

Amazon Data Services Ireland Ltd.

Operational Report

Attachment-4-8-1

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February 2022

Licence Application (LA009828)

CONTENTS

1.0	Site Overview	3
2.0	Site Context.....	4
3.0	Planning Status	4
4.0	Description Of Activity	7
4.1	Site Overview.....	7
4.2	Primary Processes/Activities.....	8
4.3	Secondary Process/Activities.....	9
4.4	Water, Sewer, And Stormwater Drainage Infrastructure.....	12
5.0	Best Available Techniques And Commission Implementing Decision	15
6.0	MANAGEMENT OF RAW MATERIALS, INTERMEDIARIES AND WASTES	15
6.1	Raw Materials Management	16
6.2	Intermediates AND products	19
6.3	Waste Management.....	19
6.4	Tanks, Bunds And Pipelines	20
7.0	Emissions And Abatement Treatment Systems.....	20
7.1	Air Emissions	21
7.2	Emissions To Sewer (Wastewater Emissions)	23
7.3	Stormwater / Surface Water Emissions.....	23
7.4	Emissions To Ground	25
7.5	Noise Emissions	25
8.0	Management And Process Control Systems	26
8.1	Environmental Management System (Ems)	26
8.2	Emergency Response Plan.....	26
8.3	Standard Operating Procedures.....	27
8.4	Preventative Maintenance.....	27
8.5	Waste Management.....	27
8.6	Energy Management.....	28
8.7	Fire Management.....	29
9.0	Cessation Of Activity	29
9.1	Site Closure	29
9.2	Baseline Report	29
9.3	Alternatives.....	30

1.0 SITE OVERVIEW

The following Operational Report relates to the Amazon Data Services Ireland Ltd. ("ADSIL" or 'the applicant') data storage facility (the subject 'Installation' under this licence application) located in the Blanchardstown Industrial Park, Snugborough Road, Dublin 15 located 2km from the N3 Road and 2.5km from the M50. The Industrial Park is situated 9 km from Dublin City Centre. The Site context is shown on Drawing Ref: 21_123D-CSE-00-XX-DR-C-0001 Site Location Plan included with this application. The application relates to the Installation, that covers 13.08 hectares (ha) in total ('The Site')

The Site is occupied by four no. data storage buildings (Buildings A, B, C and D) with ancillary elements. The ancillary elements of the development include loading bays, maintenance and storage spaces, associated water tanks, sprinkler, tanks, pump house and electrical rooms, security and utility spaces, underground foul and stormwater drainage network, on site attenuation systems, internal roading network, and site landscaping. The overall site includes the Cloghran 110 kV AIS Substation. The Site layout and main buildings is shown on Site Layout Plan Drawing Ref: 21_123D-CSE-00-XX-DR-C-0002 Site Plan included with this application.

The Installation requires a continuous supply of electricity to operate. During normal operations, the Installation is supplied electricity from the national grid. Outside of normal operations, the Installation is first supplied electricity by some or all of the onsite battery Installations and then by some or all of the onsite emergency backup generators. Outside of routine testing and maintenance, the operation of these emergency back-up generators is typically only required under the following emergency circumstances:

- A loss, reduction or instability of grid power supply,
- Critical maintenance to power systems,
- A request from the utility supplier (or third party acting on its behalf) to reduce grid electricity load.

The facility, once fully operational, will comprise a total of 9 no. 6.49 MW_{th} diesel powered emergency back-up generators; 22 no. 6.33 MW_{th} diesel powered emergency back-up generators and 39 no. 5.59 MW_{th} diesel powered emergency back-up generators, and 2 no. 0.420 MW_{th} diesel powered emergency back-up fire pumps.

The relevant requirement for an Industrial Emissions (IE) Licence is outlined within the First Schedule of the EPA Act 1992. Activity '*Class 2.1 Combustion of fuels in Installations with a total rated thermal input of 50 MW or more*' specifically relates to this Installation.

The combined thermal input from the emergency back-up generators once operational is 416.52 MWth, this exceeds the 50MW_{th} threshold of *Class 2.1* First Schedule of the EPA Act 1992. The applicant is applying to the Environmental Protection Agency (EPA) for an Industrial Emissions (IE) Licence principally relating to the operation of diesel-powered emergency back-up generators under Activity Class 2.1.

Approximately 50 personnel will be present on site daily at each data storage facility (Buildings A, B, C and D) meaning that 200 people will be on site at any one time, including external staff, maintenance contractors and visitors. Staff will be present on a shift basis, so numbers will vary throughout the day. Operational hours are 24 hours a day, 7 days a week.

2.0 SITE CONTEXT

The Installation is located on a site of 13.08 ha within the Blanchardstown IDA Business and Technology Park. The Site is bounded by the Ballycoolin Road to the north-east, and Snugborough road to the south-east. The Installation is accessed via the Blanchardstown Business and Technology Park access road to the south. The overall site is located between the N2 and N3 national primary roads, outside of the M50..

The lands in the immediate vicinity surrounding the industrial park comprise of predominantly commercial and institutional development, including pharmaceutical, data centres, food manufacturing, warehousing and logistics, and offices uses. Rosemount Business Park is located to the east, with the heavy industry further to the east including the Huntstown Quarry and Huntstown Power station (IE Ref: P0483 and P0777 and Anaerobic Digester facility (IE Ref: P0993). There are 2 no. residential properties located approximately 60 m to the north of the Installation.

Located within the Blanchardstown IDA Business and Technology Park is Ipsen Manufacturing Ireland Ltd, (IE License ref: P0117-02), located immediately to the west of The Site. Ipsen produces generic tableted pharmaceutical products. 550 meters (m) to the west of the Installation is the Equinix Hyperscale 1 (DB5) Limited, a Data Centre campus that is has IE licence currently under consideration by the EPA (IE Ref: P1168-01). The Jellybean factory (food production) is located adjacent to the southwest boundary, and a number of technology business, including software and data storage are located to the north of The Site. Inna labs a specialised engineering and manufacturing business, Securispred, a logistics business and Edwards Technology Centre, a vacuum and abatement technology business, are located immediately to the south of the campus.

Within the Ballycoolin IDA Business Park, 450 m to the north is K2 Strategic Infrastructure Ireland Limited a Data Centre campus that is has IE licence currently under consideration by the EPA (IE Ref: P1143-01).

To the north and north west of the Installation are 3 IE Licenced pharmaceutical facilities within the College Business and Technology Park; which includes Alexion Pharma International Operations Unlimited Company (IE Ref: P0552); Swords Laboratories Unlimited Company Trading As Bristol Myers Squibb Cruiserath Biologics (IE Ref P1030); and Mallinckrodt Pharmaceuticals Ireland Limited IE Ref: P1060).

The area to the west and south of The Site generally comprise residential areas (Corduff), and educational and recreational facilities with areas of open space and parks. Specifically, this area includes Technological University Dublin Blanchardstown Campus, Riversdale Community College, and Saint Patricks Senior School, as well as the Sport Ireland National Campus located to the of The Site which houses a wide range of Sport Ireland facilities.

The generally site layout and wider context is presented in Drawing Reference: 21_123D-CSE-00-XX-DR-C-0002 Site Layout Plan included with this application.

3.0 PLANNING STATUS

The Installation has received Final Grant of planning permission from Fingal County Council (FCC) under the separate applications listed below:

- Building A; final grant of permission on 13 September 2013 (FCC Reg. Ref.: FW13A/0067).
- Building B; final grant of permission on 12 Jan 2016 (FCC Reg. Ref.: FW15A/0135) with amendments receiving final grant of permission 13 June 2017 (FCC Reg. Ref.: FW17A/0034). An EIA Screening Report was submitted with the parent application and is included as Attachment-6-3-6-EIAS-Planning-Jan-2016.
- Building C; final grant of permission on 14 September 2010 to refurbish existing building (FCC Reg. Ref.: FW10A/0099), final grant of permission on 20 February 2012 to retain and extend generator yard (FCC Reg. Ref.: FW11A/0113), final grant of permission on 15 June 2012 to refurbish exiting building (FCC Reg. Ref.: FW12A/0024), and final grant of permission on 26 March 2018 to extend existing building (FCC Reg. Ref.: FW17A/0237). An EIA Screening Report was submitted the extension application Reg. Ref.: FW17A/0237 this application and is included as Attachment-6-3-6-EIAS-Planning-Mar-2018.
- Building D; final grant of permission on 28 August 2018 (FCC Reg. Ref.: FW18A/0078); An EIA Screening Report was submitted with this application and is included as Attachment-6-3-6-EIAS-Planning-Aug-2018.

All planning permissions for the data storage facilities that are relevant to this Licence application under Class 2.1 of the EPA Act 1992 (as amended) have been granted on site (see Section 6 of this licence application). Any further information, including reports and advice, relating to the environmental assessment of the proposed activity is contained within Section 7 of this licence application.

Project Threshold and Planning

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 2001-2018. 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.

It is considered that most relevant development class in the context of the proposed Project under Part 2, Schedule 5 is Class 10(a):

10. Infrastructure projects

- (a) *Industrial estate development projects, where the area would exceed 15 hectares.*

The development is within an Industrial Estate and as the total site area is c. 13.02 hectares and so does not exceed the limit, quantity or threshold set out in Part 2, Schedule 5 is Class 10(a).

Additional Planning Permissions Outside of Main Activity:

In addition to the relevant planning permissions for the Data Storage buildings and combustion of fuels (that relate to the IE application being made) the following additional permissions below relate to the history of the overall site.

Table 3.1 *Planning Permission*

Application Details	Description of Development
Applicant: Hexagon Partnership	To construct a new AIS (Air Insulated Switchgear) 110kV electricity substation and to carry out ancillary site works.

<p>Reg. Ref.: FW11A/0104 Final Grant Date: 18 Jan 2012</p>	<p>The proposed works will consist of the following:</p> <ol style="list-style-type: none"> 1. Excavation and fill of the proposed 110kV substation site to formation level, diversion of existing services and construction of a stoned compound area. 2. Construction of a substation control building within the compound area for the 110kV substation. 3. Construction of two number transformer bays and control building for the transformers to the north of the existing Hexagon facility with a 2.4m high powder coated perimeter palisade fence. 4. Construction of a 4m wide concrete access road within the compound area and fencing of the compound area. 5. Construction of a car parking compound for users of the substation. 6. Installation of all substation structures within the developed compound area. 7. Installation of 1 no. line interface mast and 2 no. down masts within the adjoining IDA lands to the north west of the Hexagon facility. 8. 8. Installation of a 2.4m high powder coated perimeter palisade fence to the AIS substation.
<p>Applicant: Hexagon Partnership Reg. Ref.: FW11A/0118 Final Grant Date: 28 May 2012</p>	<p>Permission for the Installation of boundary fencing/ railings and access gates, new security hut and upgrading of the site security system to include red-wall system, CCTV, public lighting poles and associated underground services to the Hexagon site.</p>
<p>Applicant: Hexagon Partnership Reg. Ref.: FW12A/0083 Final Grant Date: 19 Nov 2012</p>	<p>Planning retention application for minor adjustments to the 110kV electricity substation as granted planning permission on the 18th January 2012. Planning Reference Number: FW11A/0104. The substation is located in IDA Blanchardstown, Business and Technology Park, Snugborough Road, Dublin 15. The work consists of the following:</p> <ol style="list-style-type: none"> 1. Adjustment of substation compound levels between Phase 1 and Phase 2 of the development. 2. Increase in length of the substation compound. 3. Increase in height of the parapet of the control building within the substation compound (Control Building No. 1) 4. Adjustment to the transformer bay area due to the addition of a third transformer bay. 5. 5. Increase in size and repositioning of the client control building (Control Building No. 2)
<p>Applicant: Amazon Data Services Ireland Ltd Reg. Ref.: FW17A/0044 Final Grant Date: 27 Jun 2017</p>	<p>The development will consist of upgrade of existing boundary railings and palisade fence by increasing the height of the existing fencing and railings by 0.7 meters to the site boundary.</p>
<p>Applicant: Amazon Data Services Ireland Ltd Reg. Ref.: FW19A/0111 Final Grant Date: 17 Sep 2019</p>	<p>The proposed development comprises of a container compound for the purposes of providing ancillary modular plant, electronic equipment and machinery space. The development comprises provision of 2 no. modular prefabricated containers (stacked to form 2 no. storeys), associated access arrangements and staircases, a boundary fence enclosure around the proposed development with 4 no. access points, the relocation of an existing car parking space, the relocation of the existing bicycle parking, associated plant and all ancillary works.</p>
<p>Applicant: Amazon Data Services Ireland Ltd Reg. Ref.: FW19A/0161 Final Grant Date: 06 Jan 2020</p>	<p>The proposed development comprises of a container compound for the purposes of providing ancillary modular plant, electronic equipment and machinery space. The development comprises provision of 4 no. modular prefabricated containers (arranged to form 2 no. stacks of two storeys), associated access arrangements and staircases, a boundary fence enclosure around the proposed development with associated gated access points, ramped and stepped pedestrian access ways from the existing internal road and footpath to the south (including pedestrian crossing points), associated plant, and all ancillary and construction works.</p>

4.0 DESCRIPTION OF ACTIVITY

4.1 SITE OVERVIEW

The Installation comprises 4 operational data storage facilities (Buildings A, B, C and D). The layout of the existing data storage facilities, ancillary buildings, structures and attenuation systems (and the area of application) is shown in Site Layout Plan Drawing Ref: 21_123D-CSE-00-XX-DR-C-0002 Site Plan included with this application.

The four data storage facilities generally consist of the following primary aspects:

- Data Storage Rooms housing IT electrical equipment;
- Internal and External Air Handling Unit (AHU) Plant Rooms to house the equipment required to maintain the temperature, humidity and power supply for the Installation;
- Administration areas (office space, meeting rooms, welfare facilities etc.);
- Diesel powered emergency back-up generators, including fuel tanks belly tanks and/or day tanks (and associated emissions stacks/flues;
- Evaporative cooling water storage tanks; and;
- Loading bays and associated infrastructure.

Building A consists of a 2-storey building comprising electrical rooms for electronic operations, mechanical plant rooms, a double vehicle loading bay, workshops, and office and staff facilities. The gross floor area of the building including ancillary elements is 20,995 sq.m. The building includes, external roof top air handling units with associated visual screening, with water supplied by 9 no. humidification water storage tanks external to the building with c. 243 m³ total capacity. The internal generator building comprises 22 no. 5.59 MW_{th} diesel powered emergency back-up generators, with associated diesel fuel day tanks. Diesel fuel is provided to the day tanks from the Tank Farm to the north of The Site.

Building B consists of a 2-storey building for use as electrical rooms for electronic operations, mechanical plant rooms, a double vehicle loading bay and ancillary workshops. Included within the building are associated offices, staff facilities at ground floor level and at mezzanine level. The building includes, external roof top air handling units with water supplied by 9 no. humidification water storage tanks with c. 74 m³ total capacity. The gross floor area of the development including ancillary elements is 16,065 sq.m, with an additional single storey extension of 1,111 sq.m. An external generator yard contains 17 no. 6.33 MW_{th} diesel powered emergency back-up generators, with associated diesel fuel day tanks. Diesel fuel is provided to the day tanks from the Tank Farm to the north of The Site.

Building C consists of a 2-storey building for use as electrical rooms for electronic operations, mechanical plant rooms. Building C is the former Hexagon manufacturing facility. The total floor area including ancillary elements is 19,981 sq.m. The building includes external roof top air handling units, with water is supplied by 8 no. humidification water storage tanks with c. 200 m³ total capacity. Building C has an associated generator building to the north east of The Site that contains 17 no. 5.59 MW_{th} and 1 no. 6.33 MW_{th} diesel powered emergency back-up generators, with associated diesel fuel storage located external to the generator building in 17 no 10,000 litre tanks and 1 no 15,000 litre tank.

Building C has a 4,055sq.m. extension over 2-storeys with plant at roof level. The extension accommodates data storage rooms at ground and first floor levels, electrical

rooms and generator transformers at first floor levels, and stair and lift cores. The Buildings C extension includes an external generation compound located to the north east of the Building C generation Building, 4 no. 6.33 MW_{th} diesel powered emergency back-up generators with associated diesel fuel belly tanks and day tanks. Diesel fuel is provided from the Tank Farm to the north of The Site.

Building D consists of a 2-storey building for use as electrical rooms for electronic operations, mechanical plant rooms, (including a mezzanine level) with plant at roof level, administration areas, and staff facilities. The total floor area including ancillary elements is 8,657 sq.m. The building includes external roof top air handling units, with water is supplied by 1 no. humidification water storage tanks with c. 54 m³ total capacity. An external generator compound comprises 9 no. 6.49 MW_{th} diesel powered emergency back-up generators, with associated diesel fuel belly tanks. Diesel fuel is provided to the generators from the top up tank to the north of Building D.

In addition to the 4 no. data storage facilities, Installation also includes:

- An electrical Air Insulated Switchgear (AIS) Substation (operated by Eirgrid, owned by ESB);
- 1 no. transformer compound located to the north of the AIS Substation with associated control room (owned and operated by ADSIL);
- 1 no. transformer compound located between building B and Building D with associated control room (owned and operated by ADSIL);
- 1 no. bulk diesel fuel tank farm and bund with 4 no. 55,000 liter bulk tanks associated with the emergency generators for Building A and the Building C Extension with and associated fuel unloading bay;
- 1 no. diesel fuel tank farm and bund with 4 no. 55,000 liter bulk tanks associated with the emergency generators for Building B with and associated fuel unloading bay;
- 1 no. diesel fuel top up tank and bund with 1 no. 40,000 litre bulk top up tank associated with the emergency generators for Building D with associated unloading bay
- 1 no. 250 m³ sprinkler water tank, compound and associated pump house associated with Building A, B, C, and D including 2 no. diesel powered firewater pumps;
- Internal site road network;
- Underground foul and storm water drainage network,
- Underground water supply network
- 2 no. overground attenuation basins;
- 2 no. underground attenuation storm cells;
- Internal road network and access, parking spaces, cycle parking and motorbike parking.
- Supporting infrastructure including security fencing, CCTV and Lighting Infrastructure around the entire site.

4.2 PRIMARY PROCESSES/ACTIVITIES

4.2.1 Emergency Backup Generators (Generation Compound)

The Installation is supported by diesel-powered emergency back-up generators. These generators provide the necessary power to ensure the data storage buildings continue to operate in the event of a temporary failure of electricity supply. An uninterruptible power source or UPS system is also provided for the short-term transition from mains power to the emergency back-up generators.

The Installation requires a continuous supply of electricity to operate. During normal operations, the Installation is supplied electricity from the national grid. Outside of normal operations, the Installation is first supplied electricity by some or all of the onsite battery Installations and then by some or all of the onsite backup generators. Outside of routine testing and maintenance, the operation of these back-up generators is typically only required under the following emergency circumstances:

- A loss, reduction or instability of grid power supply,
- Critical maintenance to power systems,
- A request from the utility supplier (or third party acting on its behalf) to reduce grid electricity load.

Each of the four data storage buildings are accompanied by a designated emergency backup generators for the supply of emergency power to that building. There is no interconnectivity between the generators of different buildings.

The Installation has a maximum operational electrical demand of 85.5 MWe.

The generators are housed within a container with various designed control measures in place including acoustic attenuation, exhaust silences, and diesel stored locally in either day tanks or belly tanks within each containerised generator.

The individual double skinned belly tanks and day tanks at the emergency back-up generators have level gauges (high and low) within the fuel tanks connected to an onboard controller which will alarm to prevent overfilling and identify a sudden loss of fuel within the tank.

The containerised emergency backup generator housing includes retention bunding in the base of the container, there are leak detection systems within the bund to alert in the event of a leak from a generator fuel tank. The onboard controller for individual generators is connected to the Building Management System (BMS).

4.2.2 Data Storage Building(s)

Data storage facilities are centralised computer server systems on a large scale. They typically involve systemised racks of hundreds/thousands of server units. They offer significant advantages (and economies of scale) over traditional in-house data storage systems. The primary advantages are:

- Higher reliability and redundancy of systems,
- 24/7 monitoring and maintenance of storage by staff,
- Higher security and data protection, and
- Flexibility – ability to increase or decrease storage requirements at short notice in line with specific business needs.

The demand for cloud computing and data storage continues to be high and the Installation is intended to help meet this need.

4.3 SECONDARY PROCESS/ACTIVITIES

4.3.1 Ancillary infrastructure

There are integrated administration areas, associated with each main data hall buildings. The administration areas comprise the following main components:

- Reception areas,
- Open office areas, and conference rooms/meeting rooms,
- Maintenance and storage spaces; and
- Break room and sanitary facilities.

Additional Ancillary infrastructure includes:

- Underground foul and storm water drainage network,
- utility ducts and cables,
- Internal road network and car and motorcycle parking spaces. sheltered bicycle parking spaces,
- security hut and security fencing; and
- Drainage infrastructure including 2 no. attenuation basins and 2 no. underground attenuation systems.

4.3.2 Data Hall Cooling Systems

The location of the facilities in Ireland allows for the use of free-cooling media without the need for mechanical cooling. To take advantage of this, the air handling equipment will be fitted with airside condensers to utilise this outdoor air to cool the space.

The cooling units or Air Handling Units (AHUs) provide conditioned air to maintain temperature, relative humidity and pressurisation in the data halls. The cooling units under 2 modes; Free Cooling and Evaporative Cooling: Free Cooling uses outside air and Evaporative Cooling mode or 'Adiabatic Cooling' uses water from the mains supply as the cooling media. Duty and standby units are in place to ensure cooling is available at all times.

In the Free Cooling system, fresh air from outside the buildings enters the data halls via external louvres. The air is warmed as it passes across the IT servers located in the data halls, and subject to temperature conditions, this air is either recirculated or exhausted to atmosphere by the exhaust fans located at roof level. There is no emission of air pollutants from this process; and therefore, the exhaust is not considered an 'emission point'.

Free Cooling is sufficient to cool the data halls for the majority of time. There are a small number of hours each year, during elevated external temperatures particularly during summer months, that Evaporative Cooling (also known as adiabatic cooling) is required.

Evaporative cooling utilises 'mains water (at ambient temperature) from the mains supply as the cooling media. This water is stored within humidification or humidification water storage tanks located adjacent to each building.

The Fresh air is passed over evaporative cooling pads that are dampened by the cooling water as it is drawn into the building, the external air is cooled through an air/water heat exchange before entering the data hall. The majority of the evaporative cooling water is evaporated in this process. The evaporative cooling system provides greater energy efficiency than other options such as the use of chillers/compressor systems.

Evaporative cooling water is distributed via a ring main to each AHU corridor. The AHU has a water 'sump' which is supplied from the cooling water tanks. These sumps are equipped with a mechanical float valve to maintain the water level at an operational

level to ensure there is sufficient water for the pumping system. Water is then pumped up into the AHU. Water that is not evaporated at the end of the cooling cycle is discharged to storm water.

The evaporative cooling water for The Site is sourced from the mains water provided by Irish Water, the water requires no chemical treatment. The AHUs are clean systems and therefore the evaporative cooling water is of sufficient quality to be discharged to stormwater, furthermore this water diluted in The Site's stormwater attenuation systems.

The recirculated evaporative cooling water in the humidification water storage tanks is drained down typically every 7 days to the storm water drainage network to prevent legionella growth in the system.

The regular replenishment of the evaporative cooling Water prevents legionella growth. The Evaporative Cooling Water quality in the AHU sump is maintained by a UV water sterilizer, and a conductivity probe is used to determine the level of salts build up – there is no water treatment or water softeners added.

In the event that conductivity exceeds 1,500 $\mu\text{S}/\text{cm}$, water is bled off constantly when 1,500 $\mu\text{S}/\text{cm}$ is reached, the sump is not drained fully as that would impede the evaporative system. Water is bled off until conductivity drops below 1,500 $\mu\text{S}/\text{cm}$ and the drain valve is closed.

Cleaning of the water-based cooling systems, including all AHUs and pipelines with hydrogen peroxide solution is only undertaken if positive legionella samples have been detected in the unit.

4.3.3 Office Space Air Conditioning

Office air conditioning is provided by a Variable Refrigerant Flow (VRF) system which allows varying degrees of cooling across the office and support spaces thereby reducing energy consumption. High efficiency unit are used to minimise the electrical power demand. R410a and R407c refrigerants are used in these chiller and cooling systems.

The fresh air ventilation system for the office area for Building D will be served using energy efficient Heat Recovery Units which will recover waste heat from the office spaces and re-use to pre-heat the air with the HRU.

This will reduce the overall energy consumption for this system. The toilet areas shall be mechanically ventilated and automatically controlled by occupancy sensors to set back the ventilation rate during periods of non-use.

4.3.4 Waste Heat Recovery

The cooling system design for Building D can accommodate the future Installation of heat recovery coils in the central ventilation plant. If incorporated, the heat recovery coils would remove heat from the air after it passes through the data storage rooms to a hydraulic (water) pipe network before the air is re-introduced to the data storage room or exhausted to the atmosphere.

The heat recovery coils could generate hydraulic temperatures of between 20-30°C at the point of recovery.

The above provision could supply heat energy to a future district heating scheme developed by others external to The Site boundary. It should be noted that in order to benefit from the above heat recovery that district heating infrastructure external to The Site including plate heat exchangers, pumps and distribution networks would need to be developed by others.

A suitable receptor is not currently available and therefore this is not included in the licence application.

4.3.5 Electricity Supply and 110 kV Substation

The power requirements for the Installation are provided via a direct connection to the Air Insulated Switchgear (AIS) 110 kV Substation located in the east of The Site that was consented under FW11A/0104.

The AIS system was approved by EirGrid to allow for EirGrid and ESB Networks requirements for 100% expansion which will allow for future development for users within the industrially zoned lands. ESB Networks are the Transmission Asset Owner (TAO). ESB Networks is a subsidiary within ESB Group. ESB Networks finances, builds, and maintains the transmission system through which electricity flows from generation stations to bulk supply points near Ireland's cities and towns. It does this under a TAO licence granted by the Commission for Regulation of Utilities (CRU). ESB Networks performs its transmission related functions under the direction of Eirgrid. In summary EirGrid operates the transmission system (TAO) while ESB Networks carries out construction, maintenance, and repairs (TAO) under the direction of EirGrid. For this development, EirGrid will operate and the AIS Substation, remotely from their control centres. However, ESB Networks will carry out all local operations on Eirgrid's behalf. Eirgrid and ESB Networks are committed to running their businesses in the most environmentally friendly way possible.

There is a transformer compound containing 3 no. transformers and associated control building to the north the AIS Substation owned and operated by ADSIL, and a second transformer compound containing 2 no. transformers and associated control building located between Building B and Building C owned and operated by ADSIL.

In addition to the mains connection, there is an array of PV panels on Building D which can generate on site renewable energy up to a peak of 9.6 kWe. The on-site renewable electricity generation will be back-fed to the electrical general supply for the building, serving lighting, office area general services and office IT equipment. The total contribution to the onsite electrical demand from this addition is presented in Attachment-4-6-1.

4.4 WATER, SEWER, AND STORMWATER DRAINAGE INFRASTRUCTURE

The Site is serviced by a 300mm diameter asbestos cement watermain. This watermain is in the verge of the access road to The Site and continues in a northerly direction onto Ballycoolin Road.

4.4.1 Water Supply

The water supply to The Site is sourced from mains water supply via a metred connection from the existing main to the south of the Installation in accordance with the FCC Planning Permissions (FCC Reg. Ref.: FW13A/0067, FW15A/0135

FW10A/0099 and FW18A/0078). Water is used at the Installation for both staff welfare and cooling and humidification functions of the building's AHUs.

The design requires an average water demand of up to 35,099.6 m³ per annum. Where water demand is required during a short-term drought, additional supply can be provided from an alternative source such as tanker supply.

On-site water storage to support the cooling and humidification functions of the building's AHUs. is provided adjacent to each building:

Building A: 9 no. humidification water storage tanks with c. 243 m³ total capacity,
Building B: 9 no. humidification water storage tanks with c. 74 m³ total capacity ,
Building C: 8 no. humidification water storage tanks with c. 200 m³ total capacity
Building D: 1 no. humidification water storage tanks with c. 54 m³ total capacity

Pumps will supply water to the data storage facilities from the humidification water storage tanks listed above. The storage tanks will act as break tanks and buffer demand on the public watermain infrastructure.

Fire water

A 250-300mm fire ring main is in place to provide firefighting water to The Site.

There is a 1 no. 250 m³ sprinkler water tank and pump house containing 2 no. diesel powered firewater pumps associated with Building A, B, C and D.

There is no addition of water treatment chemicals applied, the water tanks are emptied once annually.

4.4.2 Stormwater Drainage Systems

Rainwater runoff from impermeable areas of The Site will be collected via the onsite stormwater drainage network and discharge to the south of the Installation in accordance with the FCC Planning Permissions (FCC Reg. Ref.: FW13A/0067, FW15A/0135 FW10A/0099 and FW18A/0078). The stormwater drainage network will convey the stormwater via various hydrocarbon interceptors to one of 4 no. stormwater attenuation systems (See Drawing 21_123D-CSE-00-XX-DR-C-1100).

- Attenuation 1 is an above ground attenuation basin, and has a capacity c. 2,210 m³ located to the south of The Site
- Attenuation 2 is an above ground attenuation basin, and has a capacity of c. 400 m³ located between Building B and Building D
- Attenuation 3 is an underground storm cell and has an area of 720 m² and a depth c. 1 m located to the west of Building D
- Attenuation 4 is an underground storm cell and has a capacity of c. 190 m³ located to the north of The Site.

The stormwater discharges offsite at 4 no. Emission Points (SW1, SW2, SW3, SW4) as shown on Drawing Reference: 21_123D-CSE-00-XX-DR-C-1100 Surface Water Layout Plan.

The 4 no. emissions points discharge stormwater to the 1200 mm diameter existing surface water drainage main, located to the south in the public road and runs through the IDA Blanchardstown Business and Technology Park. This stormwater main flows east to the man-made attenuation and detention structure (artificial lake) located in

College Business Park, from here it drains westwards to the Ballycoolin Stream, the Ballycoolin Stream flows 1.2 km downstream in a southerly direction and confluences with River Tolka.

The surface water outflow will be limited to a greenfield runoff rate of 2l/s/Ha as the runoff from The Site is to be attenuated and a flow control device used to limit the discharge rate.

The attenuation systems provided on site cater for the 1/100-year critical event with a 10% Climate Change factor allowed as required under the Greater Dublin Strategic Drainage Study (GDSDS). The attenuation areas have been constructed in line with SuDS measures requirement, and with the FCC Planning Permissions (FCC Reg. Ref.: FW13A/0067, FW15A/0135 FW10A/0099 and FW18A/0078)..

Evaporative Cooling Water Drain Down

As discussed in Section 4.3.2 above, the evaporative cooling water from the AHUs discharges to the stormwater network. This is recirculated mains water that has been through the AHUs only. There is no addition of water treatment chemicals. The air handling units are clean systems and therefore the water is of sufficient quality to be discharged to storm.

4.4.3 Wastewater Drainage System

Domestic effluent arising from occupation of the data storage facilities will discharge to the public foul sewer (at Emission Points SE1, SE2, SE3, and SE4) and from the transformer compound and control building located adjacent to the AIS Substation to the public foul sewer (at Emission Point SE5). Refer to Drawing 21_123D_CSE-00-XX-DR-C-1200 for the foul drainage layout.

This foul sewer discharges to a 450mm diameter public foul sewer located on the south side of the main access road which serves the IDA Blanchardstown Business and Technology Park. The foul network ultimately discharges into a regional pumping station before final treatment and disposal at Ringsend Wastewater Treatment Plant (WWTP) in Dublin.

Domestic Effluent (Buildings A to D)

A gravity piped foul drainage network comprising of 225 mm pipes will take effluent from internal sanitary locations and outfall into the external foul network. The outfall into the existing public foul network will be at four locations, one to the southwest (SE1), two in the south (SE2 and SE3) and one in the southeast (SE4).

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

Diesel Tank Farm

Drainage of rainwater from the diesel tank farm and associated unloading bays to the north of The Site is directed to foul sewer and connects to the foul main at emission point SE3. The drainage sumps at the fuel unloading bays and in the bulk tank concrete bunds contain hydrocarbon detectors which automatically shut off drainage from these sumps if diesel is detected in the sump, preventing any contaminated stormwater from exiting the bund. These probes are also connected to the BMS/EPMS critical alarm.

Drainage from the bulk tank farm is equipped with a Class 2 hydrocarbon interceptor. The location of these are illustrated on Drawing 21_123D_CSE-00-XX-DR-C-1200. This hydrocarbon interceptor is equipped with an oil warning system which is connected to the BMS/EPMS critical alarm.

Transformer Compound

The transformer compound and control building located adjacent to the AIS Substation is directed to foul sewer, and connects to the foul main at emission point SE5.

Drainage from the transformer compound is equipped with a Class 2 hydrocarbon interceptor. The location of these are illustrated on Drawing 21_123D_CSE-00-XX-DR-C-1200. This hydrocarbon interceptor is equipped with an oil warning system which is connected to the BMS/EPMS critical alarm.

5.0 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 5.1.

Table 5.1 *Applicable BAT documents*

Horizontal BREF	Publication date	Attachment
Best Available Techniques (BAT) Reference Document for Large Combustion Plants	2017	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 assessment has 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.

6.0 MANAGEMENT OF RAW MATERIALS, INTERMEDIARIES AND WASTES

A list of all raw materials in use on The Site is provided in Attachment 4-6-2. The only chemical stored in bulk is diesel.

Spill kits will be located across The Site in highly visible and mobile units. These will include absorbent socks, mats, pads, disposable bags, and PPE. Spill kits will be utilised in the event of a spill outside the designated bund and staff are trained in the use of spill management materials. Staff will be fully trained in site procedures, including all Standard Operating Procedures (SOPs) and emergency response and

safety procedures in relation to the storage and handling of all substances being used at the Installation.

6.1 RAW MATERIALS MANAGEMENT

The only chemical stored on site in bulk is diesel. There are no other raw materials held onsite other than domestic cleaning chemicals for cleaning of the staff facilities. These are managed by the cleaning company. All oils, paints, adhesives or other materials required are brought onsite and removed from site by the relevant contractors.

Refrigerant is held within the VRF system for the offices. No refrigerants are stored onsite. R410a and R407c refrigerants are held within this system on a continuous basis and would only be removed during decommissioning.

The small amounts of hazardous waste generated are stored internally in appropriate waste receptacles on bunds, or externally to each building in appropriate waste receptacles in covered bunds.

The waste is covered, and a mobile retention bund is in place to contain any liquid waste that requires storage. The waste is collected from this area by an authorised waste manager for disposal off-site.

Waste oil and filters and waste batteries are not stored onsite and are removed by the maintenance companies during maintenance operations and change outs.

6.1.1 Diesel Fuel Oil Storage

Fuel (diesel) for the emergency back-up generators is stored in multiple locations across The Site; that includes bulk diesel tanks, 'top up' tanks. The emergency back-up generators have 'day' tanks and/or 'belly' tanks located within the generator container.

All fuel tanks, banded storage and pipelines have been designed for the specific purpose and contents. As required the structures will be rendered impervious to the materials stored therein. All fuel tanks, banded storage and pipelines are integrity tested following Installation by vendor. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

There is a total diesel storage capacity on site of 950,500 litres, 950.5 m³ or approximately 807.9 tonnes (assumed density of 0.85 l/kg). The tanks on site are filled to 80% capacity under normal conditions; therefore the total diesel storage on site is 760,400 litres, 760.4 m³ or approximately 646.3 tonnes (assumed density of 0.85 l/kg).

There are 2 no. diesel unloading bays located on site: 1 no. at the bulk diesel tank farm to the north of The Site, and 1 no. in place for the top-up tank located to the east of Building D.

In accordance with the Commission for Energy Regulation (CER) regulations, low sulphur diesel is used.

Buildings A and Buildings C Extension

Bulk diesel is supplied to the emergency backup generators at Buildings A and the Building C Extension from 4 no. 55,000 litres steel bulk storage tanks located in a

bunded tank farm to the north of The Site. The bund has a capacity of 312 m³. The bund capacity exceeds the EPA guidance for 110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of the substance which could be stored within the bunded area.

The bund is constructed of suitable concrete and have undergone testing for their integrity during the commissioning phase. All bunds and pipelines are integrity tested following Installation by the vendor.. The bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge should hydrocarbon be detected in the sump, and sends an alarm signal to the BMS to alert EOTs.

The bulk fuel tanks are fitted with automated level gauges and the online readings from these gauges are fed back into the facility's BMS/EPMS. The bulk tanks also have high/low level alarms (90% high, 30% low) and a high-level switch at 95% which alarm to the BMS/EPMS critical alarm.

Fuel delivery to the bulk storage tanks will take place within the designated unloading areas in accordance with strict Standard Operating Procedures. Diesel will then be piped from the bulk storage tanks to the emergency backup generator day tanks or belly tanks. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

Each of the 22 no. emergency backup generators at Buildings A are accompanied by a double skinned day tank (2,500 litres each) for immediate supply to the generator. These day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

Each of the 4 no. emergency backup generators at the Buildings C Extension are accompanied by a double skinned day tank (4,000 litres each) for immediate supply to the generator. These day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

Buildings B

Bulk diesel is supplied to the emergency backup generators at Buildings B from 4 no. 55,000 litre steel bulk storage tanks located in a bunded tank farm to the north of The Site. The bund has a capacity of 335 m³. The bund capacity exceeds the EPA guidance for 110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of the substance which could be stored within the bunded area

The bund is constructed of suitable concrete and have undergone testing for their integrity during the commissioning phase. All bunds and pipelines are integrity tested following Installation by vendor. The bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge should hydrocarbon be detected in the sump, and sends an alarm signal to the BMS to alert EOTs..

The bulk fuel tanks are fitted with automated level gauges and the online readings from these gauges are fed back into the facility's BMS/EPMS. The bulk tanks also have high/low level alarms (90% high, 30% low) and a high-level switch at 95% which alarm to the BMS/EPMS critical alarm.

Fuel delivery to the bulk storage tanks will take place within the designated unloading areas in accordance with strict Standard Operating Procedures. Diesel will then be

piped from the bulk storage tanks to the emergency backup generator day tanks or belly tanks. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

Each of the 17 no. emergency backup generators at Buildings B are accompanied by a double skinned day tank (3,500 litres each) for immediate supply to the generator. These day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

Buildings C

Diesel is supplied to the 18 no. emergency backup generators at Buildings C by direct filling to the individual upright tanks, there are 17 no. 10,000 litre upright double skinned tanks; and 1 no. 15,000 litre upright double skinned tank located externally to the north east of the generation building. The individual tanks are double skinned tanks, with level gauges (high and low) within the fuel tanks connected to an onboard controller which will alarm to prevent overfilling and identify a sudden loss of fuel within the tank.

Buildings D

Bulk diesel will be supplied to the emergency backup generators at Buildings D from 1 no. 40,000 litre bulk storage tank each (a total of 1 no tanks) located to the east of Building D. The bund capacity for this tank is 51 m³. The bund capacity exceeds the EPA guidance for 110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of the substance which could be stored within the bunded area.

The bund is constructed of suitable concrete and have undergone testing for their integrity during the commissioning phase. All bunds and pipelines are integrity tested following Installation by vendor. The bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge should hydrocarbon be detected in the sump, and sends an alarm signal to the BMS to alert EOTs.

The top up tank is fitted with automated level gauges and the online readings from the gauges will feed back into the facility's BMS/EPMS. The bulk tanks will also have high/low level alarms (95% high, 20% low based on analogue level sensor) and a high-level switch at 95% which alarm to the BMS/EPMS critical alarm.

Fuel delivery to the top up tank will take place within the designated unloading areas under strict Standard Operating Procedures. Diesel will then be piped from the top up tank to the emergency backup generator day tanks or belly tanks. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

Each of the 9 no. emergency backup generators at the Buildings D are accompanied by a double skinned day tank (1,000 litres each) for immediate supply to the generator, and a double skinned belly tank (16,000 litres each). These day and belly tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS.

6.1.2 Energy Use

The operation of the Installation will involve the consumption of electricity, fuel and mains water. The estimated quantities to be used when the Installation is operational

are specified in Attachment-4-6-1 of the application and are shown below in Table 6.1 below.

Table 6.1 Summary of the Estimated Future Resource use at the Installation Resource

Resource	Estimated quantity per annum
Electricity (purchased)	1,785,233 MWh
Total Electricity (generated and used)	1,785,233 MWh
Electricity (generated and exported)	N/A
Natural Gas	N/A
Diesel (Gas Oil)	1,001 tonnes annually
Water (Public Supply)	35,099.6 m ³

The applicant will employ a variety of technologies to maximise the efficient use of energy within the Installation. The Installation will be operated in accordance with an Energy Efficiency Management System (ENEMS) as well as the requirements of BAT.

The application of BAT provides for the efficient use of resources and energy in all site operations. It requires an energy audit to be carried out and repeated at intervals as required by the Agency and the recommendations of the audit to be incorporated into the ENEMS.

6.2 INTERMEDIATES AND PRODUCTS

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

6.3 WASTE MANAGEMENT

There will be minimal solid and liquid waste produced at the data storage facilities including domestic wastes, kitchen wastes, packaging wastes, non-hazardous WEEE, E-Waste, filters, waste oils and spent batteries. A more detailed description of the waste types and their management is provided in Section 8 of this application.

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in designated, easily accessible areas of The Site.

Packaging waste associated with rack deliveries to the data storage facilities is collected in recycling bins.

The small amounts of hazardous waste generated are stored in a designated storage area in each building. The waste is covered, and a mobile retention bund is in place to contain any liquid waste that requires storage, where required. The waste is collected from this area by an authorised waste contractor for recovery and / or disposal off-site.

Waste oil and filters and waste batteries are not stored onsite and are removed by the maintenance contractors during maintenance operations and change outs.

Waste sludge from the hydrocarbon interceptor is removed directly from each separator by a specialised and appropriately licensed contractor by means of a vacuum tanker.

Other smaller amounts of domestic waste are produced at the offices and other staff areas including the canteens. This includes paper and office waste as well as dry mixed recyclables and compost food wastes. Very small quantities of mixed municipal wastes may also be produced from time to time. These are separated at each of the individual data storage facilities and then are emptied into skips/larger bins externally for collection by the nominated waste contractor. The quantities are small due to the number of staff present onsite on a daily basis.

6.4 TANKS, BUNDS AND PIPELINES

All tanks, banded storage and pipelines have been designed for the specific purpose and contents. As required the structures will be rendered impervious to the materials stored therein. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

Bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge and sends an alarm signal to the BMS.

The bulk diesel tanks and top up tank are located within a banded area meeting the requirements of Agency guidelines on the "Storage and Transfer of Materials for Scheduled Activities". All bunds will be capable of containing 110% of the volume of the largest drum/tank within the bund or 25 % of the total volume of the substance stored and will be designed in accordance with the EPA's guidelines for the storage and transfer of materials for scheduled activities (EPA, 2004).

Fuel will be supplied from the banded diesel tanks to the day tanks and emergency back-up emergency backup generator units via distribution lines, these are double lined when underground. Leak detection systems are installed on all below ground fuel delivery lines which alarm to the BMS/EPMS critical alarm.

Delivery of diesel fuel oil will be a controlled process, and is undertaken in accordance with the Fuel Delivery SOP. Deliveries will be supervised and will take place in designated banded loading bays. Hydrocarbon interceptors are in place for the diesel tanker delivery bay to capture any spills.

The containerised emergency backup generator housing includes retention bunding in the base of the container (see section 6.1.1), there are leak detection systems within the bund to alert in the event of a leak from the generator fuel tank or lubricating oil tank. The onboard controller for individual generators is connected to the Building Management System (BMS).

The removal of any waste (oil/diesel) from the interceptors is undertaken by a licenced contractor.

All bunds and underground pipelines are integrity tested following Installation by the vendor.

7.0 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 therefore this has not been described.

7.1 AIR EMISSIONS

Main Air Emissions

There are no main air emissions proposed.

Minor Air Emissions

The following is a list of the minor air emission points from each of the emergency back-up generators on The Site. These emission points are shown in Drawings No. CSE-00-XX-DR-C-2000 Air Emission Layout Plan.

- Building A: 22 no. 5.59 MW_{th} diesel powered emergency back-up generators with stacks with a minimum height of 20.4m above ground level.
- Building B: 17 no. 6.33 MW_{th} diesel powered emergency back-up generators with stacks with a minimum height of 23.2m above ground level.
- Building C: 17 no. 5.59 MW_{th} diesel powered emergency back-up generators with stacks with a minimum height of 6.8m above ground level.
- Building C Extension: 5 no. 6.33 MW_{th} diesel powered emergency back-up generators with stacks a minimum height of 6.8m above ground level.
- Building D: 9 no. 6.49 MW_{th} diesel powered emergency back-up generators with stacks with a minimum height of 22m above ground level.
- Sprinkler Pumphouse: 2 no. diesel powered fire pumps 0.450 MW_{th}.

The Installation requires a continuous supply of electricity to operate. During normal operations, the Installation is supplied electricity from the national grid. Outside of normal operations, the Installation is first supplied electricity by some or all of the onsite battery Installations and then by some or all of the onsite backup generators. Outside of routine testing and maintenance, the operation of these back-up generators is typically only required under the following emergency circumstances:

- A loss, reduction or instability of grid power supply,
- Critical maintenance to power systems,
- A request from the utility supplier (or third party acting on its behalf) to reduce grid electricity load

The environmental impact of these minor emissions is set out in Section 7; Attachment-7-1-3-2-Air Emissions Impact of this license application.

Potential Air Emissions

These are emissions which only occur under abnormal process conditions. Typical examples include bursting discs, pressure relief valves, and emergency generators. The emergency back-up generators are included as minor emission sources due to the routine testing and maintenance.

- 9 no. Diesel Tank Breather Vents (1 per each Bulk Tank and Top Up Tank).
- 18 Diesel Tank Breather Vents (1 per each Upright tank at Building C).
- 9 Diesel Belly Tank Breather Vents (1 per each belly tank at Building D).

The diesel storage bulk tanks and top up tanks at the Installation each include breather vents (pressure relief vents). These produce minor diesel vapour (trace) emissions.

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 such emissions anticipated from the Installation. External pipelines containing diesel will have flange guards to prevent fugitive emissions.

7.1.1 Treatment and Abatement Systems

The emissions from the emergency back-up generators have been considered against the Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193). Under the Regulations new medium combustion plants which do not operate more than 500 operating hours per year, as a rolling average over a period of three years, shall not be required to comply with the Emission Limit Values (ELV) under the Regulations.

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. Air dispersion modelling has been undertaken as discussed in Attachment-7-1-3-2-Air Emissions Impact 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.

The stack heights of the emergency back-up generators for the have been designed to ensure that an adequate height was selected to aid dispersion of the emissions and achieve compliance with these ambient air quality standards at all off-site locations (including background concentrations). There is no SCR abatement or treatment systems proposed or required for the emergency diesel generators.

The results of the air dispersion model undertaken for the Installation is set out in Attachment-7-1-3-2-Air Emissions Impact. The USEPA methodology modelling results (based on 72 hours of operation) indicate that ambient ground level concentrations are below the relevant air quality standards for NO₂ for all scenarios modelled and no additional abatement systems are required.

7.1.2 Control and Monitoring

The emissions from the emergency back-up generators have been considered with respect to the Medium Combustion Plant (MCP) Regulations (S.I No. 595 of 2017), which transposed the Medium Combustion Plant Directive ((EU) 2015/2193).

The diesel generators are for emergency back-up use only and are not anticipated to operate in excess of 500 hours per annum. Therefore, the emergency generators are exempt from complying with the emission limit values subject to Section 13(3) of the Medium Combustion Plant (MCP) Regulations.

7.2 EMISSIONS TO SEWER (WASTEWATER EMISSIONS)

Foul Water Drainage

Foul drainage will be collected in the onsite foul network and will discharge to the mains foul sewer.

The outfall into the mains foul network is at five locations, one to the southwest (emission point SE1), two in the south (emission point SE2 and SE3) and two in the southeast (emission point SE4 and SE5). SE1 caters for foul flows from Building D. SE2 caters for foul flows from Building B, SE3 caters for foul flows from Building A and C and drainage from the diesel tank farm. SE4 will for foul flow from Building A., and SE5 caters for flows from the Control Building and Transformer compound located to the north of the AIS Substation.

The foul network ultimately discharges into a regional pumping station before final treatment and disposal at Ringsend Wastewater Treatment Plant (WWTP) in Dublin.

No monitoring is proposed for the foul water discharge.

7.2.1 Treatment and Abatement systems

There is no requirement for onsite treatment or abatement for foul effluent (domestic only) from the Installation. This will be treated offsite at the Ringsend Wastewater Treatment Plant.

Drainage from the bulk tank farm is equipped with a Class 2 full retention hydrocarbon interceptor. Drainage from the transformer compound is equipped with a Class 2 full retention hydrocarbon interceptor. The location of these are illustrated on Drawing 21_123D_CSE-00-XX-DR-C-1200. This hydrocarbon interceptor is equipped with an oil warning system which is connected to the BMS/EPMS critical alarm.

As there are no food preparation areas within the Buildings there is no requirement for the Installation of a grease trap to prevent fats, oils and greases (FOG) from entering the foul network.

7.2.2 Control and Monitoring

There is no process water discharged to the foul water network on site (domestic foul only), no monitoring of the overall sewer discharge is proposed.

The emission / offsite discharge points are labelled SE1, SE2, SE3, SE4, and SE5 on Drawing 21_123D-CSE-00-XX-DR-C-1200 Foul Water Layout plan included with the application.

7.3 STORMWATER / SURFACE WATER EMISSIONS

7.3.1 Storm Water Drainage

Emission to storm sewer consists of stormwater runoff from building roofs, yards and the road network. Residual cooling water, associated with the evaporative cooling process, is also discharged from the cooling systems to the storm sewer.

The attenuated stormwater drains at 4 no. Emission Points (SW1, SW2, SW3, SW4). The Site drainage is shown on Drawing 21_123D-CSE-00-XX-DR-C-1100 Surface Water Layout Plan included with this application.

There are 4 no. attenuation systems on site comprising 2 no. above ground attenuation basins, labelled Attenuation 1 and 2, and 2 no. below ground attenuation storage systems, labelled Attenuation 3 and 4.

- Attenuation Basin 1 discharges at Emission Point SW1 into the existing 1200 mm storm sewer to the south.
- Attenuation Basin 2 discharges at Emission Point SW2 into the existing 1200 mm storm sewer to the south.
- Attenuation Storage 3 discharges at Emission Point SW3 into the existing 1200 mm storm sewer to the south.
- Attenuation Storage 4 discharges unattenuated stormwater at Emission Point SW4.

7.3.2 Treatment and Abatement systems

This network conveys the stormwater through hydrocarbon interceptors to one of 4 no. stormwater attenuation systems constructed on the campus. The cooling water discharged from the evaporative cooling units is effectively clean water that has passed through the cooling equipment.

The discharge from site will pass through Class 1 hydrocarbon interceptors to capture any hydrocarbons prior to outfall.

The Class 1 Hydrocarbon interceptors are located down gradient of each attenuation basins and storm cell to ensure the quality of stormwater discharge is controlled prior discharge offsite. The interceptors are equipped with level detection and will connect to the BMS/EPMS critical alarm.

Stormwater discharge from the offloading areas for the top up tank at Building D also discharge through the Class 1 hydrocarbon interceptor upgradient of the attenuation storage no. 3.

There is no further requirement for additional on-site treatment of stormwater from The Site.

Additional onsite control and mitigation measures are in place including:

- Double skinned diesel belly tanks and day tanks, with high- and low-level alarms;
- Bunded bulk diesel and diesel top up tanks with high- and low-level alarms;
- Diesel tank (Bulk and Top Up) bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge and sends an alarm signal to the BMS.
- Hydrocarbon interceptors with level alarms; and
- Standard operating procedures for fuel delivery.

7.3.3 Control and Monitoring

No online monitoring is proposed for the stormwater discharge. The only bulk chemicals stored are hydrocarbons; adequate control measures are in place to monitor any potential leaks or spills of hydrocarbons at source.

It is proposed that weekly visual inspections for discolouration and odour are undertaken upstream of the stormwater discharge points (Monitoring Point SW1-1, SW2-1, SW3-1, and SW4-1).

It is intended to install a penstock on the outfall of each of the attenuation systems prior to the discharge into the stormwater main (Emission Point SW1, SW2, SW3, and SW4). Once installed, this penstock will allow the outfall of the basin(s) to be closed off to inhibit the outflow in the event of a spill or a fire. Potentially polluted water that reaches the storm water attenuation basins(s) (for example, in the case of a fire) shall be tested before release to the receiving storm water main. Any stormwater of unacceptable quality will be pumped out or otherwise removed of the attenuation basin and disposed of appropriately. In the highly unlikely event of a major spill that entered the storm cell(s), inspection would be undertaken to ensure there is no subsurface contamination.

Due to the limited storage of bulk chemicals (diesel fuel only) on site, and the robust control measures outlined above it is considered that not further monitoring or control methods are required for storm water.

7.4 EMISSIONS TO GROUND

There are no planned discharges of process and/or contaminated waters to ground.

7.5 NOISE EMISSIONS

During operation, the primary source of noise is expected to arise from building service plant which will be required to service the data storage facilities (i.e. the AHU air intake and the AHU air exhaust) as well as the operation of the emergency back-up generators during testing and emergency scenarios (i.e. generator air intake, generator air exhaust and generator engine exhaust).

An assessment of the noise emission impacts in line with the EPA *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* has been conducted by AWN and included in Attachment-7-1-3-2-Noise Emissions Impact Assessment.

7.5.1 Treatment and Abatement Systems

Plant items have been selected in order to achieve the required noise levels in order that the plant noise emission levels are achieved on site during operations. Each emergency generator is contained within an acoustic container to dampen the noise, and in line attenuators for the generator stacks and exhausts are used where necessary.

With due consideration as part of the detailed design process, this approach will result in The Site operating well within the constraints of the best practice guidance noise limits that have been adopted as part of the detailed assessment.

It is anticipated that the noise abatement measures are sufficient to ensure that the noise levels comply with the daytime, evening and night-time noise limits proposed, to be stipulated in the IE licence at the nearest noise sensitive receptors.

7.5.2 Control and Monitoring

Annual day time, evening and night-time monitoring is proposed to be undertaken in accordance with standard IE licence requirements.

8.0 MANAGEMENT AND PROCESS CONTROL SYSTEMS

8.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

An Environmental Management System (EMS) will be developed for The Site in accordance with the requirements of BAT. The EMS will outline the management of The Site's environmental program and, although not certified by ISO, will be in line with the principals of ISO14001.

8.1.1 Building Management System (BMS) and Electrical Power Monitoring System (EPMS)

The Installation operates a Building Management System (BMS) and an Electrical Power Monitoring System (EPMS) for control and monitoring, data collection and alarm/reporting of the air handling systems and mechanical utility systems site wide. Specifically, this includes the cooling systems, electrical supply, emergency back-up generators, water supply, fire alarms, fire detection and suppression systems and fuel oil use.

The BMS/EPMS will ensure the Installation is running an optimal efficiency and will alert the operators in the event of a malfunction through the use of visual and audible alarms. This includes malfunctions of the bulk fuel tank level indications and of the hydrocarbon interceptors, and any fuel bund or tank leaks.

The EPMS monitors the total fuel use as required for the GHG Permit. The EPMS will also control the changeover in electrical supply from the grid to the emergency back-up generators in the event of an outage.

8.2 EMERGENCY RESPONSE PLAN

An on-site Emergency Response Plan (ERP) has been developed for the data storage facilities and will be updated to incorporate any requirements of the Licence and future development. The ERP details the required actions to be undertaken in the event of an incident on site and will cover all possible emergency scenarios including fires, explosions, natural disasters, chemical spills, terrorism, etc. The ERP also includes the arrangements for contacting the emergency services and the relevant ADSIL personnel. The ERP is reviewed regularly by the Regional Environmental Manager and Regional Safety Manager and is updated as required.

It should be noted that the Installation will operate 24/7, 365 days a year. There is therefore no additional specific procedure required for emergencies outside normal working hours.

In addition to the ERP there is a disaster response procedure which provides instruction for the Disaster Response Action Team (AWS DRT).

8.3 STANDARD OPERATING PROCEDURES

Standard Operating Procedures (SOPs) have been developed for ADSIL sites and these will be continuously updated in conjunction with the EMS. These address all the relevant environmental matters onsite including, but not limited to;

- Spill prevention and response procedures,
- Pollution management and prevention,
- Waste Management,
- Fuel delivery,
- Emergency electricity supply and changeover procedures.

8.4 PREVENTATIVE MAINTENANCE

Preventative Maintenance (PM) is undertaken on mechanical moving parts equipment and electrical equipment including pumps, AHUs, humidifiers, generators, power transformers, etc. This maintenance includes all the regular and systematic tasks that ADSIL will carry out to ensure that the equipment is in an acceptable working condition, delivering required performance and expected durability.

Enterprise Asset Management (EAM) is the software platform ADSIL Infrastructure uses to maintain and manage its mechanical, electrical, and plumbing (MEP) equipment. This platform enables Infrastructure teams to do a variety of tasks:

- Track and coordinate planned and unplanned maintenance
- Track the full life cycle of critical data center assets
- Identify defective equipment through mechanisms like field service bulletins (FSBs)
- Provide tracking for DCEO spare part inventory
- Provide key insights for equipment failure, root cause analysis (RCA), and total cost of ownership (TCO)

The EAM team maintains the EAM system – the EAM team objective is to create and maintain a reliable maintenance platform that improves operational excellence, reduces both equipment failures and maintenance costs, and promotes standardized processes that support operations in ADSIL data centers.

A Maintenance Plan is developed before commissioning of equipment to include all the operations to be carried out in detail, as well as the means to be used and the estimated duration of the operations. The plan shall also include periodic assessments of the state of the Installation and proposals for improvement.

In addition to the PM, regular inspections of all infrastructure onsite. The twice a shift inspection of infrastructure ensures that any issues are dealt with if they arise.

8.5 WASTE MANAGEMENT

The majority of the wastes generated at the Installation will be non-hazardous. Waste operations will involve proper segregation and management of waste.

All waste leaving site will be recycled or recovered, except for those waste streams where appropriate recycling facilities are currently not available and the waste is disposed of as a last resort. All waste leaving The Site will be transported by suitably permitted contractors and taken to suitably registered, permitted and / or licenced

facilities. All waste leaving The Site will be recorded and copies of relevant documentation maintained.

Any waste classed as hazardous will be stored in a designated area (suitably banded, where required) and will be removed off site by a licensed hazardous waste contractor(s).

Waste oil, filters, waste batteries and waste sludge from the hydrocarbon interceptors will be removed directly by the maintenance contractors as and when generated; however, the Operator will appropriate permits and waste documentation, compliant with relevant legislation are provided by the licensed waste contractors.

Waste SOPs are in place for the operation of the data storage facilities. This will ensure the proper management and recycling of wastes generated at the facilities. The waste SOPs will enable the Installation to contribute to the targets and policies outlined in the *Eastern-Midlands Region Waste Management Plan 2015-2021*.

8.6 ENERGY MANAGEMENT

Energy management forms an integral part of the Installation's management. Measures are in place to minimise energy use as far as possible. ADSIL is committed to continually improving their energy efficiency and reducing their carbon footprint.

A Building Management System (BMS) and an Electrical Power Management System (EPMS) are in place to track the operation of critical sub-units and report back on energy efficiency of each section.

An Energy Efficiency Management System (ENEMS) will be developed for The Site in accordance with BAT which will set out the energy targets for the specific facility on an annual basis along with the responsible party; and targets will be assessed at the end of each year and reported in the Annual Environmental Report for the Installation. Energy efficiency learnings are shared between sister facilities in Ireland and Europe.

The ENEMS will include Key Performance Indicators (KPIs) for energy efficiency. The efficient use of energy will be monitored as part of The Site's continuous improvement programme to ensure all colleagues on site actively participate in the programme. Key process monitoring will be carried out to monitor the plant performance including water usage, energy consumption (diesel and electricity), hours of operation and power generated. The energy monitoring via the BMS will be accessible in real time so that future decisions on energy management/optimisation can be made on a fully informed basis.

Electrical performance monitoring in respect of Power Usage Effectiveness (PUE) of The Site is undertaken on a continuous basis. PUE is an indicator for measuring the energy efficiency of a data centre. PUE is measured as a ratio of total amount of energy used by a computer data storage facility to the energy delivered to computing equipment. An ideal PUE is 1.0. Anything that isn't considered a computing device in a data storage facility (i.e. lighting, cooling, etc.) falls into the category of facility energy consumption.

Further details of energy efficiency measures on site are included in Attachment-4-7-2 of this Application.

8.7 FIRE MANAGEMENT

A system is provided for detection, alarm and fire suppression to enhance life safety and protection of property by the detection of fire, enabling an audio/visual alarm to be given such that emergency actions may be taken fully compliant with Irish and EU regulations and in accordance with the insurers' requirements.

The data storage facilities are equipped with automated fire detection systems (heat and smoke). These are 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 are connected to the sprinkler system and these will be triggered in the event of a fire.

The fire detection and alarm systems are/will be subject to routine checks by site personnel and are/will be inspected and tested by the external service provider on a regular basis.

A firewater retention risk assessment is included with this application documentation Attachment-9-2-3-FWRA.

9.0 CESSATION OF ACTIVITY

9.1 SITE CLOSURE

A certain amount of environmental risk is associated with the cessation of any licensable activity (site closure). An outline Site Closure report has been provided in Section 9 of this application. Details outlined in The Site Closure Plan include the following:

- Decommissioning of equipment will involve disconnecting all electrical connections and decommissioning the IT Hardware, the diesel fired generators, the transformers, and all other relevant operational equipment at the Installation,
- The diesel generators, transformers, servers and other equipment will be removed and sold to a third party or scrapped depending on the age/condition at the time of closure,
- Hazardous materials stored in chem-stores, raw materials in the operations area, and any other materials on site will either be returned to the suppliers or disposed of as hazardous waste by a suitable waste contractor; and
- All non-hazardous waste will be sent for appropriate recycling, recovery, treatment or disposal.

It is anticipated that the EPA will impose suitable Conditions to the IE Licence once granted to ensure the proper closure of the activity with aim of protecting the environment.

9.2 BASELINE REPORT

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

On the basis of the site investigations undertaken prior to construction of the ADSIL facility and an assessment of source-pathways-receptors, the following conclusions have been made:

- The soil quality data is limited for the facility. However, based on available data, there is no evidence of contamination within the soils beneath the site. There is no groundwater quality data available and no existing monitoring boreholes to facilitate collection of samples.
- The only relevant bulk hazardous substances (substances stored or used onsite and which are classified as hazardous by the EPA under the Groundwater Regulations and contained in bulk storage) is diesel for back-up emergency generators. The risk prevention measures at the facility significantly reduce the potential for an environmental impact to soil or water to occur. These measures include bunded or double contained vessels, dual-contained fuel pipe system (when underground), and spill management procedures.
- Source-pathway-receptor linkages were assessed for the bulk storage areas. It was concluded that there are no direct pathways to either the soil and groundwater environment. A leakage from a bulk tank would be fully contained in the designated bund or the double skin lining of the tank, with leaks during delivery fully contained within the continuous hard stand delivery area. Any leakage outside of the delivery area would be contained within the drainage system. As the site is covered in hardstand, any spilled or leaked hydrocarbons, if not immediately contained will migrate through stormwater drainage system and subsequently be treated within the on-site interceptors and is assimilated within the attenuation systems on site.

9.3 ALTERNATIVES

9.3.1 Process alternatives

In terms of technology, the Installation will employ similar data server technology that is used by ADSIL at their other facilities, in the greater Dublin area and around the world, and represents state of the art technology.

Alternative technologies are considered on an ongoing basis by ADSIL as a part of each of its designs based on many factors including technical feasibility, environmental impact, efficiency, security, reliability and cost.

ADSIL is committed to continually assessing and improving this technology particularly with respect to minimising power and water consumption, in accordance with the goals of Ireland's Framework for Sustainable Development 'Our Sustainable Future'. The operator's designs are constantly evolving, and hardware is chosen with energy efficiency central to the decision-making process.

High efficiency EC direct drive fans will be used in all air supply and extract systems serving the data storage rooms. Also, the office air conditioning shall be served by a variable refrigerant flow (VRF) refrigerant system. Typically, the energy efficiency of a VRF system will exceed that of traditional air-cooled chillers by 15-25%.

9.3.2 Alternative Mitigation Measures

The mitigation measures for the environmental aspects considered under this IE licence application (if relevant) are set out in the accompanying emissions impact assessment reports within Section 7 of this licence application.