood or consequences of a disaster, therefore the Proposed Development site would remain the same as it is currently.

18.4.2 Risk Evaluation

The potential effects in this Section assume a worst-case scenario, which does not consider the implementation of mitigation measures or emergency plans which would be put in place to reduce the likelihood and potential effect of any major accidents and / or disasters.

A Risk Register has been developed which contains all the plausible scenarios identified during the Construction, Operational and Decommissioning Phases of the Proposed Development and has been evaluated using the criteria in Section 18.2.6, using the Classification of Likelihood ratings and effect descriptions (Table 18.1).

The Risk Register is provided in Table 18.4. This Table details potential risk events and the likelihood of occurrence of each risk event. The approach adopted has assumed a ‘risk likelihood’ where one or more aspects of the likelihood description are met. Any risk event associated with the Proposed Development, with a likelihood of occurrence which is less than ‘extremely unlikely’, has been excluded from the assessment.

The consequence rating of the effect, if the incident occurs, is indicated in Table 18.2 (Section 18.2.6). In accordance with the DEHLG 2010 guidance, a risk matrix was used to determine the level of significance of each risk event.

Major accident and/disaster risk events that fall in the amber or red zones ('Medium' or 'High' risk events) (refer to Section 18.2.6) are considered to present a risk of significant effects (as defined in Section 18.2.3), and are brought forward for further consideration and assessment for mitigation.

Table 18.4: Rating of major accidents and disasters in the absence of mitigation.

Risk ID	Risk Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category
Construction / Decommissioning Phase						
A	Utilities – risk of exposure to and release of untreated wastewater due to the strike of mains sewers and combined sewers during excavation	Very Unlikely	2	Limited • Potential Injury due to pressurised discharge; • Hazards associated with exposure to untreated wastewater (diseases etc.); • Potential discharge of untreated wastewater to adjacent watercourses; • Potential displacement of local residences and businesses in the event of flooding; and • Potential to disrupt wastewater management systems.	2	Low
B	Utilities – risk of striking watermains supply	Unlikely	3	Minor • Potential minor injury for nearby personnel and potential displacement of local residences and businesses in the event of flooding; • Clean mains water supply so no potential for contamination; and • Potential to disrupt water supply.	1	Low
C	Utilities - contact with / damage to high voltage and medium voltage power lines (overhead or buried)	Very Unlikely (These are generally the easiest cables to detect remotely and should have warning marker tapes above them)	2	Serious • Potential fatalities and injuries; • Potential to lead to fire and associated effects; and • Potential to disrupt electricity / telecoms supply - localised disruption / inconvenience to community.	3	Low
D	Utilities - contact with / damage to low voltage power lines buried telecom services and / or fibre optic cables	Unlikely	3	Limited • Potential for damage to existing GIL Campus and disruption to existing GIL Campus operations.	2	Low
E	Structural damage/collapse	Unlikely	3	Serious • Potential fatalities and injuries; and • Potential for damage to existing GIL Campus and disruption to existing GIL Campus operations.	3	Medium

Risk ID	Risk Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category
F	Contamination Event – risk of encountering unknown contaminated ground and mobilisation during construction/hazardous pipe materials (i.e. Asbestos pipes), and potential damage to brittle pipes during construction	Unlikely	3	Limited • Potential injury from exposure to hazardous substances; and • Potential for a limited number of people to be affected and for short duration localised effects.	2	Low
G	Contamination Event – pollution event leading to environmental damage to watercourses or groundwater, particularly associated with the potential release of silt to the aquatic environment	Likely	4	Serious • Potential to cause environmental damage to the aquatic environment and associated species and to ecologically designated areas.	3	Medium
H	Transport Incident - major road traffic accident resulting from a collision between construction traffic and public traffic i.e. cars, buses, Heavy Goods Vehicles (HGVs), in addition to pedestrians and cyclists using the road or footpaths	Likely	4	Serious • Potential fatalities and injuries; • Potential to lead to fire and associated effects; • Potential to discharge deleterious material (e.g. fuel) to watercourses; and • Potential for damage to existing GIL Campus and disruption to existing GIL Campus operations.	3	Medium
I	Transport Incident - aircraft related accident due to proximity of Casement Aerodrome.	Extremely Unlikely	1	Very Serious • Potential for a significant number of fatalities and injuries; and • Potential for damage to existing GIL Campus and disruption to existing GIL Campus operations.	4	Low
J	Biosecurity - risk of spread of invasive species during construction works, particularly during site clearance works	Likely	4	Serious • Contamination with extended duration and potential to lead to more widespread effects.	3	Medium
K	Tree Stability - risk of trees with unstable roots falling during surface and excavation works / potential for contact with overhead lines, residents, properties, pedestrians and road users	Unlikely	3	Limited • Potential fatality and injuries; and • Localised effects and short duration. Potential for some minor damage to local infrastructure.	2	Low
L	Extreme Weather Event – events such as prolonged flooding resulting in sediment load runoff during construction, storm damage, snowstorm, wildfire	Unlikely	3	Limited • Localised displacement of a small number of people, localised effects of short duration; and • Potential for damage to existing GIL Campus and disruption to existing GIL Campus operations.	2	Low

Risk ID	Risk Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category
M	Industrial Incident – explosion / fire occurring at existing or adjacent facility containing flammable / hazardous substances (i.e. diesel generators)	Likely	4	Limited • Potential for damage to existing GIL Campus and disruption to existing GIL Campus operations.	2	Medium
Operational Phase						
N	Structural damage/collapse	Very Unlikely	2	Serious • Potential fatalities and injuries; and • Potential for damage to GIL Campus and disruption to operations.	3	Low
O	Transport Accident - aircraft related accident due to location within Inner Horizontal Surface of Casement Aerodrome.	Extremely Unlikely	1	Very serious • Potential for a significant number of fatalities and injuries; and • Potential for damage to GIL Campus and disruption to operations.	4	Low
P	Extreme Weather Event – risk of extreme weather events such as prolonged flooding resulting in sediment load runoff, storm damage, snowstorm, wildfire	Unlikely	3	Limited • Potential for damage to GIL Campus and disruption to operations.	2	Low
Q	Industrial Incident – explosion / fire occurring at existing or adjacent facility containing flammable / hazardous substances (i.e. diesel generators)	Likely	4	Limited • Localised displacement of a small number of people, localised effects of short duration; and • Potential for damage to GIL Campus and disruption to operations.	1	Low
Decommissioning Phase						
It is noted that any potential effects which could arise during the Decommissioning Phase are likely to replicate those in the Construction Phase.						

The Proposed Development has an expected operational lifespan of 35-40 years after which the Proposed Development will undergo a decommissioning process. It is expected that the potential risks associated with the Construction Phase for the Proposed Development will be similar in consequence and likelihood as the Decommissioning Phase of the Proposed Development, with similar activities proposed.

18.4.3 Results of Risk Assessment

The results from the evaluation have been applied to Table 18.5.

Table 18.5: Evaluation of levels of significance in the absence of mitigation.

Likelihood						
	5 – Very Likely					
	4 – Likely	[Q]	[M]	[G], [H], [J]		
	3 - Unlikely	[B]	[D], [F], [K], [L], [P]	[E]		
	2 – Very Unlikely		[A]	[C], [N]		
	1 – Extremely Unlikely				[I], [O]	
		1 – Minor	2 – Limited	3 – Serious	4 – Very Serious	5 - Catastrophic
	Consequence of Effect					

From examining the plausible risks presented in Table 18.5, Risk IDs A, B, C, D, F, I, K, L, N, O, P and Q are considered as being below the threshold of significance set for the purposes of this assessment (Green Zone or 'Low' risk event).

No risks have been assessed to fall within the Red Zone ('High' risk scenario) and Risk IDs E, G, H, J, and M fall within the Amber Zone ('Medium' risk event) and therefore constitutes the potential for Adverse Significant effects. These are brought forward for further consideration and assessment of mitigation measures.

The scenario with the highest risk score relates to Risk IDs G, H, and J associated with the Proposed Development.

18.5 Mitigation and Monitoring Measures

As mentioned previously, the design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on avoiding or reducing the potential for environmental effects, where practicable, whilst ensuring the objectives of the Proposed Development are attained. The design of the Proposed Development has been developed in compliance with the relevant design standards which include provisions to reduce the likelihood of risk events occurring (e.g. structures have been designed to avoid the risk of collapse, drainage systems have been designed to cater for increased rainfall events etc.).

Regulation 15 of the Safety, Health and Welfare at Work (Construction) Regulations places a duty on designers carrying out work related to the design of a project to take account of the 'General Principles of Prevention' as listed in Schedule 3 of the Safety, Health and Welfare at Work Act. In addition to the duties imposed by Regulation 15 of the Safety, Health and Welfare at Work (Construction) Regulations, designers must comply with Section17(2) of the Safety, Health and Welfare at Work Act 2005 which requires persons who design a project for construction work to ensure, so far as is reasonably practicable, that the project is designed and is capable of being constructed to be safe and without risk to health, can be maintained safely and without risk to health during use, and complies in all respects, as appropriate, with other relevant legislation. This includes S.I. No. 138/2012 - Building Regulations (Part A Amendment) Regulations 2012 and, if the works being designed are intended for use as a workplace, the relevant parts of the Safety, Health and Welfare at Work (General Application) Regulations.

In accordance with these requirements, the Proposed Development engineering design team designed the Proposed Development in accordance with relevant legislation, standards and guidance, thereby mitigating potential design and construction related risks.

As a designated Principal Response Agency (PRA) South Dublin County Council has an ongoing major emergency management programme in place. The Major Emergency Plan has been prepared to facilitate the response to, and recovery from, major emergencies by South Dublin County Council and to ensure that the Council's arrangements are co-ordinated with those of the other two designated Principal Response Agencies, the Health Service Executive and An Garda Síochána.

18.5.1 Construction Phase

Aside from the mitigation and monitoring measures outlined in the Construction Environmental Management Plan (CEMP, refer to Appendix 5.1) (e.g., site inspections and audits), the Construction and Demolition By-Products and Waste Management Plan (CDRWMP, refer to Appendix 5.1), and the Construction Traffic Management Plan (CTMP, refer to Appendix 5.1) and those included throughout the EIAR, no additional mitigation or monitoring is considered necessary during the Construction Phase of the Proposed Development.

A Construction Environmental Management Plan (CEMP) has been prepared and is included in Appendix 5.1 of this EIAR. The CEMP will be updated by the PSCS and the appointed Contractors prior to the commencement of the Construction Phase, so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. It will be a condition of the Employer's Requirements that the successful Contractors, immediately following appointment, must detail in the CEMP the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR. The CEMP has regard to the guidance contained in the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan, and the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

The CEMP (Appendix 5.1) summarises the overall environmental management strategy that will be adopted and implemented during the Construction Phase of the Proposed Development and must be read in conjunction with the construction details outlined in Chapter 5 (Construction) in this EIAR.

Details of mitigation measures proposed to address potential effects arising from construction activities are described in the CEMP.

18.5.2 Operational Phase

GIL is committed to protecting the environment, preventing pollution and minimising adverse environmental impacts. An Environmental Management System (EMS) is implemented at the existing DC1 and DC2 facility which covers incident management, emissions and waste management, fuel delivery and chemical storage. This EMS will be reviewed to ensure it includes the full development once operational. The EMS outlines the management of the site's environmental program and is broadly in line with the principles of ISO 14001. The existing GIL Campus has recently achieved formal ISO14001 certification, this certification will be expanded to include the Proposed Development once operational.

As part of its IE licence (P1189-01) requirements, GIL has prepared an Emergency Action Plan (EAP) for current DC1/DC2 operations. The EAP provides instructions on how to prevent and/or mitigate injury to persons, and damage to the environment.

The EAP applies to the following incidents and activities:

- Evacuation;
- Spills/releases of oils, hazardous materials/wastes;
- Fires/explosions;
- Medical emergencies;
- Releases of refrigerant gases;

- Dangerous weather conditions; and
- Other emergencies requiring facility evacuation.

An Emergency Response Team (ERT) is currently established on the Proposed Development site to respond to incidents and potential emergencies. The ERT is comprised of assigned and volunteer employees who have received the training required to respond to minor incidents at the data centre prior to the arrival of external response personnel.

Aside from the monitoring measures to be carried out in accordance with the Proposed Development site's IE licence (P1189-01) and the GIL EMS, no additional monitoring is considered necessary during the Operational Phase of the Proposed Development.

Table 18.6: Major accidents and / or disasters - assessment of mitigation measures.

Risk ID	Event	Pre-Mitigation Risk Score	Mitigation Measures [including Confirmatory Studies]	Post-Mitigation Likelihood	Post-Mitigation Consequence of Effect	Post-Mitigation Risk Score
Construction Phase						
E	Structural damage/collapse	Medium	Please refer to Chapter 5 (Construction) and the CEMP (Appendix 5.1) of this EIAR for details on construction works management and mitigation measures that will be put in place	2 Very Unlikely	3 Serious	Low
G	Contamination Event – pollution event leading to environmental damage to watercourses or groundwater, particularly associated with the potential release of silt to the aquatic environment	Medium	Please refer to Chapter 12 (Water), Chapter 13 (Land, Soils, Geology & Hydrogeology) and the CEMP (Appendix 5.1) of this EIAR for details on design and mitigation measures that will be put in place.	2 Very Unlikely	2 Limited	Low
H	Transport Incident - major road traffic accident resulting from a collision between construction traffic and public traffic i.e. cars, buses, Heavy Goods Vehicles (HGVs), in addition to pedestrians and cyclists using the road or footpaths	Medium	Refer to Chapter 5 (Construction) and the CEMP (Appendix 5.1) of this EIAR for details on construction works management and mitigation measures to be put in place.	2 Very Unlikely	3 Serious	Low
J	Biosecurity - risk of spread of invasive species during construction works, particularly during site clearance works	Medium	Refer to Chapter 11 (Biodiversity), and the CEMP (Appendix 5.1) of this EIAR for details of mitigation measures to be put in place	2 Very Unlikely	3 Serious	Low
M	Industrial Incident – explosion / fire occurring at existing or adjacent facility containing flammable / hazardous substances (i.e. diesel generators)	Medium	Refer to Chapter 5 (Construction) and the CEMP (Appendix 5.1) of this EIAR for details of mitigation measures to be put in place.	2 Very Unlikely	3 Serious	Low
Operational Phase						
No Risk IDs have been found to require mitigation.						
Decommissioning Phase						
It is noted that any potential effects which could be caused during the decommissioning phase are likely to replicate those that were caused by the Construction Phase.						

Table 18.7: Evaluation of levels of significance - post-mitigation.

Likelihood	5 – Very Likely					
	4 – Likely					
	3 - Unlikely					
	2 – Very Unlikely		[G]	[E], [I], [J], [M]		
	1 – Extremely Unlikely					
		1 – Minor	2 – Limited	3 – Serious	4 – Very Serious	5 - Catastrophic
	Consequence of Effect					

18.5.3 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 will be similar to those used during the Construction Phase, refer to Section 18.5.1.

18.6 Residual Effects

There are no identified incidents and / or major accidents and / or disasters risk events that present a sufficient combination of risk likelihood and consequence of effect that would be deemed to generate a risk event is Low.

No Significant Adverse residual effects have been identified in the Construction, Operational and Decommissioning Phases of the Proposed Development.

As mentioned previously, the design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on avoiding or reducing the potential for environmental effects, where practicable, whilst ensuring the objectives of the Proposed Development are attained. The design of the Proposed Development has been developed in compliance with the relevant design standards which include provisions to reduce the likelihood of risk events occurring (e.g. structures have been designed to avoid the risk of collapse, drainage systems have been designed to cater for increased rainfall events etc.).

Processes will be in place during all phases of the Proposed Development including the proposed mitigation and monitoring measures (refer to Section 18.5) that will be introduced to avoid and/or reduce the vulnerability of the proposed development to major accidents and/or natural disasters. Therefore, it is considered that there will not be any likely Significant Adverse environmental effects arising from the vulnerability of the proposed Project to major accidents and/or natural disasters.

18.7 References

Construction Industry Research and Information Association (CIRIA) (2015) *Environmental Good Practice on Site Guide, 4th Edition*

European Commission (EC) (2012) *Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC.*

European Commission (EC) (2014) *Directive 2014/52/EU of the European Parliament and 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.*

Environmental Protection Agency (EPA) (2014) *Guidance on Assessing and Costing Environmental Liabilities.*

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

Government of Ireland (GoI) (2010) *A Framework for Major Emergency Management Guidance Document 1-A Guide to Risk Assessment in Major Emergency Management.*

Government of Ireland (GoI) (2023) *National Risk Assessment for Ireland 2023.*

Health and Safety Authority of Ireland (HAS) (2024) *List of Lower Tier Seveso Establishments.*

Institute of Environmental Management Assessment (IEMA) (2020) *Major Accidents and Disasters in EIA – A Primer.*

South Dublin County Council (SDCC) (2022) *South Dublin County Development Plan 2022 – 2028.*

South Dublin County Council (SDCC) (2024) *South Dublin County Council Climate Action Plan 2024 – 2029.*

South Dublin County Council (SDCC) (2016) *Major Emergency Plan 2016.*