South Dublin Routing 4 No. 2 Limited

Operational Report (Revised)

Attachment-4-8-1

September 2024

Licence Application LA011399

CONTENTS

1.0 REPORT INTRODUCTION AND PURPOSE OF IE LICENCE

This Operational Report relates to the South Dublin Routing 4 No. 2 Limited ('the Applicant') application to the Environmental Protection Agency (EPA) for an Industrial Emissions (IE) Licence to operate their Energy Centre and Data Centre located at Orion Business Campus, Northwest Business Park, Dublin 15, D15 XE2N, Co Dublin. The location of the subject site is shown on DUB01EX-RKD-ZZ-ZZ-DR-A-00008-Site Location Map included with this application, this application relates to the entire Installation, that covers c. 5.48 hectares in total (hereafter referred to as the 'Site').

The Installation, when fully operational, will consist of 3 no. Energy Centre (EC) Buildings to provide a continuous power supply to the 3 no. 2-storey Data Centre (DC) Buildings. The Energy Centre, and Data Centre, main buildings, and site infrastructure (hereafter referred to as the 'Installation') is shown on DUB01EX-RKD-ZZ-ZZ-DR-A-00006-Site Layout Plan, included with the application.

The combustion plant for the complete Installation (hereinafter referred to as the "Permanent Generation") will include the following combustion emission sources:

- 9 no. dual-fuel engines are Megawatt Thermal Input (MW_{th}) (at 100% load) of 21.640 MW_{th} when operating with gas fuel; and 23.018 MW_{th} operating with HVO fuel.
- 1 no. 1.15 MW_{th} emergency generator,
- 1 no. 0.81 MW_{th} fire sprinkler pump.

Prior to the complete and fully operational Permanent Generation, the site will be powered by temporary on-site generation plant to supply electricity to DC1 and DC3 in advance of the completion of the permanent Energy Centre(s).

The temporary combustion plant (hereinafter referred to as the "Temporary Generation") will include the following combustion emission sources:

- 4 no. temporary gas-powered engines each 5.955 MW_{th}; (at 100% load), and
- 4 no. temporary diesel (HVO) engines each 6.350 MW_{th} (at 100% load).

The relevant requirement for an Industrial Emissions (IE) Licence is Activity Class 2.1 of the First Schedule of the Environmental Protection Agency EPA Act 1992 (as amended) (EPA Act 1992). Activity Class 2.1 states:

> *Combustion of fuels in installations with a total rated thermal input of 50 MW or more*

In addition to this IE Licence Application the Installation will require a Greenhouse Gas (GHG) Emissions permit in accordance with the European Communities (Greenhouse Gas Emissions Trading) Regulations 2004, (S.I. 437 of 2004 and amendments) the application for this GHG permit was submitted to the EPA on 30 May 2024.

This Operational Report describes the plant, methods, processes, ancillary processes, abatement, recovery and treatment systems, and operating procedures for the activity. The installation will be in operation 24 hours a day, 7 days a week.

1.1 SITE CONTEXT

The Site is located within Orion Business Campus, Northwest Business Park, Ballycoolin, Dublin, Co Dublin. The site is located at c. 9.8 km to the northwest of Dublin

city centre, c. 4.5 km to the southwest of Dublin Airport and c. 1.6 km from the M50 motorway. The site was previously in use as warehouse space and a logistics and distributions centre with associated office space. The site is close to the strategic road and mainline rail connections to the west and south of Ireland. The site is within c. 15 kilometres of Dublin city centre.

The site is located near the centre of the Northwest Business Park, Northwest Business Park itself is occupied by a wide variety of commercial and industrial development including pharmaceutical, data centres, food manufacturing uses, and warehousing and logistics. Huntstown Quarry and Huntstown Power Station are both located to the east of the site.

The nearest buildings around the development site are commercial i.e., not residential. The nearest residential noise sensitive locations are to the northeast and northwest of the site are at distances of approximately c. 820 m and c. 1 km respectively. A number of commercial noise-sensitive locations are at distances of c. 30 to 50 m.

Figure 1.1 *Site Location Map – Indicative site area shown*

1.1.1 Industrial sites in the Surrounding Area

Existing development that may be capable of combining with the Installation to result in cumulative effects are those that have similar emission sources or environmental effects during the operation of these existing developments.

To provide context to this IE application and the impact assessments undertaken for the Site a search using the EPA Maps[1] has been undertaken to identify existing IE

[1] https://gis.epa.ie/EPAMaps/

licenced, Waste Licenced, or Integrated Pollution Control (IPC) licenced facilities within 3 km of the Site boundary these are listed in Table 1.1 below.

Table 1.1 *EPA licenced sites within 3 km of the site boundary*

Name	Address	Distance (km) from the Site	EPA Licence Number	Industry
Lagan Materials Limited	Rosemount Business Park, Ballycoolin Road, Blanchardstown, Dublin 11, Dublin	0.32	P0081-02	Chemicals
Blancomet Recycling IE Limited	Unit 5 Rosemount Park Drive, Rosemount Business Park, Dublin 11, Dublin, D11 FVH2	0.34	P1115-01	Waste
Starrus Eco Holdings Limited (Millenium Business Park)	Millennium Business Park, Grange, Ballycoolin, Dublin 11, Dublin, D11 PN52	0.4	W0183-01	Waste
Starrus Eco Holdings Limited (Cappagh)	Cappagh Road, Finglas, Dublin 11, Dublin, D11 NP68	0.61	W0261-02	Waste
K2 Strategic Infrastructure Ireland Limited	Ballycoolin Business Park, Ballycoolin Road, Dublin 15, Dublin, Dublin, D15fy81	0.67	P1143 (Applied)	Energy
ADSIL Blanchardstown	Blanchardstown Industrial Park, Snugborough Road, Dublin, Dublin, D15 V978	0.89	P1172-01	Energy
Ipsen Manufacturing Limited	Blanchardstown Industrial Park, Blanchardstown, Dublin 15, Dublin	1.05	P0117-02	Pharmaceutical
Corduff FlexGen	Land to north of existing ESB National Supply Store, Townlands of Goddamendy and Cruiserath, Corduff Road, Dublin 15, Dublin	1.1	P1138-01	Energy
Equinix Hyperscale 1 (DB5) Limited	Equinix DB5, Blanchardstown Industrial Park, Snugborough Road, Dublin 15, Dublin, A00AA00	1.3	P1168-01	Energy
Swords Laboratories Unlimited Company Trading As Bristol Myers Squibb Cruiserath Biologics	Cruiserath Road, Mulhuddart, Dublin 15, Dublin	1.4	P0552-03	Pharmaceutical
Energia Power Generation Limited	Huntstown, Finglas, Dublin 11, Dublin	1.5	P0777-02	Energy
Huntstown Power Company Limited	Huntstown, Finglas, Dublin 11, Dublin	1.5	P0483-04	Energy
Huntstown Bioenergy Limited	Huntstown, North Road, Finglas, Dublin 11, Dublin	1.5	P0993-02	Energy

Alexion Pharma International Operations Limited	College Business & Technology Park, Blanchardstown Road North, Blanchardstown, Dublin 15, Dublin	1.8	P1030-01	Pharmaceutical
Mallinckrodt Pharmaceuticals Ireland Limited	College Business and Technology Park, Cruiserath Road, Blanchardstown, Dublin 15, Dublin, D15TX2V	2	P1060-02	Pharmaceutical
ADSIL Cruiserath	Cruiserath Road, Dublin 15, Dublin, Dublin, D15 A6RX	2	P1182-01	Energy

To provide context to this IE application and the impact assessments undertaken a similar search has been undertaken within 3 km of the site boundary for existing Control of Major Accident Hazards (COMAH) / Seveso Directive III establishments registered with the Health and Safety Authority[2]. These sites are listed in Table 1.2 below.

Table 1.2 *Seveso establishments within 3 km of the site boundary*

Name	Address	Seveso Tier	Distance (km) from the Site	Consultation Zone (km)
Gensys Power Ltd	Huntstown Power Station, Huntstown Quarry, Dublin 11	Lower	1.5	0.5

1.2 PLANNING STATUS

Permanent Generation

Planning permission for demolition of the existing logistics/warehouse building and development of the site was granted 6 March 2018 under planning permission Fingal County Council (FCC) Ref. Ref.: FW17A/0167 and amended by FCC Ref. Ref.: FW18A/0114. The duration of these permissions were extended under FCC Ref. Ref.: FW17A/0167/E1 and FCC Ref. Ref.: FW18A/0114/E1.

A further application for modifications (FCC Ref. Ref.: FW22A/0168) was subsequently withdrawn. In 2024 two retention permissions on the Site FCC Ref. Ref.: FW24A/0012 and FCC Ref. Ref.: FW24A/0013, and further amendments and FCC Ref. Ref.: FW24A/0246E were applied for and have been granted.

Temporary Generation

A determination was made by FCC under Section 5 of the Planning & Development Act, 2000 (as amended) for an exemption for the temporary use of energy generation plant. This determination was made on 14 June 2024 (FCC Ref. Ref.: FS5W/015/24).

Additionally, the permitted modifications (FCC Ref. Ref.: FW24A/0246E) to permission FCC Ref. Ref.: FW17A/0167 and permission FCC Ref. Ref.: FW18A/0114, included the Temporary Generation plant.

[2]https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/

Planning Summary

The license application for Class 2.1 of the EPA Act 1992 (as amended) covers the permitted, but not yet fully constructed development, all planning permissions relevant to the IE licence have been granted. Detailed information can be found in Section 6 (Attachment-6-1-Stakeholder-Engagement) of the license application, including the Planning Decision and Planning Report for each application. A summary of all relevant planning permissions is provided in Table 1.3 below.

Table 1.3 *Summary of Planning Permissions Granted at Installation*

Application Details	Description of Development
Reg. Ref.: FW17A/0167 Grant Permission Date: 06 Mar 2018 (Final Grant)	The development will comprise the following: Demolition of existing warehouse building (c.14,940 sq.m) Construction of 3 no. 2-storey, Data Centres, each building including data halls, offices, staff areas, plant areas, roof plant. Max height of each building c.12 m to parapet. Provision of an Energy Centre at each Data Centre, each including 5 no. flues (c.28m high), fuel tanks, switch rooms and associated plant. Provision of gas pressure reduction facility (including 2 no. service buildings of total c.52 sq.m) and with separate access. Provision of 80 no. car parking spaces, 60 no. bicycle parking spaces, internal roads and docking areas. Individual vehicular access to each data centre to be provided via the 3 no. existing entrances to the north of the site. Extension of existing footpath to the north-east of the site. Site lighting and security fencing (c.2.4m high palisade.) All associated site development works, landscape works and services provision. Total floor area of the proposed development is c.31,537 sq.m.
Reg. Ref.: FW18A/0114 Grant Permission Date: 31 Oct 2018 (Final Grant)	Modifications to permission Ref. FW17A/0167 (for demolition of existing warehouse and construction of 3 no. data centres and associated works). The proposed modifications to the permitted development will comprise the following: Revised internal layouts of the 3 no. permitted buildings, increase in the footprint of Building 2, and re-allocation of ancillary office/admin space between the 3 buildings with associated elevational changes. Provision of plant room within upper floors of each building and reduction in roof plant. Revised energy centre layouts with reduction in size of plant buildings and the number of flues reduced to 3 per stack (one stack per building, each c.28 m high). Provision of sprinkler pump house. Revised access, internal roads and car parking layouts with 82 no. car parking spaces, 63 no. bicycle parking spaces now provided. Revised security fencing and external lighting layouts. Provision of 2 no. single storey security buildings (c.72.69 sq.m total floor area). All associated site development works, landscape works and services provision. Total gross floor area of the proposed development revised to c. 40,635 sq.m. The remainder of the development to be carried out in accordance with parent permission Ref. FW17A/0167.
Reg. Ref.:FW17A/0167/E1 & FW18A/0114/E1 Grant Extension of Duration Date: 19 Jul 2022	Extension Of Duration Of Permission to FW17A/0167 and FW18A/0114/E1
Reg. Ref.: FW22A/0168 Application Withdrawn	The development will consist of modifications to permission Ref. FW17A/0167 (for demolition of existing warehouse and construction of 3 no. data centres and associated works) and permission Ref. FW18A/0114 (Amendments to the permitted 3 no. data centres and associated works). the proposed modifications will relate to the first

Date: 20 Jun 2023	phase of the permitted development which encompasses Building No. 1, Energy Centre No. 1, the main site entrance, internal access roads, ancillary infrastructure, 35 no. car parking spaces and 24 no. bicycle spaces. The proposes modifications will comprise the following; Revised internal layout of building No. 1 with associated elevational changes including but not limited to material alterations, alteration of door locations, alteration of louver locations, alteration to the loading bay area and addition of canopies to the front and rear of the building; The provision of Solar PV Panels to the roof of the administration building; Additional roof penetrations; Alteration to the size, orientation and design of the security/guard house building no. 1; Alteration to the car park, entrance and access roads within the site, relocation of 4 no. motorbike parking spaces and addition of 1 no. additional space (total 5), provision of 4 no. EV charging points (with ducting provided for a further 14 no. future charging points). Alteration to the location and design of the gas metering skid, pump house and sprinkler water tank; Modification to the landscaping, perimeter fencing and entrance gates; Modification to the location and design of the GNI compound and its separate vehicle entrance along the southern boundary; and All associated site development works, landscape works and service provision. The gross floor area of Building No. 1 decreased to 12,153.63 spm and the total gross floor area of the proposed development revised to 39.802.87 sqm. The proposed modifications to the first phase of the development will also include alteration to the energy centre for building no. 1 for a temporary period of c. 3.5 years. The temporary modifications within the generator yard include; Installation of 4 no. gas powered generators and 4 no. bio diesel (HVO) generators (including biodiesel storage) used in standby applications; Each generator will include a 12m tall flue stack; 2 no. Battery Storage area and a Battery inverter station; and Installation of 6 no. containerised switch gear rooms and 8 no. transformers; Installation of a n ESB substation(Max 500K Va) for a temporary period of c. 3.5 years is also proposed to the south of the generator yard. the temporary modifications will replace the permitted layout for the temporary period. Following the temporary period, the energy centre including the generator yard will return to the layout and design as permitted by FW18A/0114. The temporary works will be removed once Building 2 & 3 have been commissioned. The remainder of the development to be carried out in accordance with parent permission Reg. Ref. FW17A/0167 and Amendment permission FW18A/0114.
Reg. Ref.: FW24A/0012 - Retention Permission Grant Retention Permission Date: 8 April 2024	The application for retention consists of construction of a new 500KVA substation (GFA of 30.1 sqm & max height of 3.2 m) and back-up generator. The development will also include amendment to permission Ref. FW17A/0167 and permission Ref. FW18A/0114 to include the works subject to retention.
Reg. Ref.: FW24A/0013 - Retention Permission Grant Retention Permission Date: 7 June 2024	The application for retention consists of modifications to the permitted entry area and guardhouse (GFA 45.67 sqm & max height 4.275m) in relation to orientation and design. Other minor modifications to car parking and landscaping are also included. The development will also include amendment to permission Ref. FW17A/0167 and permission Ref. FW18A/0114 to include the works subject to retention.
Reg. Ref.: FS5W/015/ Grant Section 5 Exemption Date: 14 June 2024	Application for an exemption under Section 5 of the Planning and Development Act 2000 (as amended) for the temporary use of energy generation plant pursuant to planning permission FW17A/1067.
Reg. Ref.: FW24A/0246E	The application for planning permission consists of modifications to permission Ref. FW17A/0167 (for demolition of existing warehouse

Grant Permission Date: 28 August 2024	and construction of 3 no. data centres and associated works) and permission Ref. FW18A/0114 (Amendments to the permitted 3 no. data centres and associated works). The proposed modifications will comprise the following: Revised layout of Plant Yard No. 1 to provide a new gas pressure reduction station (GPRS), revised Energy Centre, modifications to permitted flue design, and alteration of HV Building to MV building and revised design; Revised layout of Plant Yard No. 2 to provide revised Energy Centre, modifications to permitted flue design, fuel storage tanks, and combined services building; Revised layout of Plant Yard No. 3 to provide revised Energy Centre, modifications to permitted flue design, and alteration of HV Building to MV building and revised design, new battery energy storage system (BESS); Modifications to internal access and landscape areas to accommodate redesigned Plant Yards; Ancillary infrastructure including revised sprinkler tank and pumphouse location; Minor modifications to rear loading of Buildings No. 1, 2 and 3; and All associated works ancillary to the modifications. The proposed modifications will also include a temporary energy generation compound for a period of c. 1.5 year. The temporary modifications include: Installation of 4 no. gas powered generators and 4 no. bio diesel (HVO) generators (including biodiesel storage) used in standby application; Each generator will include a 12 m tall flue stack; 2 no. Battery Storage area and a Battery inverter station; Installation of 6 no. containerised switchgear rooms and 6 no. Transformers; and ancillary equipment including fuel interceptor. Following the temporary period, Data Centre building No. 2 will be developed in accordance with the layout and design as permitted by FW18A/0114 including the modifications proposed in this application. The temporary works will be removed once Energy Centre No. 1 and 2 have been commissioned. The remainder of the development is to be carried out in accordance with parent permission Reg Ref. FW17A/0167, Amendment permission FW18A/0114, and any subsequent amendments permitted by this application for planning permission.

2.0 DESCRIPTION OF ACTIVITY

2.1 INSTALLATION OVERVIEW

2.1.1 Temporary Generation Installation Layout

The Temporary Generation plant is required whilst construction works are ongoing to develop the permitted scheme. Whilst the balance of the scheme including Energy Centres 1 and 2 is being developed, temporary energy generation (via gas-power generators, diesel generators, and batteries) is required. When the EC1 and EC2 are complete, commissioned, and fully operational, the temporary energy plant will be removed. The Temporary Generation is located under the footprint of DC2.

This IE Licence seeks the Temporary Generation plant to operate in conjunction with EC1 and EC2 until Q4 2026, unless otherwise agreed with the Agency to extend the duration of this Temporary Generation phase.

The EC1 and EC2 plant will operate in conjunction with the Temporary Generation during commissioning, testing, and load change over. During the Temporary Generation phase the Installation will consist of:

- 2 no. two-storey DC Building(s) named, DC1 and DC3. The Data Centre Building(s) include data halls, adjacent office space, staff area, plant area, roof plant, adiabatic hybrid coolers.
- Temporary Generation plant including 4 no. temporary gas-powered engines with a Megawatt Thermal Input (MW_{th}) (at 100% load) of 5.955 MW_{th}; and 4 no. temporary diesel (HVO) engines with a MW_{th} of 6.350 MW_{th}. Each generator will include a 12 m tall flue stack.
- Temporary Generation ancillary development and essential infrastructure. Including battery inverter station; containerised switchgear rooms and transformers, fuel storage, battery energy storage system (BESS), and various electrical equipment.
- Permanent Generation plant, including 2 no. EC Building(s) named, EC1, and EC2, that each contain 3 no. Dual-Fuel Engines (total of 6 no. engines), each combustion unit includes a selective catalytic reduction (SCR) abatement system. Each EC includes 3 no. are 28 m above ground level flues, grouped into 1 no. common stack. The emissions to air from the Dual-Fuel Engines will be controlled through the use of SCR abatement.
- EC(s) ancillary development and essential infrastructure. Including, MV Building, Combined Services Building, transformers, fuel/lubricant storages, battery energy storage system (BESS), and various electrical equipment. Fuel storage tanks area, lubricating oil tank area, and urea tank area, along with associated unloading bay and fuel distribution pipe rack, and below surface level pipe trench.
- Ancillary site wide development including: roads, site security fencing, guard house, car parking spaces, sheltered bicycle parking, unloading bays, waste storage areas, underground drainage and attenuation system, and landscaping.

See Figure 2.2 Temporary Site Layout Plan (Dwg. Ref.: DUB01EX-RKD-ZZ-ZZ-DR-A-00010). The Installation during the Temporary Generation phase will be in operated by a number of experienced personnel (See Attachment-2-5-3 Technical Knowledge or Qualifications). The Installation will be in operation 24 hours a day, 7 days a week.

During the Temporary Generation phase, the Installation will primarily be powered by 4 no. temporary gas-powered engines. During this phase the Installation will also have the ability to be powered from 3 no. Dual-Fuel Engines from EC1 and EC2. The Temporary Generation and the Dual-Fuel Engines will not operate concurrently to provide electricity as the site load does not require it. However, at times due to commissioning, load testing, and change over, there will be times at a worst case when both power solutions are running.

The primary fuel source for the temporary gas-powered engines, and EC(s) is gas supplied from the national grid. In the unlikely eventuality of transmission gas failure or other emergency situation, the electricity requirements will be provided by the 4 no. temporary diesel (HVO) engine, or the 3 no. Dual-Fuel Engines in EC1 and EC2 operating in liquid fuel mode. Hydrotreated Vegetable Oil (HVO) is the preferred liquid fuel and diesel is to be an alternative back-up fuel to HVO. HVO has an almost identical chemical composition to petroleum-diesel this allows for HVO to be used in diesel engines without the need modification.

In normal operation the Dual-Fuel Engines will utilise approximately 1% liquid fuel as a pilot fuel. In the unlikely eventuality of transmission gas failure or other emergency situation, the EC engines have dual-fuel functionality and can be powered using a liquid fuel. Hydrotreated Vegetable Oil (HVO) is the preferred liquid fuel and diesel is to be an alternative back-up fuel to HVO. HVO has an almost identical chemical composition to petroleum-diesel this allows for HVO to be used in diesel engines without the need modification. Hereinafter the secondary fuel for the Dual-Fuel Engines (HVO or diesel) is referred to as simply as liquid fuel.

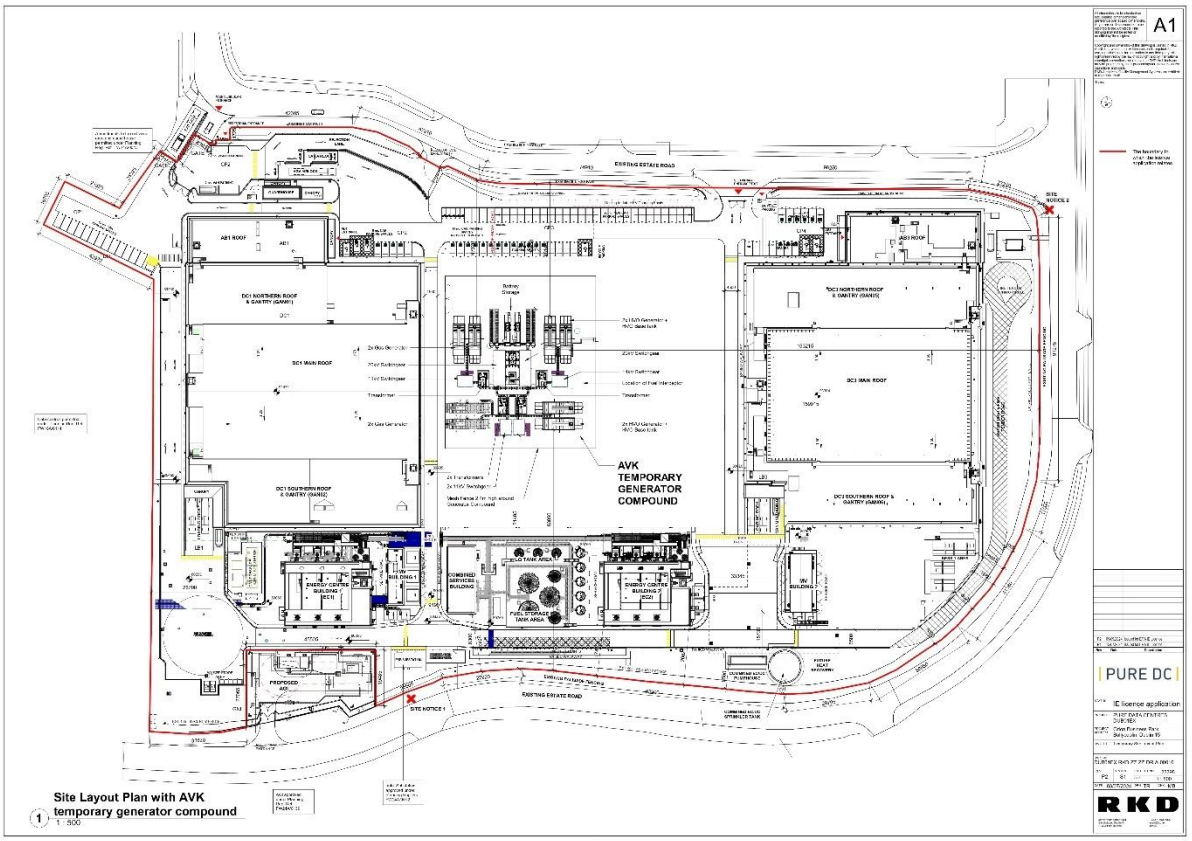

Figure 2.1 *Temporary Site Layout Plan (DUB01EX-RKD-ZZ-ZZ-DR-A-00010)*

2.1.2 Permanent Generation Installation Layout

The Installation when fully constructed (post-removal of Temporary Generation plant) will consist of:

- 3 no. two-storey DC Building(s) named, DC1, DC2, and DC3. The Data Centre Building(s) include data halls, adjacent office space, staff area, plant area, roof plant, adiabatic hybrid coolers.
- Permanent Generation plant, including 3 no. EC Building(s) named, EC1, EC2, and EC3 that each contain 3 no. Dual-Fuel Engines (total of 9 no. engines), each combustion unit includes an selective catalytic reduction (SCR) abatement system. Each EC includes 3 no. are 28 m above ground level flues, grouped into 1 no. common stack. The emissions to air from the Dual-Fuel Engines will be controlled through the use of SCR abatement.
- The EC(s) ancillary development and essential infrastructure. Among these key components are the MV Building, Combined Services Building, transformers, fuel/lubricant storages, battery energy storage system (BESS), and various electrical equipment. Fuel storage tank area, lubricating oil tank area, and urea

tank area, along with associated unloading bay and fuel distribution pipe rack, and below surface level pipe trench.

- Ancillary site wide development including: roads, site security fencing, guard house, car parking spaces, sheltered bicycle parking, unloading bays, waste storage areas, underground drainage and attenuation system, and landscaping.

See Figure 2.2 Site Layout Plan (Dwg. Ref.: DUB01EX-RKD-ZZ-ZZ-DR-A-00006). The Installation will be in operated by a number of experienced personnel (See Attachment-2-5-3 Technical Knowledge or Qualifications). The Installation will be in operation 24 hours a day, 7 days a week.

When fully operational, the Installation will be powered by the EC Building(s) and the BESS, a utility connection will be drawn from the grid for lighting and powering the office and administration areas. The primary fuel source for the EC(s) is gas supplied from the national grid. In normal operation the Dual-Fuel Engines will utilise approximately 1% liquid fuel as a pilot fuel. In the unlikely eventuality of transmission gas failure or other emergency situation, the EC engines have dual-fuel functionality and can be powered using a liquid fuel.

Figure 2.2 *Site Layout Plan (DUB01EX-RKD-ZZ-ZZ-DR-A-00006)*

2.2 INSTALLATION PHASING

The development and ramp-up of data centres are a multi-phase process. Bringing a data centre to full operational capacity is not an instantaneous event but rather a gradual process that unfolds over time. Initially, data centres are constructed with the focus on establishing core infrastructure, including the shell of the building, underground utilities, and essential systems such as power supply and cooling

mechanisms. Once these foundational elements are in place, the installation of IT equipment, such as servers, storage systems, and networking hardware, begins. The deployment of the IT equipment components is completed done in phases to align with the growing demands of the centre's future tenants or users.

The construction of the development of core infrastructure is to be undertaken on a phased basis to implement the overall site masterplan. The phasing corresponds with occupier requirements and is based on the detailed planning and design of the construction phase of the project. The data storage facilities are designed to allow for this phased construction, with data halls being delivered and occupied in an orderly and efficient manner.

Table 2.1 sets out the development construction phasing based on current timelines.

Table 2.1 *Estimated Construction Development Phasing*

Element	Estimated Start	Estimated End
DC1 (Completed)	Q1 2022	Q4 2023
Temporary Generation	Q3 2024	Q1 2025
DC2	Q3 2026	Q1 2028 - Cold Shell only, +18 months for TOC
DC3	Q4 2026	Q1 2028 - Cold Shell only +16 Months for TOC
EC1	Q2 2024	Q2 2026
EC2	Q3 2024	Q2 2026
EC3	Q4 2026	Q2 2028 Linked to DC3 approval to proceed

Post-practical completion the ramp-up phase (installation of IT equipment) can extend over months or even years, during which the data centre progressively increases its operational capacity. During the initial ramp-up phase, the Temporary Generation will be employed to support initial operations before the full Permanent Generation is complete. The Temporary Generation ensures that early-stage data centre operations can commence without delay, while the permanent power systems are finalised and commissioned.

The Temporary Generation system has a total rated thermal input of 49.22 MWth. In this case, the Temporary Generation does not independently exceed this 50 MWth threshold, it would not, under normal circumstances, require an IE Licence on its own. The Installation is anticipated to operate a load exceeding $50MW_{th}$ input in Q2 2026 when EC1 is operational.

The installation and commissioning of the Permanent Generation system are planned to occur in phases, and during this transition, there will be a period of overlap between the Temporary Generation and Permanent Generation systems. This overlap is necessary to ensure a continuous power supply to the data centre facilities, allowing for a smooth changeover and commissioning process.

During this overlapping phase, the combined thermal input of the installed Temporary and Permanent Generation systems will exceed the 50 MWth threshold. As a result, even though the Temporary Generation alone does not require an IE Licence, the entire installation, during this overlap, will necessitate such a licence.

Table 2.1 sets out the development energy generation operational phasing based on current timelines, from commencement of operations (including commissioning and change over).

Table 2.2 Estimated Energy Generation Operational Phasing

Element	Engines	Estimated Operation	Estimated End
Temporary Generation Phase 1	2 HVO & 2 Gas	Q4 2024	Q4 2026
Temporary Generation Phase 2	2 HVO & 2 Gas	Q1 2025	Q4 2026
EC1	3 DF engines	Q2 2026	N/A
EC2	3 DF engines	Q2 2026	N/A
EC3	3 DF engines	Q2 2028	N/A

2.3 PRIMARY PROCESSES

2.3.1 Temporary Generation

The Temporary Generation ensures that the data centre can meet its energy needs during the transitional phase, maintaining operational continuity while the permanent energy infrastructure is being completed.

The Temporary Generation includes 4 no. temporary gas-powered engines each with a Megawatt Thermal Input (MWth) of 5.955 MWth when operating at full capacity. In addition, there are 4 no. temporary diesel (HVO) engines, each a thermal input of 6.350 MWth. Each of these generators is equipped with a 12-metre flue stack to effectively disperse emissions.

During the Temporary Generation phase, the installation will primarily rely on the 4 no. gas-powered engines to supply electricity to the data centre's IT areas. Additionally, a utility connection to the national grid will be utilised to provide power for non-critical functions, such as lighting and the operation of office and administration areas. The primary fuel source for the energy centres is natural gas, supplied directly from the national grid. In the unlikely event of a gas transmission failure or other emergency situation, the electricity requirements of the data centre will be met by the 4. no diesel (HVO) engines.

Beyond the engines themselves, the Temporary Generation includes several key ancillary developments necessary operation of the plant. These include a battery inverter station, containerised switchgear rooms and transformers which manages the energy storage and distribution, ensuring that the power supply remains stable and responsive to demand fluctuations. Furthermore, the Temporary Generation is equipped with a Battery Energy Storage System (BESS). The BESS provides additional energy reserves, allowing the installation to respond to short-term energy demands or potential supply interruptions.

Liquid Fuel / Oil Storage

Each temporary diesel (HVO) generator is equipped with a 34,580-litre double-skinned belly tank. The double-skinned design provides an additional layer of protection against leaks, ensuring that fuel is securely contained and reducing the risk of environmental contamination. In addition to the main fuel tanks, each generator also includes a 400-

litre lube oil tank to supply lubrication necessary for the smooth operation of the engines. To further enhance safety and environmental protection, the diesel generators are housed within containers that include leak detection systems. These systems are capable of identifying any potential leaks early, allowing for immediate intervention to prevent spillage and mitigate any environmental risks.

Battery Energy Storage System (BESS)

The temporary BESS provides energy security by storing excess electricity generated during periods of low demand. This stored energy can be utilised during peak demand or in case of an emergency, ensuring continuous power supply to critical operations. The temporary BESS is located to the south of DC3 and east of EC3.

The primary role of the BESS is to act as a backup power source. In the event of a primary power failure or interruption, the BESS can immediately supply stored electricity to keep essential systems running until the main power source is restored or until power is restored.

2.3.2 Energy Centre (EC1, EC2, and EC3)

The Energy Centre (EC) Building(s) EC1, EC2, and EC3 include 9 no. turbocharged reciprocating internal combustion units with a Megawatt Thermal Input (MW_{th}) (at 100% load) of 21.640 MW_{th} when operating with gas fuel; and 23.018 MW_{th} operating with HVO fuel.

The combustion units are Dual-Fuel Engines, under normal conditions the generators will be fuelled with gaseous fuel and a liquid “pilot fuel”. The term “pilot fuel” refers to a small quantity of fuel used to initiate the combustion of a primary fuel, the liquid fuel is injected into the combustion chamber first and ignited, which then ignites the gaseous fuel. Under abnormal operating conditions, should the gas supply fail, the engines can immediately switch to liquid fuel (HVO or Diesel) maintaining a constant supply of electricity to the Installation. The gaseous fuel supplied by Gas Networks Ireland (GNI) consists of Natural Gas and Biomethane, Biomethane that began flowing into the gas network in 2019 and GNI aims to deliver a net-zero carbon gas network by 2050.

The normal operational load from the DC Building(s) are to be supplied from 7 no. engines. The electricity generated by the EC is distributed throughout the DC Building(s) to power various equipment, including servers, cooling systems, lighting, and other electrical loads essential for the facilities operations.

The engines are each fitted with Selective Catalytic Reduction (SCR) abatement to reduce exhaust emission gases to air (see Attachment-7-1-3-2-Air Emissions Impact Assessment). The exhausts from the 9 no. engines will be via 3 no. stacks (3 flues each) and have been designed at a height of 28 m above ground level. The individual engines will be housed in purpose-built structures clad with sound attenuating materials to allow the plant to operate with negligible impact on noise sensitive locations (see Attachment-7-1-3-2-Noise Emissions Impact Assessment). Lubricating oil (LO) plays a crucial role in ensuring smooth and reliable operation of the Dual-Fuel Engines thereby enhancing the engine's performance and longevity. Each engine calls directly for LO which is circulated via an oil pump from the clean LO tanks, and waste oil returned to the waste LO tank. The LO system is equipped with sensors and gauges that monitor oil pressure and temperature.

The EC is designed to operate continuously throughout the year, and the 3 no EC Building(s) operate as a single generating plant providing the Applicant the ability and flexibility to provide the required electricity load by operating the minimum number of engines required to meet the required load. This approach makes for a more efficient use of engines as less are required for redundancy and maintenance standby purposes overall.

Each EC Building will have its own oily water detention system that will collect potential spills, contaminated wastewater (oily water), rainwater falling into flues, condensate is separated from uncontaminated wastewater (stormwater) and contained in a separate holding sump that will be emptied periodically and disposed of by tanker.

The Installation will operate a Building Management System (BMS) automation system for control, monitoring, data collection and alarm/reporting of the generators, continuous emission monitoring systems, fuel oil, and gas utility systems. The BMS will also be used to monitor and control the operating parameters of the generators to ensure they work at optimal efficiency. The BMS will ensure the Installation is running an optimal efficiency and will alert the operators in the event of a malfunction using visual and auditable alarms.

Selective Catalytic Reduction (SCR) Abatement

The SCR system injects an aqueous solution of urea (AdBlue), into the exhaust stream of each engine. The mixed exhaust gases and aqueous urea solution pass through a specialised catalytic converter, known as the SCR catalyst (ceramic catalyst). Inside the SCR catalyst the high-temperature exhaust gases react with the urea significantly reducing NO_x (>90%) and producing nitrogen gas (N_2) and water vapor (H_2O).

Each SCR system consists of a mixing section which sprays urea into the exhaust flue gas via a urea dosing pump, the system is controlled by two NO_x sensors before and after the SCR unit. The electronic sensors check for adequate urea injection, ensuring that the catalyst is functioning effectively to reduce NO_x emissions. Any discrepancies or malfunctions are detected by the system. Monitoring and diagnostics of engine emissions via the SCR abatement systems is included to ensure compliance with emission limits.

Bulk Tank and Service Yard

Located to the south of EC2 is a centralised Bulk Tank and Service Yard for the 3 no. EC(s) where lubrication oil, waste oil, and urea (AdBlue) catalyst will be stored.

The EC(s) uses liquid fuel as a pilot fuel, and the EC(s) has dual-fuel functionality and can be powered using a liquid fuel during emergency situations. The service yard includes 3 no. 350 m^3 carbon steel Bulk Liquid Fuel Storage Tanks, and 2 no. 65 m^3 carbon steel pilot liquid fuel Day/Receiving Tanks. The liquid fuel tanks are bunded within the services yard.

There are 3 no. Lubricating Oil (LO) tanks located in the LO tank area located south of EC2, 1 no. 30 m^3 for clean LO, 1 no. 25 m^3 for waste LO, and 1 no. 20 m^3 service LO tank.

The SCR abatement requires an aqueous solution of urea (AdBlue) this is stored in 5 no. 50 m^3 double walled stainless-steel tanks; these bulk tanks serve to fill 9 no. day tanks at each individual Dual-Fuel Engines.

EC Cooling Systems

The individual Dual-Fuel Engines are provided with a high temperature (HT) closed loop coolant circuit, consisting of an ethylene glycol / water mixture to control engine operating temperatures and allow generated heat to be dissipated through roof mounted air-cooled radiators. Dissipation of heat from the various engine components is required to maintain engine performance. Control of the HT circuit is based on set temperatures at the specified design flow rate. The number of individual air cooler fans running depends on the heat load to be dissipated and the ambient temperature during operation.

Waste Heat Recovery

The waste heat generated by the energy centre has the potential as a source of energy in district heating schemes. It is important to make clear, there are no district heating scheme in place in the local area; however, the necessary space planned to incorporate a waste heat recovery system in future. This means that the Installation is ready for the incorporation and connection to any district heating scheme in the future; such users could be residential houses and flats, commercial buildings, and pharmaceutical / laboratories for example.

Water Treatment Systems

The Installation includes water treatment systems to supply a higher quality of water to the EC(s) turbo wash (designed to clean the turbine section of the engine). The EC(s) will be supplied from the Uisce Éireann (UÉ) mains connection in combination with rainwater harvesting. The water treatment systems include carbon filters, demineralisation, reverse osmosis (RO) and ultraviolet (UV) treatment. This water that passes through the treatment plant is only for the use as process water; domestic water is provided directly from the mains. The RO system operates by subjecting water to a multi-stage purification process. A reverse osmosis water treatment system is a process that utilises a semipermeable membrane to remove impurities and contaminants from water by applying pressure to force water molecules through the membrane while leaving larger particles and contaminants behind.

As part of the process, the water treatment systems necessitate the discharge of wastewater, which is directed to the foul drain. The EC(s) turbo wash has no wastewater discharge; water is injected into the engine while it is running and expelled (as steam).

Battery Energy Storage System (BESS)

The BESS provides energy security by storing excess electricity generated during periods of low demand. This stored energy can be utilised during peak demand or in case of an emergency, ensuring continuous power supply to critical operations. The Permanent Generation BESS is located to the south of DC3 and east of EC3.

The primary role of the BESS is to act as a backup power source. In the event of a primary power failure or interruption, the BESS can immediately supply stored electricity to keep essential systems running until the main power source is restored or until power is restored.

2.3.3 Data Storage Buildings

The Data Centre Building(s), DC1, DC2, and DC3, when completed will house banks of servers IT and technical hardware to allow the Applicants clients (individuals, businesses, and organisations) to store their information at a secure and reliable facility off their premises for minimal cost and complexity compared to the traditional forms of in-house data storage systems. The Data Centre will provide clients with state-of-the-art power, cooling, and connectivity technology, accompanied by robust security measures to ensure strict control over access to information. The Data Centre hardware and other associated equipment generate heat, which needs to be managed by the cooling systems.

The primary requirements of the development are to run the banks of servers in the three DC(s) and the air-handling units to control temperature and humidity within the building.

The data halls themselves and the equipment within requires a consistent temperature to operate. It is shown by the numerous other data centres in Ireland, the temperate climate is ideally suited. The naturally cool ambient temperature means the data halls require less cooling than if the facility were in regions of the world subject to greater temperature and humidity variation.

Free-Cooling Chiller System

The free-cooling chiller system uses air-handling units to control temperature and humidity within the IT rooms. A closed-loop chilled water (CHW) system is used to transport heat away from the IT equipment. The closed-loop cooling system in the DC(s)utilises a fluid with glycol water solution (30/70 glycol/water mix), which is initially filled during installation and requires only infrequent top-ups thereafter. This fluid acts as the heat transfer medium, circulating through a network of pipes and heat exchangers. Unlike open-loop systems, this closed-loop design doesn't consume water during the cooling process, making it more sustainable. The cooling process involves a heat exchanger that cools the circulating air within the DC(s), effectively minimising the risk of external contaminants entering the space. The system utilises mechanical refrigeration during peak cooling, the refrigerant undergoes phase changes within the closed-loop system, efficiently absorbing heat from the indoor air and releasing it outside the building. Free cooling, utilising low ambient temperatures, will be utilised by central plant for more than 68% of the year, after which mechanical refrigeration will assist at higher power consumption to maintain the CHW temperatures for cooling. This ensures a controlled and energy-efficient cooling process, maintaining optimal conditions within the data centre.

The cooling system, which will operate 24/7, are designed to run as efficiently as possible. The control system includes sensors to monitor various environmental factors, such as temperature, humidity, and air quality. A central control system monitors and stages plant on/off as required of load, as well as adjusting fan speeds and pump speeds, through variable speed drives (VSDs) to meet demand. The CHW system prioritises free cooling to maintain design conditions in the IT equipment. Power monitoring on all key CHW system plant items monitors power consumption year round, for evaluation and to make operating improvements in the future.

The CHW systems will have the necessary connections on the Return line for extension to a future plate heat exchanger and heat upgrade plant room for heat recovery and export. Recirculation air from the IT Rooms and all office spaces is

reused within the ventilation plant as a means of offsetting heat load for the ventilation plant, and supports sustainability efforts.

Water Treatment Systems

The Installation includes advanced water treatment systems to supply a higher quality of water to the DC(S)humidification processes. The DC(s)will be supplied from the Uisce Éireann (UÉ) mains connection in combination with rainwater harvesting. The water treatment systems include carbon filters, demineralisation, reverse osmosis (RO) and ultraviolet (UV) treatment no chemical dosing is anticipated. This water that passes through the treatment plant is only for the use as process water; domestic water is provided directly from the mains or collected rainwater.

The RO system operates by subjecting water to a multi-stage purification process. A reverse osmosis water treatment system is a process that utilises a semipermeable membrane to remove impurities and contaminants from water by applying pressure to force water molecules through the membrane while leaving larger particles and contaminants behind.

As part of the process, the water treatment systems necessitate the discharge of wastewater, which is directed to the foul drain.

2.4 SECONDARY PROCESSES AND INFRASTRUCTURE

2.4.1 Ancillary Infrastructure

Other ancillary infrastructure associated with the Installation includes:

- The Installation is supported 1 no. containerised Emergency Generator (HVO/diesel powered) to provide utility power to the Installation in the event of a temporary failure of electricity supply. This Emergency Generator includes a 6.5 m^3 Metal Bunded Fuel Tank; dual wall integral fuel tank base Integral diesel fuel tank is incorporated into the generator set base frame, and 1 no. 1 m^3 fuel tank internal within the generator enclosure.
- Sprinkler pump house, sprinkler tanks and 1 no Fire Sprinkler Pump (HVO/diesel powered); the sprinkler pump house includes 1 no. 0.5 m^3 fuel tank within the pump room.
- Security infrastructure, security hut, security fencing
- CCTV, site lighting and associated landscaping
- Car parking and bicycle parking spaces, internal roads and docking areas. Individual vehicular access to each data centre
- Drainage infrastructure including underground stormwater attenuation, hydrobrake, and hydrocarbon interceptors.
- Temporary drainage infrastructure including underground stormwater attenuation, and hydrocarbon interceptor.

The overall layout of the Installation is shown on DUB01EX-RKD-ZZ-ZZ-DR-A-00005-Site Master Plan included with this application.

2.4.2 Water, Wastewater, and Stormwater Drainage Infrastructure

2.4.2.1 Potable Water and Process Water Supply

The Installation's domestic water use includes welfare facilities and staff use, serving the needs of the on-site personnel. Industrial (process) water is required and the EC(s) turbo wash and for DC(s) humidification processes. The Installation domestic and industrial water is provided from rainwater harvesting (harvested at roof level and stored in a rainwater recovery system), the Uisce Éireann (UÉ) mains supply. The Applicant has a commitment to adopt best practice in Resource and Waste Management in the pursuit of Net Zero water in operation initiative across all operational sites. A commitment has been made to incorporate best practices in water conservation throughout the detailed design process. This includes the reduction in water demand and innovative reuse of water and rainwater for process applications.

Water meters, sluice valves and hydrants, in line with Uisce Éireann (formerly Irish Water) requirements and specifications, will be installed at the connections onto the existing water mains, as required. Fire hydrants will be installed in accordance with the requirements of the Building Regulations.

It is proposed to provide a 125mm OD PE100 SDR11 (100mm internal diameter) watermain to supply and process water to the proposed development. A 180mm OD PE100 SDR11 (150mm internal diameter) watermain shall be provided to supply firefighting water. It is envisaged that there will be a single connection to the 100mm diameter public watermain located on the access road to the north of the site. A bulk water meter shall be constructed at the entrance of the site. The watermain layout has been designed in accordance with DOE's "Recommendations for Site Development Works for Housing'. All watermains and details are to be constructed in accordance with Irish Water requirements. Connection agreements have been applied for with UÉ and are ongoing.

2.4.2.2 Domestic and Process Wastewater (Foul Sewer)

The sanitary effluent from staff amenities, washroom facilities and break room areas, will be collected within the on-site foul sewer. The onsite sewer will also collect wastewater from the water treatment rooms for the EC(s), and condensate from DC(s) cooling and humification systems. The EC(s) turbo wash has no wastewater discharge; water is injected into the engine while it is running and expelled (as steam).

The onsite sewer will connect via gravity and discharge into a single outfall (SE1) into the existing 300mm Ø sewer located to the south of the site.

There is a separate drainage line to collect any runoff form a sprinkler activation within the DC2 and DC3 battery rooms. In event of a sprinkler activation in battery room, shut down valve will be activated, water will be collected in a holding tank located to the south of DC2 and DC3. The Applicant will then have to sample and test the water and then determine appropriate method of discharge such as tanker.

All internal foul drainage networks were designed in accordance with the relevant guidance including Irish Waters Code of Practice for Wastewater Infrastructure, National Building Regulations Technical Guidance Document H – Drainage & Waste Disposal.

For more information on the on the foul wastewater drainage layout refer to DUB01EX-HPE-XX-ZZ-DR-C-52122 included with this application.

2.4.2.3 Stormwater Drainage Systems

The stormwater water drainage system has been designed using WinDes MicroDrainage software in accordance with the Department of Environment and Local Government's guidance document - "Recommendations for Site Development Works for Housing Areas", with guidance taken from the "Greater Dublin Strategic Drainage Study" (GDSDS) and CIRIA C644 – "Building Greener".

The drainage system has been designed with the aim of providing a sustainable drainage solution ensuring, in so far as feasible, that the development has a minimal impact on the existing public stormwater sewer system. This is achieved with the incorporation of Sustainable urban Drainage Systems (SuDS) such as permeable paving, filter drains, swales, and attenuation systems.

The stormwater from building roofs shall be collected in a gravity pipe network which will be constructed around the perimeter of the main buildings. The stormwater collected by the drainage system will be attenuated in one of 4 no. underground attenuation tanks. The stormwater attenuation tanks are not designed to retain water, there is negligible water retained within the attenuation tanks in dry weather. The attenuation tanks shall be designed to cater for a 1/100 year return period storm event without any above ground flooding. An additional 10% has been allowed for climate change in line with GDSDS recommendations. The attenuation tanks shall be a geocellular module type.

Stormwater run-off from the car park areas will be collected via a permeable paving system. Any run-off which cannot be removed by infiltration will be routed to the one of the attenuation tanks.

Run-off from the remaining hardstanding areas on site, including the access roads and yard areas will be directed either to a system of swales and filter drains, or directly to an attenuation tank. Excess run-off from the SuDS features shall be directed to an attenuation tank. Run-off from the access road and truck turning areas shall pass through a full retention oil interceptor prior to reaching the attenuation tank.

It is proposed to connect the internal stormwater drainage system to an existing 900mm diameter surface water sewer (emission point SW1), which is located at the south west corner of the site. This outfall is then drained via a culvert into the offsite Abbotstown Steam, that ultimately outfalls to the Tolka River. A non-return valve is proposed to be fitted at the outfall point to the existing storm sewer to prevent surface water entering from the public sewer into the system during surcharged conditions.

The discharge rate from the development is limited to 14.4/s. Using WinDes MicroDrainage software, the total storage requirement for the proposed development has been calculated as c. 2,935 m^3.

The underground attenuation storage will receive stormwater which has passed through suitably sized hydrocarbon interceptor to ensure any hydrocarbon pollution is removed prior to storm water entering the attenuation zones. The hardstanding areas that drain stormwater from the roadways, loading dock, and fuel delivery areas shall pass through hydrocarbon interceptor (Class 1), prior to entering the stormwater drainage system. The hydrocarbon interceptors treat rainfall and prevent hydrocarbon spillages entering the stormwater system or the offsite Abbotstown Steam.

The service yard fuel tank bund drains to the stormwater system, this includes a system to detect hydrocarbons. If hydrocarbons are detected the system closes off the bund, thereby preventing any further discharge to the on-site stormwater network.

The designated fuel unloading areas are dished to contain any spills into ACO drain along the kerb line. All runoff passes through forecourt hydrocarbon interceptor (Class 1) with automatic shutdown valve. In event of spillage form delivery vehicle, the forecourt interceptor (Class 1) will lock down and any excess fuel will build up within tank. The forecourt interceptor (Class 1) will have alarm connected to BMS to warn of high level of hydrocarbon within interceptor which should be disposed of by tanker.

For more information on the stormwater network layout refer to the drawing ref.: DUB01EX-HPE-XX-ZZ-DR-C-52123 included with this application.

Temporary Generation compound includes a Temporary Stormwater Drainage System, and Temporary Hydrocarbon interceptor. For more information on the temporary stormwater network layout refer to the drawing ref.: DUB01EX-HPE-XX-ZZ-DR-C-52200 included with this application.

3.0 BEST AVAILABLE TECHNIQUES AND COMMISSION IMPLEMENTING DECISION

Section 86A (3) of the EPA Act 1992 as amended, requires that the Agency shall apply BAT conclusions as a reference for attaching one or more conditions to an IE Licence. The installation has principally been assessed against the BAT conclusions contained in Table 3.1:

Table 3.1 *Applicable BAT documents*

Best Available Techniques	Publication date	Attachment
Best Available Techniques (BAT) Reference Document for Large Combustion Plants	2021	Attachment-4-7-1-BREF - Large Combustion Plants
Reference Document on the Best Available Techniques for Energy Efficiency	2009	Attachment-4-7-2-BREF - Energy Efficiency
Reference Document on the Best Available Techniques on Emissions from Storage	2006	Attachment-4-7-3 BAT REF - Emissions from Storage
Reference Document on the application of Best Available Techniques to Industrial Cooling Systems	2001	Attachment-4-7-4 BAT REF - Industrial Cooling Systems

The included assessment documents have demonstrated that the installation will comply with all applicable BAT Conclusion requirements specified in the CID and will be in line with the guidance specified in the other relevant BREF Documents and relevant national BAT notes.

The 4 no. temporary gas-powered engines and 4 no. temporary diesel (HVO) engines, 9 no. Dual-Fuel Engines have been evaluated in accordance with the Best Available Techniques (BAT) Reference Document for Large Combustion Plants (LCP) (see Attachment-4-7-1-BREF - Large Combustion Plants).

The Large Combustion Plant (LCP) Regulations (S.I. No. 644/2003 of 2003) which transposed the LCP Directive 2001/80/EC into Irish law apply to combustion plant with a rated thermal input of which is equal to or greater than 50 MW, irrespective of the type of fuel used (solid, liquid, or gaseous). Furthermore, the Industrial Emissions Directive (IED) Directive 2010/75/EU provides that in cases where the waste gases of two or more combustion plants are, or technically could be, discharged through a common stack, the aggregation rules of Article 29 of the IED define whether and when such a combination of plants shall be considered as a single combustion plant. To calculating the total rated thermal input, combustion plants with a rated thermal input below 15 MW shall not be considered in aggregation[3].

The Dual-Fuel Engines have a rated thermal input above 15 MW, therefore fall within the scope of the LCP aggregation rules, the Emergency Generators do not fall within the scope of the LCP.

The individual Dual-Fuel Engine(s) have a Net Electrical Efficiency of at least 42% which is compliant with the LCP best available technology (BAT) requirement of 38-45% electrical efficiency.

The 4 no. temporary gas-powered engines and 4 no. temporary diesel (HVO) engines are below 50 MW_{th}, and are not LCP. The temporary gas plant and the emergency diesel generators are not LCP, the Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017) ("MCP Regulations"), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193), applies to the temporary plant.

4.0 EMISSIONS AND ABATEMENT TREATMENT SYSTEMS

This section describes the emissions from the unit operations above and the abatement or treatment system in place for those emissions and summarises any monitoring controls in place. There are no planned emissions to ground, ground water or surface water from the operational development.

4.1 EMISSIONS TO AIR

4.1.1 Emissions

4.1.1.1 Main Air Emissions

Temporary Generation

The main emission related to the Temporary Generation are listed below:

- 4 no. temporary gas-powered engines emissions stacks that have a maximum height of 12 meters above ground level (MCP Reg. Ref.: M0979-01, M0980-01, M0981-01, M0982-01);
- 4 no. temporary diesel (HVO) engine emissions stacks that have a maximum height of 12 meters above ground level (MCP Reg. Ref.: M0975-01, M0976-01, M0977-01, M0978-01); and

[3] https://environment.ec.europa.eu/topics/industrial-emissions-and-safety/industrial-emissions-directive_en

- 6 no. Dual-Fuel Engine emissions stacks that have a maximum height of 28 meters above ground level (also included in Permanent Generation).

The emission points from each Dual-Fuel Engine(s) are labelled Emission Points A2-1 to A2-6. These emission points are shown in DUB01EX-RKD-ZZ-ZZ-DR-A-00007 included with this application.

The emission points from the temporary gas-powered engines are labelled Emission Points A2-101 to A2-104, and temporary diesel (HVO) engines are labelled Emission Points A2-105 to A2-108. These emission points are shown in DUB01EX-RKD-ZZ-ZZ-DR-A-00011 included with this application.

The individual Dual-Fuel Engine(s) are 21.640 MW_{th} when operating with gas fuel; and 23.018 MW_{th} operating with HVO fuel. The LCP aggregation rules apply as the rated thermal input of the individual plant are greater than 15 MW; the 3 no. individual engines within each Energy Centre (EC1, EC2, EC3) are considered as a single combustion plant together as they discharge through a common stack.

The MCP Regulations applies to the temporary plant. The temporary diesel (HVO) engines are not anticipated to operate in excess of 500 hours per annum. Therefore, the Emergency Generators as proposed are exempt from complying with the emission limit values subject to Section 13(3) of the Medium Combustion Plant (MCP) Regulations. The temporary diesel (HVO) engines are fitted with a controller which tracks the number of hours the generators operate.

Permanent Generation

Once the temporary gas-powered engines and temporary diesel (HVO) engine emissions are decommissioned. The main emission related to the Permanent Generation are listed below:

- 9 no. Dual-Fuel Engine emissions stacks that have a maximum height of 28 meters above ground level.

The emission points from each Dual-Fuel Engine(s) are labelled Emission Points A2-1 to A2-9 in Attachment 7-4-1. These emission points are shown in DUB01EX-RKD-ZZ-ZZ-DR-A-00007 included with this application.

The individual Dual-Fuel Engine(s) are 21.640 MW_{th} when operating with gas fuel; and 23.018 MW_{th} operating with HVO fuel. The LCP aggregation rules apply as the rated thermal input of the individual plant are greater than 15 MW; the 3 no. individual engines within each Energy Centre (EC1, EC2, EC3) are considered as a single combustion plant together as they discharge through a common stack.

4.1.1.2 Minor Air Emissions

The minor emission to air sources are listed below:

- 1 no. Emergency Generator with flue c. 2.3 meters above ground level.

The emission points the Emergency Generators is labelled Emission Points A3-1 in Attachment 7-4-2. This emission point is shown in DUB01EX-RKD-ZZ-ZZ-DR-A-00007 included with this application.

The Emergency Generators will only be used during abnormal operating in the case of emergencies are classified as minor emission points due to their periodic testing and infrequent use.

The Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193), applies to the Emergency Generator. However, this generators is not anticipated to operate in excess of 500 hours per annum. Therefore, the Emergency Generators as proposed are exempt from complying with the emission limit values subject to Section 13(3) of the Medium Combustion Plant (MCP) Regulations. These generators are fitted with a controller which tracks the number of hours the generators operate.

4.1.1.3 Potential Emissions

These are emissions which only operate under abnormal process conditions. Typical examples include bursting discs and pressure relief valves.

The potential emission to air sources are listed below:

- 1 no. Fire Sprinkler Pump with flue c. 2.3 meters above ground level.

Fire sprinkler pumps are only required to operate in the event of a fire at the Installation. The emission points from each generator have been labelled Emission Points A4-1 in Attachment-7-4-2. These emission points are shown in DUB01EX-RKD-ZZ-ZZ-DR-A-00007 included with this application.

4.1.1.4 Fugitive Air Emissions

Fugitive emissions are defined as low level diffuse emissions, mainly of volatile organic compounds, that occur when either gaseous or liquid process fluids escape from plant equipment. There are no fugitive emissions of principal polluting substances or odour expected from the Installation.

4.1.2 Treatment and Abatement Systems

Air dispersion modelling has been undertaken as discussed in Attachment 7-1-3-2 (Air Emissions Impact Assessment) to ensure that the appropriate ambient air quality standards are met. The modelling has been undertaken using the AERMOD air dispersion model in line with EPA Guidance Note AG4.

4.1.2.1 Main Air Emissions

The individual Dual-Fuel Engines in EC1, EC2, and EC3 will be equipped with a Selective Catalytic Reduction (SCR) abatement system. The SCR abatement works by injecting a reagent (aqueous urea solution) into engine exhaust gas stream, causing a reaction with the Nitrogen Oxides (NOx) significantly reducing NOx emissions, and producing nitrogen and water vapor.

The stack heights of the Dual-Fuel Engines have been designed to ensure that an adequate height was selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards at all off-site locations (including background concentrations).

The temporary gas-powered engines meet the MCP Regulations (Part 2, Table 2) natural gas emission limit values of the without the requirement for additional abatement controls.

4.1.2.2 Minor Air Emissions

The Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193), applies to the 1 no. Emergency Generator and 4 no. temporary diesel (HVO) engines.The 1 no. Emergency Generator and 4 no. temporary diesel (HVO) engines are not anticipated to operate in excess of 500 hours per annum. Therefore, theis combustion plant are exempt from complying with the emission limit values subject to Section 13(3) of the MCP Regulations. There is no abatement or treatment systems proposed or required for the Emergency Generator.

4.1.2.3 Potential Air Emissions

There are no abatement or treatment systems proposed or required for the fire sprinkler pumps.

4.1.2.4 Fugitive Air Emissions

There are no fugitive emissions (principal polluting substances) expected from the Installation. There are no abatement or treatment systems proposed or required.

4.1.3 Control and Monitoring

4.1.3.1 Main Air Emissions

The Advanced Control System (ACS) utilises Programmable Logic Controller's (PLC) to automatically optimize the load distribution among DC Buildings maximising power production efficiency for each Dual-Fuel Engine(s). The ACS ensures that each machine operates as close to its peak efficiency point as possible reducing overall fuel consumption. The control system will continuously monitor the live EC(s) energy usage and production data.

Continuous Emissions Monitoring System (CEMS) will be installed on each Dual-Fuel Engine(s) stack. The CEMS will monitor flow, temperature and pressure, as well as Oxides of Nitrogen (NOx), Carbon Monoxide (CO) and Ammonia (NH3) levels in the flue gas. All data is captured and stored locally and available via a network connection to the control room where it can be viewed live and data is available for interrogation and generation of reports to satisfy the Agency. The CEMS will adhere to EN14181 / MCERTS / EN15267-3 standards and will be implemented following the guidelines outlined in EPA Guidance AG3 (2021).

Monitoring of the air emissions from the Dual-Fuel Engine(s) will be in accordance with the requirements of the LCP Regulations and the IE Licence, once issued. This will include continuous monitoring for flow, oxygen content, temperature, pressure, water vapour content (as required), Nitrogen Oxides (as NO_2), Carbon Monoxide (CO), and Ammonia (NH_3) when operating in primary fuel (Gas). The proposed emission limit values (ELVs) when operating on gaseous fuels are set out in Attachment-7-4-1-Emissions to Air-Main and Fugitive.

The Dual-Fuel Engine(s) can operate on liquid fuel (HVO /Diesel) as a secondary or contingency fuel source. The liquid fuel option is in case of unforeseen or emergency

circumstances such as a failure in the incoming gas supply. Dual-Fuel Engine(s) are expected to operate using liquid fuel less than 500 hours per year (hr/y). Periodic monitoring of Dust (Total Particulates), and Sulphur Dioxide (SO_2) will be undertaken when operating on liquid fuel as requested by the Agency. Best Available Techniques (BAT) Reference Document for Large Combustion Plants 2021 sets out that: *The BAT-AELs set out in these BAT conclusions may not apply to liquid-fuel-fired and gas-fired turbines and engines for emergency use operated less than 500 h/yr, when such emergency use is not compatible with meeting the BAT-AELs.* The Dual-Fuel Engine(s) will not operate using liquid fuel (HVO/Diesel) in excess of 500 h/yr. The BAT-associated emission levels (BAT-AELs) for NOX emissions to air do not apply to this plant when operating in an emergency on liquid fuel (HVO/Diesel). Due to this limited use, no emission limit values (ELVs) when operating on liquid fuel have been proposed.

The temporary gas-powered engines meet the MCP Regulations (Part 2, Table 2) natural gas emission limit values. Periodic measurements of emissions from the temporary gas-powered engines shall be undertaken for NOx and CO every three years. In accordance with AG11 ISO17025 accredited contractors will be used to monitor the stack emissions. No further control measures are required for emissions.

4.1.3.2 Minor Air Emissions

The Emergency Generator will be equipped with control systems that monitors the generator's performance alerting operators to any potential issues or malfunctions. These Emergency Generator will be fitted with data logger to track the number of operational hours.

Periodic measurements of emissions from the Emergency Generator and 4 no. temporary diesel (HVO) engines shall be undertaken for Carbon Monoxide (CO) every 1,500 hours, or every five years (whichever is the lessor) for medium combustion plants with a rated thermal input equal to or greater than 1 MW and less than or equal to 20 MW. In accordance with AG11 ISO17025 accredited contractors will be used to monitor the stack emissions. No further control measures are required for emissions. Due to this limited operational use (<500 hrs), no emission limit values (ELVs) have been proposed.

4.1.3.3 Potential Air Emissions

There are no control or monitoring systems proposed or required for the fire sprinkler pumps. The Fire Sprinkler Pump at the installation is below 1 MW_{th} and no monitoring is required. Due to this limited operational use, no emission limit values (ELVs) have been proposed.

4.1.3.4 Fugitive Air Emissions

There are no fugitive emissions expected from the Installation. There are no control or monitoring systems proposed or required.

4.2 EMISSIONS TO SEWER (WASTEWATER EMISSIONS)

4.2.1 Emissions

Sanitary effluent from welfare facilities and amenities for staff from site will be collected and connect to the foul sewer system on site.

The EC(s) necessitates a regular discharge of process wastewater from the reverse osmosis and water treatment processes. The EC(s) discharge is collected within the onsite foul sewer and combines within domestic wastewater culminating in a discharged to the offsite sewer at emission location SE1.

The cooling system for the DC(s) utilise dry cooling. However, the DC(s) requires humidification and there will be condensate discharge form the cooling units. This wastewater discharge is collected within the onsite foul sewer and combines within domestic wastewater culminating in the offsite sewer at emission location SE1.

The site wastewater emissions are set out in Attachment-7-3-1-Emissions-to-Sewer, Attachment-7-3-2 Equivalent-Protection-Sewer.

The discharge will enter the public off-site foul sewer at emission point SE1. The emission / offsite discharge point is labelled SE1 on Drawing Ref: DUB01EX-HPE-XX-ZZ-DR-C-52122 included with the application. The wastewater emissions ultimately discharge to Ringsend Wastewater Treatment Plant (WWTP).

4.2.2 Treatment and Abatement systems

There is no requirement for onsite treatment or abatement for process effluent produced from the as the is essentially clean water, albeit with the addition of treatment chemicals, has passed through cooling systems. There is no requirement for onsite treatment or abatement. Wastewater will be treated offsite at the Ringsend WWTP.

4.2.3 Control and Monitoring

The combined domestic and process wastewater is tested at monitoring locations SE1-1. The monitoring points locations are shown on Drawing Ref: DUB01EX-HPE-XX-ZZ-DR-C-52122 included with this application. The monitoring of parameters will be undertaken by agreement with the Agency and Uisce Éireann.

4.3 STORMWATER EMISSIONS

4.3.1 Emissions

The stormwater, rainwater from building roofs, yards, and the road network, will be discharged to the off-site stormwater network located to the west of the site. This is a new facility, and foul wastewater is separated from all stormwater lines in accordance with BAT.

The Installation contains storage tanks for fuel, urea (AdBlue) solution, and lubricating oils, posing a potential risk of contaminating stormwater if a spill occurs on site.

There is a low risk of contamination of stormwater, this would only be from complete containment failure resulting in a major leak or spill or emergency situation such as fire.

The emission / offsite discharge point is labelled SW1 on drawing DUB01EX-HPE-XX-ZZ-DR-C-52123 included with the application.

4.3.2 Treatment and Abatement Systems

In the unlikely event of a leak or spills at the site there are mitigations and designed containment measures in place. The following stormwater management measures will be in place on site:

- Containment Measures: The facility will implement a comprehensive containment strategy for all storage tanks, loading/unloading areas, and fuelling stations. Secondary containment structures, such as double tanks, and bulk tank bund, will be in place to prevent spillage and leakage from reaching stormwater drainage systems.
- Temporary Hydrocarbon Interceptor: a Class 1 hydrocarbon interceptor is included in the storm sewer, to retain hydrocarbons such as HVO/diesel fuel and lubricating oils, from the stormwater runoff from the Temporary Generation plant. This interceptor is equipped with an automatic closure mechanism that activates when the hydrocarbon layer reaches a certain level, and oil level warning and alarm systems. This closure prevents the hydrocarbons from being released into the stormwater flow.
- Hydrocarbon Interceptors: Class 1 forecourt and bypass hydrocarbon designed to separate and retain hydrocarbons, such as HVO/diesel fuel and lubricating oils, from the stormwater runoff are included in the stormwater network design. These interceptors are equipped with an automatic closure mechanism that activates when the hydrocarbon layer reaches a certain level, when this happens oil level warning and alarm systems activate. This closure prevents the hydrocarbons from being released into the stormwater flow. These alarms are all connected to the BMS.
- Spill Response Protocol: A detailed spill response protocol will be established to address any accidental releases of HVO/diesel, urea (AdBlue), or lubricating oils. Trained personnel will promptly respond to spills to minimize environmental impact.
- Good Housekeeping Practices: Strict housekeeping measures will be enforced to ensure that spill-prone areas are kept clean and free from potential contaminants. Regular inspections and maintenance will be conducted to prevent leaks or spills, in addition to tegular inspections and maintenance of the hydrocarbon interceptor to ensure its proper functioning.

In event of fire sprinkler activation within campus, shut down valve on outfall will be closed and any contaminated fire water will be contained within the site and be subject to a formal clean up procedure.

Potentially contaminated water (e.g., in the event of a fire) that enters the stormwater attenuation tanks will be assessed prior to discharge to the off-site storm water network. Any stormwater of unacceptable quality will be pumped out of and disposed of appropriately. There is no further requirement for abatement of the stormwater from the site.

4.3.3 Control and Monitoring

The Stormwater Monitoring Plan (Attachment-7-7-Stormwater Discharges and Attachment-7-7-1 Stormwater Monitoring) sets out sampling, visual inspection and provision for corrective actions in the event of pollutant exceedances or contamination.

The Stormwater Monitoring Plan ensures that the Installation takes proactive measures to prevent stormwater pollution and protect the surrounding environment. Due to the robust control measures outlined above it is considered that no further

monitoring or control methods are required for stormwater. It is anticipated that only clean stormwater will be discharged to the stormwater main, appropriate trigger levels (warning limits, and action limits) for stormwater discharge will be agreed with the Agency after the Installation is operational and 12 months of monitoring has taken place.

The stormwater monitoring points are labelled SW1-1, and SW1-2 on drawing DUB01EX-HPE-XX-ZZ-DR-C-52123 included with the application.

4.4 NOISE EMISSIONS

4.4.1 Emissions

In the operational context of the facility, various sources contribute to outward noise emissions. The primary sources of outward noise have been identified as follows:

- Building Services Noise: Building services refer to the mechanical and electrical systems within the facility that provide essential functions such as heating, ventilation, air conditioning, and electrical distribution. These systems can produce noise during their normal operation, which may contribute to the overall noise profile of the facility.
- Plant Noise: The Energy Centre, housing the Dual-Fuel Engines, and the temporary generation plant constitutes a predominate source of noise emissions. As the engines operate to generate electricity for the DC(s), they produce sound due to their combustion processes and mechanical components.
- Additional Vehicular Traffic on Public Roads: The transportation of personnel, equipment, and supplies to and from the facility may involve vehicular traffic on public roads adjacent to the site. This traffic can contribute to external noise levels, particularly during peak operational periods.

To ensure compliance with environmental regulations and best practices, a comprehensive assessment of the noise emission impacts has been conducted. This assessment aligns with the guidelines outlined in the Environmental Protection Agency (EPA) Guidance Note for Noise: Licence Applications, Surveys, and Assessments in Relation to Scheduled Activities (NG4).

The results of the noise impact assessment are detailed in Attachment-7-1-3-2 (Noise Impact Assessment). This document summarizes the findings and implications of the assessment, including measurements of noise levels at various locations around the facility during different operational scenarios.

4.4.2 Treatment and Abatement Systems

The Installation plant items (equipment and machinery) have been carefully chosen to meet specific noise level requirements. This means selecting machinery and devices that inherently produce lower noise levels during their operation. By incorporating low noise equipment, the overall noise impact of the plant is reduced. The main objective is to ensure that the noise generated by the Installation during its operations remains within acceptable limits.

To further control noise emissions, the following measures will be implemented:

- Plant items will be selected in order to achieve the required noise emission levels.

- Appropriate attenuation will be specified in order achieve the required noise emission levels.
- Any air intake or exhaust points will incorporate suitable atmosphere side attenuation in order that overall site noise emissions comply with the adopted noise criteria.
- The EC(s) are constructed using specialised sound-absorbing materials that dampen noise, ensuring that noise levels are kept at acceptable limits.

The goal of these noise abatement measures is to ensure that the plant's noise levels comply with *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).* It is expected that the combination of acoustic containers, acoustic louvres, and low noise equipment will be sufficient to maintain noise levels below the stipulated limits at the nearest noise-sensitive receptors, such as residential areas or other noise-sensitive locations near the plant.

4.4.3 Control and Monitoring

To sustain the effectiveness of the noise control measures over time, a comprehensive maintenance and inspection schedule will be implemented. This includes regular checks of the acoustic enclosure, ventilation system, and vibration isolation mounts to identify and address any potential issues that could impact noise reduction.

Annual day time, evening and night-time monitoring will be undertaken in accordance with the IE licence requirements.

4.5 EMISSIONS TO GROUND

4.5.1 Emissions

There are no process emissions to ground from the installation.

5.0 MANAGEMENT OF RAW MATERIALS, INTERMEDIARIES OR PRODUCTS, AND WASTES

A list of all raw materials in use on the site is provided in Attachment-4-6-2.

5.1 RAW MATERIALS

5.1.1 Liquid Fuel (HVO/Diesel)

The stored Liquid Fuel is used as a pilot fuel for the Dual-Fuel Engines and an emergency fuel, ensuring the continued operation of the Dual-Fuel Engines and emergency systems.

The Installation will include:

- Temporary Generation Plant
  - 4 no. 34,580-litre double-skinned belly tank
- Energy Centre Fuel Storage
  - 3 no. 350,000 litre fuel storage tanks
  - 2 no. 65,000 litre carbon steel pilot liquid fuel Day/Receiving Tanks
- Emergency Generator and Fire Sprinkler Pump Fuel Tank
  - 1 no. 1 m^3 Emergency Generator day tank

- 1 no. 6.5 m^3 Emergency Generator belly tank
- 1 no. 0.5 m^3 Fire Sprinkler Pump belly tank

The total fuel storage capacity the site is 1326 m^3. Therefore, the total fuel stored is approximately 1,034 tonnes (HVO[4] density of 780 kg/m^3). The sections below describe the above storage tanks in further detail. The risk of accidental discharge from the bulk storage of liquid fuel has been adequately addressed through design and operational management procedures.

Temporary Generation Fuel Storage

Each temporary diesel (HVO) generator is equipped with a 34,580-litre double-skinned belly tank. The double-skinned design provides an additional layer of protection against leaks, ensuring that fuel is securely contained and reducing the risk of environmental contamination. In addition to the main fuel tanks, each generator also includes a 400-litre lube oil tank to supply lubrication necessary for the smooth operation of the engines. To further enhance safety and environmental protection, the diesel generators are housed within containers that include leak detection systems. These systems are capable of identifying any potential leaks early, allowing for immediate intervention to prevent spillage and mitigate any environmental risks.

Once the Temporary Generation Plant are decommissioned these fuel tanks will be removed from site.

Energy Centre Bulk Fuel Storage

The EC(s) engines have dual-fuel functionality and can be operated on liquid fuel. The service yard includes 3 no. 350,000 litre carbon steel Bulk Liquid Fuel Storage Tanks, and 2 no. 65 m^3 carbon steel pilot liquid fuel Day/Receiving Tanks. , these steel tanks are single walled. The liquid fuel tanks are bunded within the services yard, and include high and low alarms, breather vents, leak detection alarms.

The fuel tanks will be contained within a bunded area in line with the requirements of the *Guidance to Storage and Transfer of Materials for Scheduled Activities* (EPA, 2005). The fuel tanks include level transmitters and level gauges to monitor fuel levels within that will identify any sudden loss of fuel. All tanks are single walled to contain any leaks and monitored by a leak detection system. Sensors will be connected to BMS systems to notify of activations.

There is a designated HGV fuel unloading bay located to the south of the fuel storage tanks, the fuel filling areas are dished to contain any spills into ACO drain along the kerb line. The fuel delivery trucks will drive onto containment areas before commencing to unload fuel. Fuel unloading is a highly controlled process and a standard operating procedure (SOP) for fuel unloading will be implemented. In the unlikely event of a fuel spill incident, the spill will be contained within the unloading station which is surrounded by concrete upstand and directed to the site stormwater system via an appropriately sized forecourt hydrocarbon separator (Class I).

Fuel pumps, will be used to unload fuel arriving on site and forward it to the Bulk Liquid Fuel Storage Tanks/Day/Receiving Tanks. The Fuel pumps will be located in individual dedicated enclosures built on a skid with a fuel containment solution in the unlikely event of a fuel spill incident. Transfer pipelines are in place to transfer fuel from the

[4] Crown Oil Ltd. Safety Data Sheet. Hydrotreated Vegetable Oil (HVO) EN 15940 & ASTM D975 Diesel Fuel

Bulk Liquid Fuel Storage to the Day/Receiving Tanks and on to the engines, these are on an above ground pipe rack. There are no below ground pipelines; there are 3 no. sections of pipe trench (open trench allowing vehicles to drive over and full visibility of the pipe) under road sections shown on the site plan (DUB01EX-RKD-ZZ-ZZ-DR-A-00006-Site Layout Plan).

The Bulk Liquid Fuel Storage Tanks and Day/Receiving Tanks are single-skinned, located within a bund that has a capacity of 110% of the largest tank, and fitted with level monitoring sensors connected to a control panel which provides high- and low-level alarms to prevent overfilling and identify a sudden loss of within the tank.

Emergency Generator and Fire Sprinkler Pump Fuel Storage

The liquid fuel (HVO/diesel) is stored locally at the emergency generator and fire sprinkler pump. The Emergency Generator is enclosed in a specialised container, and it has 1 no. 1 m^3 fuel tank internal within the enclosure, and 1 no. 6.5 m^3 fuel tank external to the generator enclosure. The Fire Sprinkler Pump includes a 0.5 m^3 fuel tank within the pump room.

The Emergency Generator and Fire Sprinkler Pump will be rarely used, and will only require infrequent top ups of fuel.

The process of HVO/diesel delivery to the Installation will be conducted by a fully staffed and closely monitored team, using Heavy Goods Vehicles (HGVs). Furthermore, the implementation of standard operating procedures ensures a managed approach to fuel delivery.

5.1.2 Lubricating Oil Storage

The Dual-Fuel engines engine within the EC(s) require a bulk supply of Lubricating Oil (LO).There is a centralised bulk Lubricating Oil (LO) storage in within the services yard that includes three bulk oil storage tanks consisting of 1 no. 30 m^3 for clean LO, 1 no. 25 m^3 for waste LO, and 1 no. 20 m^3 service LO tank. This allows for centralised unloading of new oil, and removal of waste oil for the entire building. These bulk tanks are single-skinned, located within a bund that has a capacity of 110% of the largest tank.

The tanks are fitted with leak detection alarms and level monitoring sensors connected to a control panel which provides high- and low-level alarms to prevent overfilling and identify a sudden loss of within the tank. The tank bunds will generally be free draining with sensors to activate shut down valves to contain any potential spills, leaks. Sensors will be connected to BMS systems to notify of activations.

LO is delivered to the site by supply tanker and pumped to the clean oil storage tanks. Unloading is undertaken from a dedicated unloading bay with control measures for the spills/leaks.

Clean LO is pumped via transfer pumps and the pipe rack from clean LO bulk tanks directly to the Dual-Fuel engines engine. LO is then gravity fed from the day tank to the engine and controlled via the engine control panel. When required, waste LO is pumped from the engine to the waste oil bulk tank. The day tanks (9 no tanks total) are contained within the EC(s) are fitted with level monitoring which provide high- and low-level alarms to the engine control panel. Waste LO is returned via transfer pumps and the pipe rack to the waste oil bulk tank in the service yard.

Regular inspections of LO storage tanks are conducted to check for signs of damage, leaks, or deterioration. Maintenance personnel will also assess the oil's quality, ensuring it meets the required specifications for use.

5.1.3 Urea (aqueous solution)

The individual Dual-Fuel Engines uses an aqueous solution of urea (AdBlue) for the Selective Catalytic Reduction (SCR) abatement system. There are 5 no. double walled stainless steel tanks storage tanks of each with a capacity of 50 m^3 located within the service yard, a total storage of 250 m^3. The Dual-Fuel Engines have dedicated day tanks (9 no. tanks total) which are located withing the EC(s), are located within each engine cell. The filling process is managed via the bulk storage tank, with pipelines along the pipe rack to the individual day tanks.

For safety and efficiency, the urea tanks are equipped with overflow and leak protection devices and alarms and controlled based on low- and high-level sensors. The level gauge sensors are integrated with an onboard controller that triggers audible alarms in case of overfilling or sudden loss of Urea from within the tank. These precautions prevent spills and ensure optimal usage of the solution.

Delivery is undertaken in a dedicated Urea unloading area, a section of ACO drain drains the vehicle parking location. In normal circumstance when no filling is being under tank the ACO drains any rainwater runoff into normal stormwater sewer which passes through interceptor. Once delivery vehicle arrives and before the commence filling, they manually activate a shutdown valve which prevents liquid from leaving the AdBlue filling point. Any spills that occur during filling will therefore be captured in the holding tank. Once the urea delivery is completed and after all pipes are disconnected the manual shut down valve is released, and the system reverts to normal rainwater operation. Overtime it is likely that liquid will build up in tank and will have to be disposed of by tanker. It cannot be disposed of to foul or stormwater system. Tank to have alarm operating at mid height of tank to notify operations that tank requires emptying.

The design and construction of the Urea tanks and pipelines are tailored specifically for this purpose, ensuring they are rendered impervious to the stored materials. This measure guarantees the integrity and containment of the Urea aqueous solution, mitigating any potential risks associated with its storage and use in the SCR abatement system.

5.1.4 Maintenance Chemicals

Any other maintenance, water treatment, or cleaning chemicals/substances are in smaller quantities (> 2,500L) and are either stored in external self-bunded chemical stores, or areas of continuous hardstand i.e. internally within maintenance rooms.

Lubricating oils and greases are securely housed in an enclosed and ventilated area equipped with a sump to capture any potential leakage. This setup ensures not only the containment of any spills but also directs run off or to the hydrocarbon separator(s) (Class I).

Maintenance rooms are specifically designed to accommodate the storage requirements of maintenance and cleaning chemicals, providing a controlled environment for their safekeeping.

5.2 WASTE

The site is designed and operated in a manner that promotes the generation of minimal waste. This approach is environmentally conscious and helps reduce the overall environmental impact of the Installation. The Applicant has a commitment to adopt best practice in Resource and Waste Management as we pursue Zero Waste to Landfill Certification across all our operational sites. This includes the management of stakeholders, end of life and operational waste and resource flows (materials) with objectives to attain a 99% diversion of materials from landfill, increase performance within the Waste Hierarchy and continuously improve the environmental management of materials in operations. For the purposes of waste at this Installation, the Applicant will endeavour to manage all wastes streams in alignment with this strategy and will ensure processes are put in place to meet these objectives.

There will be minimal solid waste produced from the Energy Centre and Data Centre Buildings. Small amounts of domestic waste will be produced at staff areas within the Installation.

A more detailed description of waste generation, including estimated waste volumes, types of waste generated, and the methods of disposal or recovery, are provided in Section 8 of the application. To ensure proper handling and disposal of waste, the Installation will employ appropriate waste segregation practices. Different waste streams will be separated to prevent contamination and facilitate recycling or proper disposal and waste will be managed in compliance with relevant regulations and industry best practices.

5.3 INTERMEDIATES OR PRODUCTS

There are no intermediates or products produced as part of the site operations.

6.0 MANAGEMENT AND PROCESS CONTROL SYSTEMS

The following section outlines the management and process control systems that will be developed for the Installation once the Industrial Emissions Licence is granted.

6.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The Environmental Management Plan (EMP) for the Installation provides guideline to the operation management team to manage relevant activities in a way that it would not cause major damage or negative impact to the environment and managing environment for the protection of air, land, and any body of water. This plan details the roles and responsibilities of key personnel, the communication strategies and the environmental control measures that will be implemented during operation.

Potential operation impacts by the operation will be identified, planned, and managed appropriately to ensure that potential adverse environmental impacts or environmental issues are negated or minimised. Due to the scale of the operation activities, it is essential that sound management of the operation is followed to protect the local environment.

The EMP has been developed to provide a guideline for the operation management team to plan effective environmental management practices that will comply with the environmental requirements specific to the operation activities. This plan is developed

to align with the principals of Environmental Management System (ISO 14001), and in relation to Environmental and Sustainability legislation and Fingal County Council planning conditions (Reg. Ref.: FW17A/0167 and FW18A/0114) which are applicable. Specifically, the key objectives of this Plan are:

- Demonstrate a commitment by the Company to comply with environmental laws and regulations within Ireland.
- Identify Environmental impacts potentially caused by the relevant operation activities.
- Identify the operation methodology to be used for each component of the operation activities.
- Outline environmental mitigation measures to be implemented during the operation activities to minimise impacts on sensitive receptors.
- Define the roles and responsibilities of all stakeholders involved with the operation activities.
- Outline a programme of monitoring and environmental audits required to ensure regulatory compliance and for the early detection of any actual or potentially significant adverse environmental impacts.
- Outline the reporting, training, auditing, and other procedures required to ensure appropriate environmental management.
- Outline actions that would be implemented in the case of non-conformance with the requirements of the EMP; and:
    - Identify all procedures and methods that the company must adopt to achieve the operation sustainability criteria and carbon reduction strategies.
    - Identify the operation process to be used for each component of the activities.

The Company will implement all aspects of this EMP. Specific contractor Method Statements have been developed and reviewed with each component of the operation activities confirmed to ensure they are environmentally friendly.

This Plan is a 'live document' and as work progresses the Plan may be further developed and elaborated which shall be presented to the Data Centre Manager for review and approval. Requirements of the Conditions of Contract with respect to Health, Safety and Environmental and Security Control apply back-to-back as specified by Conditions of Contract.

The EMP for the Installation will be reviewed once the IE License Review is granted. The EMP will align with the principals of BAT 1 of the Commission Implementing Decision (EU) 2021/2326 establishing best available techniques (BAT) for large combustion plants.

6.2 ENERGY EFFICIENCY MANAGEMENT SYSTEM (EEMS)

The Energy Efficiency Management System (EnEMS) for the Installation will be developed once the site is operational and the IE License Review is granted. The EnEMS form part of the overall site environmental Management System (EMS) and will include:

- Energy Efficiency Policy and Management Commitment
- Setting of Objectives and Targets
- Planning and implementation of procedures including training, communication, employee involvement, and documentation.

- Benchmarking, power use effectiveness, and energy audits
- Performance Monitoring and Corrective Action
- Review and Evaluation

The EnEMS enables the Installation to identify opportunities for energy efficiency improvements, reduce energy consumption, cut costs, and contribute to environmental sustainability goals.

6.3 ACCIDENT PREVENTION PROCEDURE (APP)

The Accident Prevention Procedure (APP) for the Installation will be developed once the site is operational and the IE License Review is granted. The APP will include an initial environmental risk assessment and scoping exercise will be undertaken in order to encompassing all likely accident scenarios specific to the site. The primary objective of the APP is to proactively mitigate on-site hazards before they escalate into accidents or emergencies.

The prevention procedure will include the following key elements:

- Identification of on site hazards and risks and mitigation measures to prevent accidents with adverse environmental impact and minimise consequences when accidents occur.
- Details on the storage and transfer of all raw materials in accordance with EPA's guidelines for the storage and transfer of materials for scheduled activities (EPA, 2004).
- Procedures for the management of both Hazardous and non-Hazardous waste, covering segregation, labelling, and secure containment in alignment with the Waste Management Act 1996 (as amended).
- Clear and effective procedures for the safe handling of chemicals and hazardous materials, aimed at preventing spills or accidental leaks.
- Detailing essential design components for the secure containment of chemicals and raw materials. This encompasses specifics on the location and features of stormwater hydrocarbon separators (Class I), bunds, pipelines, and protocols for ongoing maintenance to ensure effectiveness.
- Specifying protocols for the regular integrity testing of tanks, pipelines, and designated chemical storage areas in accordance with EPA's guidelines for the storage and transfer of materials for scheduled activities (EPA, 2004).
- This procedures link to related organisational documents and Standard Operating Procedures (SOP), Environmental Management Systems (EMS) as required.
- In the event of an emergency situation or accident at the Installation, the Emergency Response Procedures (ERP) will be strictly followed including notification to the EPA as required.
- A structured procedure to investigating any on-site accidents or incidents. This includes documenting the event, determining its root cause, summarising response actions, evaluating environmental impact, and extracting lessons for prevention and future response.
- Annual review process to ensure its continued effectiveness. The review process will be documented and will consider any corrective actions identified from accidents since the previous review.
- All relevant staff members will undergo annual training on the procedure. Records of staff training will be maintained and accessible for review.

The APP will be designed to ensure that all staff members have a clear understanding of the prevention measures in place on site and the standard operating procedures related to highrisk activities. It will be structured to facilitate ongoing review, improvement, and refinement. Provision of digital and physical copies of the APP will be available to guarantee its accessibility at all times.

6.4 EMERGENCY RESPONSE PROCEDURE (ERP)

The Emergency Response Procedure (ERP) for the Installation will be developed once the site is operational and the IE License Review is granted. The ERP will serve as a comprehensive guide outlining the necessary steps and protocols to effectively address potential emergency situations. It will provide a comprehensive guide for addressing potential emergencies, covering scenarios like fire, spills, floods, etc. Key components include:

- Environmental impact minimisation measures and specific response procedures for various scenarios.
- Clear communication plans for the Emergency Response Team (ERT) and staff alerts, especially during non-standard hours.
- Identification of external support, including emergency services.
- Safety protocols, linking to related documents and Standard Operating Procedures.
- Update to date chemical inventory with safety data sheets.
- An inventory of all incident response and pollution prevention equipment on-sit).
- Site plans for equipment and drainage,
- EPA notification details in accordance with licence requirements.
- Scheduled testing and maintenance of response equipment.
- Annual document review and staff training, covering roles, equipment use, and communication.

The ERP will be designed to ensure that all staff members are equipped to respond effectively and efficiently to any potential emergency situation. It will be structured to facilitate ongoing improvement and refinement, aligning with best practices in emergency response management. Provision of digital and physical copies of the ERP will be available to guarantee its accessibility at all times.

The DC(s) and EC(s) will be equipped with automated fire detection systems (heat and smoke) as well as gas detection systems in the EC(s). These will be connected to a main fire panel in the security office which is manned at all times. In the event that a fire is detected, the fire panel will display the location of the detected fire. Once detected the location of the potential fire will go into an alarm state. The fire detection and alarm systems will be connected to the sprinkler system and these will be triggered in the event of a fire. To ensure the effectiveness of the fire alarm system on site, the component parts will be tested and verified on a regular basis. Records of all tests, faults and remedial actions will be maintained and stored.

There is a separate HDPE drainage line to collect any runoff form a sprinkler activation within the DC2 and DC3 battery rooms. In event of a sprinkler activation in battery room, shut down valve will be activated, water will be collected in a holding tank located to the south of DC2 and DC3. Operations will then have to sample and test the water and then Determine appropriate method of discharge such as tanker.

A firewater retention risk assessment will be completed for the Installation as and when requested by the Agency.

6.5 BUILDING MANAGEMENT SYSTEM (BMS)

Once the Installation is constructed, it will incorporate a Building Management System (BMS). This sophisticated automation system will be responsible for controlling, monitoring, collecting data, and reporting on all aspects of the site's processes and conditions, encompassing both electrical and mechanical systems.

The BMS will play a pivotal role in overseeing and regulating the engineering systems and services. Its key functions will include:

- Control and monitoring of various plant operations, ensuring efficient performance;
- Continuous monitoring of system performance to optimize efficiency;
- Condition-based monitoring of plant and components for predictive maintenance;
- Detection of faults and triggering alarms for immediate attention; and
- Monitoring and metering of energy, water, and fuel consumption for efficient resource management.

The BMS will individually manage and monitor each item of services plant or system. This design ensures that each plant or system can operate independently in case of a network failure, guaranteeing continuous functionality.

6.6 PREVENTATIVE MAINTENANCE PROGRAMME

The Preventative Maintenance (PM) is crucial to ensure the reliable and efficient operation of critical infrastructure. It helps identify and address potential issues before they turn into major problems, minimizing downtime and costly repairs. The following maintenance programme will be developed for the site:

- A comprehensive inventory of all critical equipment and systems will be developed.
- Regular inspections of all equipment and systems will be undertaken in accordance with manufacturer's recommendations, industry best practices.
- Periodically test equipment to ensure they can handle the expected load during emergencies or high-demand periods.
- For equipment with lubricants or fluids, regular oil analysis to detect early signs of wear or contamination will be conduct. Replace fluids as recommended by the manufacturer.
- Electrical distribution systems will be inspected to identify and resolve any potential issues with power distribution and protection.
- Detailed records of all maintenance activities will be kept, including dates, tasks performed, and any identified issues.

The specific details of the PM program will be implemented depending on the size, complexity, and criticality of the equipment, and manufacturer's recommendations, industry best practices.

6.7 WASTE MANAGEMENT PROCEDURES

Waste Management Procedures will be put in place for the operation of the Installation. These procedures will ensure the proper management and recycling of of all wastes generated within the Installation. The goal is to establish a systematic and environmentally responsible approach to waste handling.

These Waste Management Procedures will align with the outlined targets and policies in the Eastern-Midlands Region Waste Management Plan 2015-2021. By adhering to the guidelines set forth in this regional waste management plan, the Installation aims to enhance its environmental performance and sustainability.

The overarching management procedures (Attachment-8-2-1-Waste-Hierarchy), and estimated waste generation (Attachment-8-1-Waste-Generated) has been provided in Section 8 of this application.

7.0 CESSATION OF ACTIVITY

7.1 SITE CLOSURE

A certain amount of environmental risk is associated with the cessation of any licensable activity (site closure). An outline Site Closure report (Attachment 9-2-3 Site Closure) has been provided in Section 9 of this application.

The basis of the closure plan is to ensure that, upon completion of implementation of the plan, the Installation would be in a suitable state for future industrial use and would not pose a risk to public health and safety or the environment.

7.2 BASELINE REPORT

A Complete Baseline Report (Attachment 4-8-3 Complete Baseline Report) for the site has been produced and included in Section 4 of this application. The complete baseline report provides conditions of the site prior as it existed prior to the construction and operation of the Installation.

8.0 ENVIRONMENTAL IMPACT ASSESSMENT

Ireland's list of Projects for which an EIA is required are set out in Part 1 and Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended). This list was developed from Annex I and Annex II of the EIA Directive.

The proposed activity is not directly listed under Annex I of the EIA Directive, or Part 1, Schedule 5, or Part 2, Schedule 5.

The component parts of the project have been considered against Part 1, Schedule 5, or Part 2, Schedule 5 of the Planning and Development Regulations 2001 (as amended). The most relevant development class in the context of the proposed Project and the assessment against that class is set out in Table 1 below.

Table 8.1 *Consideration of Project and EIA Thresholds*

Class of Development	Assessment of Project

Schedule 5, Part 1, Class 2. (a) A thermal power station or other combustion installation with a heat output of 300 megawatts or more.	The Installation is not a thermal power station, however, it could be considered 'other combustion installation'. There is no heat output from the Installation. The Installation has a total rated thermal input of c. 196.72 – 209.122 MW_{th}. The heat output does not exceed the limit, quantity or threshold set out in this class.
Schedule 5, Part 2, Class 3. (a) Industrial installations for the production of electricity, steam and hot water not included in Part 1 of this Schedule with a heat output of 300 megawatts or more	The Installation is in part for the production of electricity. The Installation has a total rated thermal input of c. 196.72 – 209.122 MW_{th}. The electrical/heat output does not exceed the limit, quantity or threshold set out in this class.
Schedule 5, Part 2, Class 10 (a). Industrial estate development projects, where the area would exceed 15 hectares.	The Installation is within an Industrial Estate and as the total site area is c. 5.48 hectares and so does not exceed the limit, quantity or threshold set out in Part 2, Schedule 5 is Class 10(a).

The Project/Installation does not exceed the limit, quantity or threshold set out in any class therefore, Environmental Impact Assessment (EIA) is not mandatory, and is therefore subthreshold development for the purpose of EIA.

On the basis of the permitted planning applications, and the documentation submitted to the EPA with this IE License Application, the activity is not likely to give rise to significant effects on the environment by virtue of its nature, size or location. It is the option of AWN that the need for a subthreshold EIA does not arise.

8.1 CONSIDERATION OF ALTERNATIVES

8.1.1 Alternative locations and layouts

While a wide variety of general environmental and economic criteria were considered, the key criteria for the location of the proposed development were:

1. Availability of a high-quality telecommunications fibre network;
2. Accessibility to the gas network (to provide energy for the high efficiency power and cooling systems required to operate the facility);
3. Located within the Gateway Core Economic Area and Metropolitan area of Greater Dublin;
4. Availability of a suitably large site with suitable development zoning; and
5. Low natural disaster risk particularly in relation to flooding.

Having considered other sites, the majority were simply not large enough to accommodate the proposed development to include both a Data Centre and associated Energy Centre.

The proposed Project is to take place within an established industrial area near the IDA Blanchardstown Business and Technology Park in northwest Dublin. The subject site is well suited to the nature of the development proposed, being partially green-field and partially brownfield in nature and located within an area of employment related development.

The proposed Project is considered suitable for the High Technology zoning of the application site. As such, the chosen location is suitable for growth and further development in industrial use. The loss of the green field land as a part of the proposed Project is consistent with the land use zoning and FCC Development Plan and therefore the loss is not significant.

The project design team have undertaken a comprehensive assessment of the proposed site to maximise its use in terms of both the spatial distribution of the various aspects within the site and the optimal use of the site area. As the overall site is rectangular in shape and surrounded by roads on 3 sides this lent it towards a simple site layout.

The facility has obtained planning permission, and the applicant possesses the land, eliminating the possibility of a 'do nothing' scenario as development can proceed within the existing permissions. During the planning stages, alternative project locations with suitable zoning and access to utilities were evaluated. However, most of these sites were found to be insufficiently spacious to accommodate the proposed development.

Throughout the planning stages, multiple site layout variations were explored, leading to the current proposed arrangement of buildings, site infrastructure, and open attenuation features. The permitted site masterplan was designed to shield much of the plant from the main roadways.

8.1.2 Alternative Processes/Technologies

The proposed technology (incorporating an Energy Centre at the site of the proposed development) represents one of the most advanced Data Centres in Ireland (and Europe). The potential for energy supply by both electric and gas supply has been considered. The Data Centre is proposed to be fully self-sufficient in terms of its power requirements. The Energy Centre is to be connected to the national gas network via an AGI installation to be located in the south-eastern corner of the site.

The engineering design team for the proposed development has explored various technologies employed by other operators in Ireland and across the globe. The design reflects the adoption of cutting-edge, state-of-the-art technology, ensuring the facility remains at the forefront of innovation.

Throughout the detailed design phase, ongoing assessment of alternative technologies remains an integral part of the process. Multiple factors are carefully evaluated, including technical feasibility, environmental impact, efficiency, security, reliability, and cost-effectiveness. This comprehensive approach guarantees that the chosen technology aligns with the highest industry standards, while being sustainable and environmentally responsible.

8.1.3 Alternative Mitigation

The mitigation measures for the data centre and energy centre development proposed are outlined in this report and in the relevant sections of this licence. These represent the best practice for achieving minimal impact on the receiving environment. Whilst alternatives were considered in the design process, the measures presented represent the best environmental and engineering options for the site.

The proactive approach to mitigating potential environmental impacts has been a key focus from the early stages of the facility's design. During the planning application stage, the design team diligently assessed and incorporated appropriate mitigation measures tailored to the unique environmental setting of the project.

The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction, and offsetting (not required in this development). Mitigation measures have also been considered based on the effect on quality, duration of impact, probability, and significance of effects.

The final design and implementation of mitigation measures reflect the best practices in the field, emphasising the goal of achieving minimal impact on the receiving environment. The selection of these measures is based on comprehensive assessments of their effectiveness, considering factors such as the potential impact's quality, duration, probability, and overall significance.

By employing such a comprehensive and holistic approach to environmental mitigation, the facility design strives to strike a delicate balance between fulfilling operational needs and safeguarding the environment. The proactive measures and strategic planning demonstrate the applicant's commitment to responsible and sustainable development, ensuring that the facility operates harmoniously with the surrounding ecosystem and communities.