Amazon Data Services Ireland Ltd

OPERATIONAL REPORT

Attachment-4-8-1

January 2022

Licence Application (LA007495)

CONTENTS

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 Clonshaugh Business and Technology Park, Dublin D17. The site context is shown on Site Location Plan CSE-00-XX-DR-C-4002 - Overall Site Location Plan included with this application. The application relates to the entire facility that is c. 24.2 hectares (ha) in total ('the Site') The entire facility includes the c. 15 ha original land parcel at the former Diamond Innovations site (hereafter referred to as the 'Existing Campus') and a c. 9.2 ha additional land parcel (hereafter referred to as the 'Extended Campus') that is located to the north of the existing campus.

The site, when fully constructed will consist of 6 no. data storage facilities (Buildings A through F). The Existing Campus accommodates 4 no. data storage facilities (Buildings A through D). The Extended Campus will accommodate 2 no. data storage facilities (Buildings E and F), Building E is currently under construction and is targeted to be operational by the end of 2022, and Building F has received a grant of planning and is targeted to be operational by the beginning of 2024. The 2 no. additional data storage facilities will be an extension to the existing campus. The main site layout is shown in drawing CSE-00-XX-DR-C-4004 included with this application.

The installation requires a continuous supply of electricity to operate. During normal operations, the facility is supplied electricity from the national grid. Outside of normal operations, the facility 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 facility, once fully operational, will have comprise a total of: 103 no. 6.49 MW_{th} diesel powered emergency back-up generators; 2 no. 2.19 MW_{th} diesel powered emergency back-up generators; 4 no. 0.450 MW_{th} diesel powered fire pumps.

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

The combined thermal input (total capacity) from the generators once operational is 674.65 $MW_{th,}$ this exceeds the 50MW_{th} threshold set out in Class 2.1 of the EPA Act 1992 (as amended). The applicant is applying to the Environmental Protection Agency (EPA) for an Industrial Emissions (IE) Licence under Activity Class 2.1 principally relating to the operation of the diesel-powered emergency back-up generators on the site.

Once all data storage facility buildings are operational, each of the six buildings will have up to c. 50 full time employees present on site during the day in each building, inclusive of third-party staff, maintenance contractors and visitors, as required, with up to 7 no. additional staff on night shifts each day per building. This comprises a total of 342 personnel over the entire site each day (including night shifts).

The facility operational hours are 24 hours a day, 7 days a week.

2.0 SITE CONTEXT

The Site is located in the Clonshaugh Business & Technology Park, approximately 7km from Dublin Airport, 7km from Dublin City Centre and 2.5km from the M50 motorway. The Existing Campus is directly east of the site is the Port Tunnel Business Park (comprising SME commercial units/office units) and a variety of commercial premises and warehouses. The southern section of the existing campus was formerly the Diamond Innovations site; for further details on the historic land use see Attachment-4-8-3-Complete Baseline Report. To the north is the Extended Campus which is overlooked by the M1-M50 interchange. To the south is the Business Estate Road connecting the site to the rest of Clonshaugh Business & Technology Park, Oscar Traynor Road (R104) and Clonshaugh Road. The west of the Site is bound by the M50 and the M1. The surrounding area is predominantly commercial/industrial with some undeveloped land.

The Extended Campus is located on lands at Woodlands, immediately north of Clonshaugh Business & Technology Park in North Dublin. The lands were previously used for agricultural purposes and have been left fallow for the past number of years (Note: it is understood it has not been in active agricultural use since the 1990s for further details on the historic land use see Attachment-4-8-3-Complete Baseline Report). The Extended Campus is bound to the east by privately owned lands including Woodlands House (an inhabited protected structure), and agricultural lands. Immediately east of the privately-owned lands is the Clonshaugh Road, which is c. 240 m to the east of the site. The west of the site is bound by a slip road related to the M50/M1 interchange junction. The north of the site is defined by the R139 and on the other side of the R139 is undeveloped agricultural land, as well as the Clayton Hotel Dublin Airport and a number of residential properties. The western portion of the southern boundary of the extended campus is bound by the site of the existing campus and the Clonshaugh Business and Technology Park.

The Clonshaugh Business and Technology Park which has been developed in the past 10-15 years extends for c. 1km to the south. The Clonshaugh Business and Technology Park hosts a number of businesses including data storage facilities, food manufacturers, retail businesses, electrical infrastructure, light manufacturing, logistics, and commercial uses. The closest occupied residential properties are located c. 230m west of the site across the M1 within the Turnapin housing estate.

The surrounding 3 km of the site includes IE and IPC Licenced sites including:

- Anglo Beef Processors Ireland (Swords) (P0189), International Aerospace Coatings Limited (P0921), and Dublin Aerospace Limited P1106 located to the north.
- Forest Laboratories Ireland Limited (P0306) and Global Switch Property (Dublin) Limited (P0109) located within Clonshaugh Business & Technology Park
- Barclay Chemicals Manufacturing Limited
- Mondelez Ireland Production Limited (Coolock) (P0809), Crown Paints Ireland Ltd (P0248) and Wood-Printcraft Limited (P0143) located in Coolock to the south east

The closest notified under the Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) to the installation are the lower tier sites Gensys

Power Limited 6 km west of the site boundary and Exolum Aviation Ireland Ltd (formerly CLH) Corballis Road, Dublin Airport, Dublin 2 c. 2 km north east of the site boundary. The proposed development is located sufficiently away from these sites to not have any COMAH related effects.

3.0 PLANNING STATUS

The installation has received Final Grant of planning permission from Dublin City Council (DCC) under the separate applications listed below:

- Building A; final grant of permission on 29 January 2016 (DCC Reg. Ref.: 3874/15) and amended by DCC Reg. Ref.: 3599/16 (26 September 2016) and 3288/16 (23 November 2016); An EIA Screening Report was submitted with this application.
- Building B; final grant of permission on 6 April 2017 (DCC Reg. Ref.: 4449/16). An Environmental Impact Statement (EIAR) was submitted with this application and is included as Attachment-6-3-6-EIAR-Planning-Apr-2017;
- Building C; final grant of permission on 23 August 2018 (DCC Reg. Ref.: 3096/18). An EIAR was submitted with this application and is included as Attachment-6-3-6-EIAR-Planning-Aug-2018;
- Building D; final grant of permission on 24 January 2019 (DCC Reg. Ref.: 4185/18); An EIAR was submitted with this application and is included as Attachment-6-3-6-EIAR-Planning-Jan-2019; and
- Building E and Building F; final grant of permission on 20 August 2021 (DCC Reg. Ref.: 3803/20). An EIAR was submitted with this application and is included as Attachment-6-3-6-EIAR-Planning-Aug-2021 and addendum made during further information request included as Attachment-6-3-6-EIAR Addendum-Planning-Aug-2021.

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):

> *"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. 24.2 hectares and so exceeds the limit, quantity or threshold set out in Part 2, Schedule 5 is Class 10(a).

The Environmental Impact Assessment Report (EIAR) relating to this activity which have been previously submitted to DCC have been submitted to the Agency as part of this application and referenced according to the month of the Final Grant of permission (Attachment-6-3-6-EIAR-Planning-Apr-2017 (AWN, 2016), Attachment-6-3-6-EIAR-Planning-Aug-2018 (AWN, 2018), Attachment-6-3-6-EIAR-Planning-Jan-2019 (AWN, 2018), Attachment-6-3-6-EIAR-Planning-Aug-2021(AWN, 2020), and Attachment-6-3-6-EIAR Addendum-Planning-Aug-2021 (AWN, 2021)of the IE Licence application).

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.

The installation is to be constructed and operated in accordance with the planning permissions set out above, therefore the EIAR submitted to the EPA are relevant to this IE License activity. Any further information, including reports and advice, relating to the environmental impact assessment of the proposed activity is made available and contained within Section 7 of this licence application .

Additional Site Planning History

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

- Amazon Data Services Ireland Ltd. applied for the demolition of the existing industrial buildings (Diamond Innovation) and ancillary structures on the site. The total floor area of buildings proposed to be demolished is 16,500 sqm. Final grant of permission on 13 January 2016 (DCC Reg. Ref.: 3634/15);
- Mullins Developments LLC applied for development at the former Diamond Innovations site (Unit 1C), Clonshaugh Business & Technology Park and adjacent lands, Dublin D17 V088. The development will consist of: (1) 2 no. satellite antennae, 5.4m in diameter on; (2) 2 no. support towers in galvanised structural steel clad in powder coated steel mesh; (3) Access stairs and platforms behind existing plant screen; (4) 3m 2 tool cabin behind existing plant screen and;(5) 2 no. access roads for maintenance in permeable paving. Final grant of permission on 23 July 2019 (DCC Reg. Ref.: 2402/19);
- Amazon Data Services Ireland Ltd. applied for permission for the 110 kilovolt (kV) Substation constructed within the existing data storage facility campus. The 110kV Substation (also referred to as the Darndale Substation) was permitted by DCC under DCC Reg. Ref.: 3874/15 as amended by DCC Reg. Ref.: 3288/16.
- Amazon Data Services Ireland Ltd. applied for new double circuit 110kV underground cable from the existing Belcamp 220kV and 110 kV Substation to the 110kV Darndale Substation on the northern part of the existing campus. The underground cable is designed to support current power demand and future growth within the Clonshaugh area inclusive but not limited to the power requirements for the ADSIL site. This development was approved under a Strategic Development Infrastructure (SID) permission granted by An Bord Pleanála (ABP) on 8th August 2019 (ABP Case Ref. PL29N.303687).

4.0 DESCRIPTION OF SITE ACTIVITY

4.1 SITE OVERVIEW

The Existing Campus is currently occupied by 4 operational data storage facilities, Buildings A, B, C and D). The Extended Campus is will accommodate 2 no. data storage facilities (Buildings E and F), Building E is currently under construction and is targeted to be operational by the end of 2022, and Building F is targeted to be operational by the beginning of 2024.

The layout of the existing and permitted data storage facilities, ancillary buildings, structures and attenuation ponds (and the area of application) is shown in Drawing CSE-00-XX-DR-C-4004 Site Layout Plan included as part of this application.

On the Existing Campus there are four data storage facilities each of which consist of the following primary aspects:

- Data Storage Rooms;
- Associated Electrical and AHU Plant Rooms to house the equipment required to maintain the temperature, humidity and power supply for the facility;
- Administration areas (office space, meeting rooms, welfare facilities etc.);
- Diesel powered emergency back-up generators, including fuel tanks (and associated emissions stacks/flues;
- Water storage tanks; and;
- Loading bays and Associated infrastructure

Building A is c. 16m in height (to top of parapet) and comprises approximately 16,700m^2 of accommodation over two storeys. Building B is c. 11.4m in height (to top of parapet) and comprises approximately 14,000m^2 of accommodation over a single storey. Roof mounted plant and other supporting equipment are largely screened by the parapet on both buildings.

Building C is c.16m in height (to top of parapet) and will comprise of a two-storey c. 16,860m^2 building for use as a data storage facility. Building D is also 16m in height (to top of parapet) and is visually similar to Building C comprising of a new two-storey c. 16,860m^2 building. Mechanical plant at roof level is screened from view on all sides by permanent screens on both buildings.

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

- An electrical substation (owned and operated by ESB) and 2 no. transformer compounds with associated control rooms (operated by ADSIL);
- A diesel fuel tank farm including 5 no. steel bulk storage tanks (3 no. 75,000 litre tanks and 2 no. 115,000 litre tank) and associated fuel unloading bay;
- 1 no. 40,000 diesel top up tank with associated unloading bay;
- A sprinkler water tank, compound and associated pump house including 2 no. diesel powered firewater pumps;
- Internal site road network;
- Underground foul and storm water drainage network;
- 2 no. surface water attenuation ponds (sized for a 1 in 100-year rainfall event); and; and;
- Supporting infrastructure including security fencing, CCTV and Lighting Infrastructure around the entire site.

Extended Campus (Buildings E and Building F)

On the Extended Campus once completed there will be two data storage facilities (Buildings E and F) each of which consist of the following primary aspects:

- Data Storage Rooms;
- Associated electrical and mechanical plant rooms to house the equipment required to maintain the temperature, humidity and power supply for the facility;
- Administration areas (office space, meeting rooms, welfare facilities and associated circulation space etc.);

- Diesel powered emergency back-up generators, including fuel tanks (and associated emissions stacks/flues); and
- Loading bays and Associated infrastructure

Building E and Building F are c. 16m in height (to top of parapet) and comprises approximately 15,703m^2 over two storeys. Roof mounted plant and other supporting equipment are largely screened by the parapet on both buildings. The roof includes, screened mechanical plant at roof level, rainwater harvesting, photovoltaic (PV) panels. Visually the appearance of Buildings E and F will complement the industrial buildings in the environs, most notably the data storage facilities on the existing campus.

The development will consist of:

- 1 no. single storey client control building (309 sqm), and Transformer Compound
- Underground foul, storm water drainage network, water supply and 1 no. overground attenuation area;
- Sprinkler water tanks, compound and associated pump house including 2 no. diesel powered firewater pumps;
- 2 no. 40,000 litre bunded diesel top up tanks with associated unloading bay;
- Road network and access from existing campus to the south, 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 facility is supported by containerised diesel-powered emergency back-up generators that are located externally in the generator yard associated with each data centre building. These generators immediately provide the necessary power to ensure the data centre 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 facility is supplied electricity from the national grid. Outside of normal operations, the facility 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 data storage buildings are accompanied by a designated generator compound for the supply of emergency power to that building. There is no interconnectivity between the generators of different buildings.

The facility once fully operational will have a maximum operational electrical demand of approximately 33.6MWe for each of Building E and F, and approximately 24.5MWe for Building A - D, with an overall maximum operational demand for the site of approximately 165.2MWe.

The generators are housed within a container with various designed control measures in place including acoustic attenuation, exhaust silences, and diesel stored locally within each containerised generator. The individual belly tanks and day 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. 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 the generator fuel tank or lubricating oil 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. At typical data storage facility scale (typically involving 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 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. car parking spaces, and. sheltered bicycle parking spaces,
- security hut and security fencing; and
- Drainage infrastructure including 3 no. attenuation ponds.

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. Duty and standby units are in place to ensure cooling is available at all times. The cooling units under 2 modes; Free Cooling and Evaporative Cooling. Duty and standby units are in place to ensure cooling is available at all times. The AHUs have two modes of operation: Free Cooling which uses outside airair, and Evaporative Cooling mode or 'Adiabatic Cooling' which uses water from the mains supply as the cooling media.

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 or harvested roof water (at ambient temperature) from the mains supply as the cooling media. 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 then 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 is recirculated back to the sump for re-use.

The recirculated Evaporative Cooling Water in the AHU sumps at Buildings A, C, D, E, F is drained down typically every 7 days to the stormwater drainage network, and to the site attenuation pond, to prevent legionella growth in the system (this is mains water and is therefore of sufficient quality to be discharged to stormwater). At Building B due to the design, the recirculated Evaporative Cooling Water is discharged directly to the site foul sewer network.

The Evaporative Cooling Water for the site is soured from the mains water provided by Irish Water, or from rainwater harvesting (for Buildings E and F), 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 ponds. Under normal operating conditions no more than one AHU per electric room will enter the flush cycle at any given time to prevent overwhelming the drain capacity of the facility.

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 within the AHU water sump exceeds 1500 microsiemens (µS/cm), the AHU water is bled off, the sump is not drained fully as that would impede the evaporative system. Water is bled off until conductivity drops below 1,500 µS/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 units are used to minimise the electrical power demand. R410A refrigerant is used in these systems.

The fresh air ventilation system for the office areas 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 waste heat from the data storage units will be removed continually by motorised fans in the AHU system.

The design of the airside heat recovery systems at Buildings E and F is such that they could accommodate the future installation of heat recovery coils in the central plant. The installation of these heat recovery coils could allow the removal of heat from air after it passes through the data storage rooms and before its reintroduction to the data storage halls or its exhaustion to the atmosphere.

This provision could supply heat energy to a future district heating scheme developed by others external to the site boundary. In order to benefit from such a heat recovery system, district heating infrastructure external to the site would have to be installed and developed by others, including plate heat exchangers, pumps and distribution networks.

4.3.5 Electricity Supply and 110 kV Substation

The power requirements for the installation provided via a connection to the 110 kilovolt (kV) Darndale Substation located on the northern portion of the Existing Campus. The 110 kV Darndale Substation was permitted by DCC as part of a larger development at Clonshaugh Business and Technology Park under DCC Reg. Ref.: 3288/16, which was an amendment of DCC Reg. Ref.: 3874/15.

The 110kV GIS Substation Compound includes an electrical transformer compound with associated control room, 4 no. transformers set within a fenced compound to the east of the control room, and permission to develop 1 no single storey client control building (216sqm) and 2 no. transformers set within a fenced compound west of the control room.

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

In addition to the mains connection, provision for an array of PV panels on Buildings E and F shall be made to generate on site renewable energy up to a peak of 26 kWe per building, to comply with Nearly Zero Energy Building (nZEB) requirements. 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 amount of panels will cover 150sqm per building and shall be located at the plant roof area. 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

4.4.1 Water Supply

The water supply will be sourced from mains water supply via a metered connection from the main to the south of the installation in accordance with the connection made under DCC Reg. Ref.: 3874/15 (29 January 2016) and amended by DCC Reg. Ref.: 3599/16 (26 September 2016) and 3288/16 (23 November 2016)

The design of Buildings A, B C and DB (and related agreement with Irish Water) requires a peak water demand of up to 6.56 l/s. When constructed and operational Building E and F on the extended campus will require a peak water demand of up to 2.72 litres per second(l/s).

The extended campus will include rainwater harvesting systems to reduce the demand on public mains. Rainwater will be directed to a rainwater holding tank at each building, from this tank it will be pumped to a filtration and Ultraviolet (UV) disinfections system, then stored in 2 no. 84 m^3 clean water storage tanks, when rainwater is unavailable these will be filled from the mains supply. When there is no demand for rainwater from the harvesting system, this water will overflow to the stormwater network.

Water is stored in localised water storage tanks at each of the data storage facilities. There is no addition of water treatment chemicals applied however the water tanks are emptied once annually.

Water is supplied to the site in a pressurised pipe system to potable cold-water storage tanks. Supply is provided from the existing 150mm watermain on the site which is fed from the public 350mm diameter uPVC watermain on the IDA estate road to the south

of the site. Water supply to Buildings E and F on the Extended Campus will be supplied via a connection to the existing 150mm watermain that serves the Existing Campus.

Firewater and Sprinkler systems

A 250-300mm fire ring main is in place across the existing campus to provide firefighting water to the site. The sprinkler pump house located at the sprinkler pump house on the Existing Campus is equipped with 2 diesel fired pumps (one duty, one standby) for the supply of firefighting water. These then feed into the internal fire main which feeds the sprinkler system for all four data storage facilities on the existing campus.

The sprinkler tank in the pump house has an effective capacity of 400m^3 which is fed from the water main will be filled on building occupation and have infrequent top-ups thereafter. There is no addition of water treatment chemicals to this water.

The fire water ring main will be extended within the site to provide firefighting water to the extended campus. The fire main will supply a new sprinkler tank and pumphouse on the Extended Campus containing 2 no. diesel fired pumps (one duty, one standby) which will be located in the extended campus to support Buildings E and F.

4.5 STORMWATER DRAINAGE SYSTEMS

Existing Campus (Buildings A to D)

Rainwater runoff from building roofs, yards and the road network is collected in the onsite storm water drainage network consisting of 225mm to 600mm diameter pipes. This network conveys the stormwater to one of two stormwater attenuation ponds constructed on the campus (See Drawing CSE-00-XX-DR-C-4206).

The Attenuation Pond 1 (4,200m^3 capacity) is located in the west and receives the majority of the rainwater runoff. The attenuation pond is design catered for a total hardstanding area of 7.67 ha; however, the actual area of hardstand across the existing campus is 7.61ha. The pond has also been designed to attenuate up to a 1% AEP rainfall event including an additional 10% for climate change.

The attenuated stormwater in Attenuation Pond 1 is discharged from the pond via a flow control device (hydrobrake) and passed through a Class 1 Bypass hydrocarbon interceptor (NPBP006 type with an oil capacity of 90 litres) to ensure that the quality of the stormwater discharge is controlled. After the hydrobrake and hydrocarbon interceptor, the attenuated waters pass to an existing 375mm diameter connection which then discharges into the existing 750mm diameter concrete public stormwater sewer within the Business Estate Road along the southern boundary of the site. This located is labelled Emission Point SW1 (Drawing DUB084-CSE-00-XX-DR-C-4206). All adjacent business and industrial developments discharge to this public stormwater sewer, which flows east, then south and ultimately outfalls to the Santry River.

Attenuation Pond 2 (600 m^3 capacity) is located directly to the north of the Darndale Substation and is designed to drain the northern portion of the site including the 110kV Darndale Substation and sprinkler compound. Prior to the attenuation pond the stormwater passes through one of 2 no. Class 1 by-pass hydrocarbon interceptors (1 no. for drainage from the transformer compound, 1 no. for drainage from the remaining areas). These are NSBP003 type interceptors with a hydrocarbon capacity of 45 litres each. The interceptors are equipped with hydrocarbon level alarms, that signal when

the interceptors are full of hydrocarbons these alarms are connected to the BMS/EPMS critical alarm.

The stormwater from Attenuation Pond 2 is then pumped via a 100 mm diameter rising main back into the stormwater drainage network for the Existing Campus to flow into Attenuation Pond 1.

Extended Campus (Buildings E and F)

Rainwater runoff from building roofs, yards and the proposed road network will be collected in a newly constructed stormwater drainage network consisting of 225 mm to 675 mm diameter pipes. A self-cleaning velocity of 1.0m/s will be achieved throughout this network. The stormwater will then be diverted to an underground attenuation system and overground detention pond (Attenuation Storage 3). A total of 2150m^3 temporary storage has been provided in the attenuation system. The underground attenuation system comprises 1668m^3 and the detention basin provides 482m^3 temporary storage.

The drainage design for the development includes a Class 1 bypass petrol interceptor immediately upgradient of the attenuation to ensure the quality of stormwater discharge is controlled prior to attenuation and discharge offsite. The interceptor will be equipped with level detection and will connect to the BMS/EPMS critical alarm.

The attenuated stormwater will be pumped via a stormwater rising main at a controlled rate of 16.6l/s (the equivalent greenfield runoff rate for the site) to a stand-off manhole and then by gravity feed to the existing stormwater sewer along the Business Estate Road via the existing 375mm diameter connection in the existing campus.

The stormwater from both the new and the existing campus therefore exit the site at shared Emission Point SW1 (Drawing DUB084-CSE-00-XX-DR-C-4206).

Evaporative Cooling Water Dram Down (Buildings A, C, D, E and F)

As discussed in Section 4.3.2 above, the Evaporative Cooling water from the AHUs at Buildings A, C, D, E and F will discharge 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.

4.6 WASTEWATER DRAINAGE SYSTEM

Domestic effluent arising from occupation of the data storage facilities will be discharged from the Existing Campus to the public foul sewer (at Emission Point SE1) and from the Extended Campus to the public foul sewer (at Emission Point SE2) the foul sewer ultimately discharges to the municipal wastewater treatment plant (WWTP) at Ringsend. Refer to Drawing CSE-00-XX-DR-C-4205 for the foul drainage layout.

Existing Campus (Buildings A to D)

Domestic effluent is collected within a gravity piped foul drainage network (150 to 225mm diameter) within the site and is discharged to the 300mm concrete public foul sewer (IDA sewer) within the Business Estate Road located along the southern boundary of the campus. All the adjacent business and industrial developments appear to discharge to the public foul sewer, which falls in an easterly direction.

The 1050mm concrete North Fringe Sewer also crosses the Existing Campus between Buildings A and B. A wayleave has been maintained for this.

The internal foul network has been designed to maintain a self-cleaning velocity in accordance with the minimum pipe gradients set out in Table 6 of the "Building Regulations Technical Guidance Document H".

In addition, rainfall which passes through the emergency back-up generator exhaust stacks at Buildings C and D will also discharge into the onsite foul drainage network. Non-return valves are fitted within the line at the discharge manhole for each data storage facility.

Extended Campus (Buildings E and F)

There is an existing 300mm diameter concrete public foul sewer which crosses the site between the new and Existing Campuses. As with the IDA sewer, this public sewer also discharges to the Ringsend WWTP. The 300mm foul sewer flows from west to east across the site, and a wayleave will be maintained for the sewer as part of the site development.

Domestic effluent arising from occupation of Buildings E and F will be collected in newly constructed foul drainage network (150 to 225mm diameter) within the site which will discharge into the 300mm public sewer. The pipes will be laid at gradients to provide self-cleaning velocities under normal operating conditions.

Rainfall which passes through the emergency back-up generator exhaust stacks will discharge to the onsite foul drainage network.

Diesel Storage Areas (Existing Campus)

Drainage of rainwater from the bulk diesel storage areas and their associated loading bays at the Existing Campus is directed to foul sewer. The drainage sumps at the fuel unloading bays and in the bulk tank and top up 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 Building A and B bulk tank farm is equipped with a Class 2 by-pass interceptor NSBP003 type with oil capacity of 45 litres and drainage from the Building C and D bulk tank bund is equipped with a Class 2 by-pass interceptor NSBP006 type with oil capacity of 90 litres. The location of these are illustrated on Drawing CSE-00-XX-DR-C-4205.

The hydrocarbon interceptors are and will be equipped with an oil warning system which will be connected to the BMS/EPMS critical alarm.

Evaporative Cooling Water Drain Down (Building B)

As discussed in Section 4.3.2 above, at Building B due to the design, the recirculated Evaporative Cooling Water is discharged directly to the site foul sewer network.

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 bulk chemical stored is diesel oil.

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

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 is held within these systems and would only be removed during decommissioning.

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

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 contractor 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

Diesel is stored in multiple locations across the site including in bunded bulk tanks and in smaller double skinned day tanks and belly tanks. The total amount of fuel stored onsite at any one time will be 1,556m^3 based on all tanks being maintained at 80% full.

There are 4 no. diesel unloading bays are located on site: 1 no. at the bulk diesel tank farm adjacent to Buildings A and B. 1 no. in place for the top up tank to the south of Building C and D, and 1 no. in place for each of the 2 no. top up tanks for Building E and F.

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

Buildings A and B

Bulk diesel is supplied to the emergency backup generators at Buildings A and B from 5 no. steel bulk storage tanks (3 no. 75,000 litre tanks and 2 no. 115,000 litre tank) located in a bunded tank farm to the east of Building A. The bund for the 2 x 115,000 litre tanks is 343.57m^3 and the bund for the 3 no. 75,000 litre tanks is 542.84 m^3. 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. Bunds and delivery bays are equipped with sump probes to detect diesel in the bund and in turn send an alarm signal to the BMS.

The bunds are constructed of suitable concrete and have undergone testing for their integrity during the commissioning phase. All pipelines are integrity tested following installation by vendor and follow up integrity testing of both bunding and pipelines will be completed every three years in accordance with the IE Licence.

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.

Each of the emergency backup generators at Buildings A and B are accompanied by a double skinned day tank (4000 litres each) for immediate supply to the generator. Each tank has a high/low level alarm (90% high high, 80% high, 30% low, 20% low low) which connects to the BMS/EPMS critical alarm.

Buildings C and D

At Buildings C and D bulk diesel will be supplied to the emergency backup generators from 1 no. 40,000 litre bulk storage tanks located to the south of the Building C in a

bunded compound. The bund will be 138.6m^3 (9m x 7m x 2.2m). 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. Bunds and delivery bays are equipped with sump probes to detect diesel in the bund and in turn send an alarm signal to the BMS.

The bunds are constructed of suitable concrete and have undergone testing for their integrity during the commissioning phase. All pipelines are integrity tested following installation by vendor and follow up integrity testing of both bunding and pipelines will be completed every three years in accordance with the IE Licence.

These bulk tanks (also known as 'top up tanks') will also be 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.

Each emergency backup generator for Buildings C and D will be accompanied by a double skinned 17,000 litre belly tank and a double skinned 1,000 litre day tank. The belly tanks will be equipped with a float type digital indicator with automated high/low alerts (95% high high, 90% high, 50% low, 45% low low). The day tanks will also be equipped with level gauges and high/low level alarms (90% high high, 80% high, 30% low, 20% low low) similar to the existing day tanks; these will alarm to BMS/EPMS critical alarm.

Buildings E and F

Bulk diesel will be supplied to the emergency backup generators at Buildings E and F from 1 no. 40,000 litre bulk storage tank each (a total of 2 no tanks) located adjacent to the loading bay. The bund for each tank is designed to be 138.6m^3 (9m x 7m x 2.2m). 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.

These bulk tanks will be 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.Each of the emergency backup generators for Buildings E and F will be equipped with a 1,000 litre double skinned day tank for top-up supply to the 17,000 litre double skinned belly tanks on each of the generator units. As with Buildings C and D, these will be equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

6.1.2 Other raw materials

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.

6.1.3 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) (MAX CONSUMPTION)	1,447,152 MWh
Total Electricity (generated and used) (MAX CONSUMPTION)	1,447,152 MWh
Electricity (generated and exported)	N/A
Natural Gas	N/A
Diesel (Gas Oil)	1,944 m^3 annually
Water (Public Supply & Rainwater Harvesting)	17,879 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 located in the rack delivery room.

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 interceptors 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 low number of staff present onsite on a daily basis.

6.4 TANKS, BUNDS AND PIPELINES

All tanks, bunded 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 will be within a bunded 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 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 bunded 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 bunded loading bays. Hydrocarbon interceptor will be 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 6.11), 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. Follow up integrity testing will be completed every three years in accordance with the IE Licence.

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 from the operational development therefore this has not been described.

7.1 AIR EMISSIONS

Main Air Emissions

There are no major air emissions proposed.

Minor 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-4207. These are classified as minor based on the size of the combustion plant and the routine testing and maintenance testing:

- Building A: 17 no. 6.49 MW_{th} emergency back-up generator stacks with a minimum height of 20m above ground level;
- Building B: 18 no. 6.49 MW_{th} emergency back-up generator stacks with a minimum height of 25m above ground level;
- Building C: 18 no. 6.49 MW_{th} emergency back-up generator stacks with a minimum height of 20m above ground level;
- Building D: 18 no. 6.49 MW_{th} emergency back-up generator stacks with a minimum height of 20m above ground level;
- Building E: 16 no. 6.49 MW_{th} emergency back-up generator stacks with a minimum height of 25m above ground level;
- Building F: 16 no. 6.49 MW_{th} emergency back-up generator stacks with a minimum height of 25m above ground level.
- 2 no. 2.19 MW_{th} diesel powered emergency generators (Building E and Building F)
- 2 no. 0.450 MW_{th} diesel powered fire pumps onsite located at the sprinkler pump house on the Existing Campus. These will only be used in the event of a fire; however, they will be tested from time to time to ensure they remain operational.
- 2 no. 0.450 MW_{th} diesel powered fire pumps will be installed as part of the development of the Extended Campus. These will only be used in the event of a fire; however, they will be tested from time to time to ensure they remain operational.

The installation requires a continuous supply of electricity to operate. During normal operations, the facility is supplied electricity from the national grid. Outside of normal operations, the facility 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 are set out in Section 7; Attachment-7-1-3-2-Air Emissions Impact of this license application.

Potential Emissions

Potential emissions are emissions which only operate under abnormal process conditions. Typical examples include bursting discs, pressure relief valves, and emergency generators. The emergency back-up generators above are included as minor emission sources due to the routine testing, load bank testing, and demand side management.

- 7 no. Diesel Bulk Tank Emergency Relief Vent; and
- 103 no. Emergency Generator Diesel Belly Tank Emergency Relief Vents.

The diesel storage bulk tanks and belly tanks at the facility each include two-way normal pressure (breather) and pressure relief vents on the diesel belly tanks. These produce minor diesel vapour (trace) emissions.

Fugitive 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.

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 for the site as set out in Attachment-7-1-4-2 (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.

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 on the air dispersion model undertaken for the installation is set out in Attachment-7-1-3-2-Air Emissions Impact that demonstrate no additional abatement systems are required. The UK EA assessment methodology determined that in any year, the diesel generators can run for 79 hours before there is a likelihood of an exceedance at the nearest residential receptor (at a 98th percentile confidence level). However, the UK Environment Agency guidance (Air Quality Modelling and Assessment Unit – Diesel Generator Short Term NO_2 Impact Assessment) that there should be no running time restrictions placed on standby generators which provide power on site only during an emergency power outage.

7.1.2 Control and Monitoring

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).

The diesel generators are for emergency back-up only and 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.

7.2 EMISSIONS TO SEWER (WASTEWATER EMISSIONS)

Foul Water Drainage

Foul drainage will be collected in the onsite foul network and will be discharged to the local foul sewer(s).Foul drainage will be collected in the onsite foul network and will be discharged to the local foul sewer(s) which ultimately discharge to Ringsend WWTP. For the Existing Campus, this is at emission point SE1 (not a licenced emission point) where the onsite sewer network discharges to the IDA sewer. For the Extended Campus, this is at emission point SE2 (not a licenced emission point) where the onsite sewer network discharges to the 300mm public sewer.

No monitoring is proposed for the foul water discharge.

Evaporative Cooling Water Discharge

Evaporative cooling water, associated with the evaporative cooling process for Building B, is discharged from the cooling systems to the foul network.

7.2.1 Treatment and Abatement systems

There is no requirement for onsite treatment or abatement for foul effluent or process water produced from the facility. This will be treated offsite at the Ringsend Wastewater Treatment Plant. The cooling water discharged from the evaporative cooling units in Building B is effectively clean water that has passed through the cooling equipment.

The loading bays for the main diesel fuel tank farm and the fuel tank adjacent to Building C at the existing campus will be equipped with Class 2 hydrocarbon interceptors to prevent fuel oil getting into the foul sewer.

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

7.2.2 Control and Monitoring

No monitoring other than visual inspection is proposed for the foul water discharge. The emission point location is labelled SE1 and SE2, on Drawing Ref. CSE-00-XX-DR-C-4205 included with the application.

7.3 STORMWATER EMISSIONS

7.3.1 Storm Water Drainage

Stormwater drainage from the site discharges via the onsite attenuation ponds to the existing stormwater sewer along the Business Estate Road at Emission Point SW1. All adjacent business and industrial developments discharge to this public stormwater sewer, which flows east, then south and ultimately outfalls to the Santry River.

The stormwater from the Existing Campus and the Extended Campus combine onsite prior to the final discharge point. Stormwater from the northern part of the Existing Campus drains to a separate attenuation pond via a hydrocarbon interceptor before being diverted back down to the main drainage network on the Existing Campus.

7.3.2 Treatment and Abatement systems

This network conveys the stormwater through hydrocarbon interceptors to one of 3 no. stormwater attenuation basins on the campus. Mitigation measures (i.e. bunds, tanks with level alarms, hydrocarbon interceptors with level alarms) will be located at the source. The attenuation ponds are sufficient to provide storage in the event of a 1:100 year storm event with 10% allowance for climate change and the flow from the pond is controlled to greenfield rates by a hydrobrake.

This volume is also sufficient to dilute the small quantities of (clean) evaporative cooling water discharged to the stormwater network from the AHUs. There is no further requirement for abatement of the stormwater from the site.

7.3.3 Control and Monitoring

No online monitoring is proposed for the stormwater discharge. The only bulk chemicals stored are hydrocarbons, and mitigation measures are in place to monitor any potential leaks or spills of hydrocarbons at the site. These measures include bunding, diesel detection alarms on the bunds and the level alarms on the hydrocarbon interceptors.

Weekly visual inspections of the stormwater discharge will be undertaken at each of the 2 no. monitoring locations SW1-1 and SW1-2 which are located along the southern boundary of the site.

It is intended to install a penstock on the outfall of Attenuation Pont 1 prior to the discharge into the stormwater main. Once installed, the penstock will allow the outfall of the pond(s) to be closed off to inhibit the outflow in the event of a spill or a fire. Potentially polluted rainwater that reaches the stormwater attenuation pond(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 pond and disposed of appropriately.

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 emissions to ground from the installation.

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 for the site and included in Attachment 7.1.3.2 (Noise 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 will be undertaken in accordance with the IE licence requirements.

8.0 MANAGEMENT SYSTEMS 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 will operate 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; a BMS and EPMS is operated independent for each of the six buildings. 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 facility 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.

These systems also monitor 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) is in place for the existing data storage facilities and this will be updated to incorporate the additional developments as well as the requirements of the EPA's guidance. 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 proposed installation will operate 24/7, 365 days a year. There is therefore no additional specific procedure required for emergencies outside normal working hours.

8.3 STANDARD OPERATING PROCEDURES

A number of Standard Operating Procedures (SOPs) have been developed for all the 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 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 is undertaken. The twice a shift inspection of infrastructure ensures that any issues are dealt with if they arise.

8.5 FIRE MANAGEMENT

A system shall be 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.

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. Once in alarm state, the site Emergency Response team will in line with the Emergency Response protocols confirm the source of the activation and will initiate site evacuation if required. Automatic Sprinkler systems will activate in the presence of 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.

8.6 WASTE MANAGEMENT

The majority of the wastes generated will be non-hazardous. Appropriate segregation and management of waste operators will ensure no significant impacts.

All waste leaving site will be recycled or recovered, with the exception of 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 bunded, 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 procedures 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 procedures will enable the facility to contribute to the targets and policies outlined in the *Eastern-Midlands Region Waste Management Plan 2015-2021.*

8.7 ENERGY EFFICIENCY

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.

The Energy Efficiency Management System (ENEMS) that will be developed for the site in accordance with BAT 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 facility. 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.

8.8 FIRE MANAGEMENT

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 IT 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 facility.

On the basis of the site investigations undertaken prior to construction and an assessment of source-pathways-receptors, the Baseline Report concludes that:

- A review of the available soil and water quality confirms that there is no evidence of any residual contamination beneath the site.
- There is only bulk diesel storage proposed for the facility. However, the risk prevention measures planned at the facility significantly reduce the potential for an environmental impact to soil or water to occur. These measures include

bunded and double contained vessels, double lined drainage and containment systems 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. Interceptors are installed on the surface water drainage. 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.

10.0 ALTERNATIVES

10.1 PROCESS ALTERNATIVES

In terms of technology, the installation will employ similar data server technology that is used by the Operator 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 Irelands Framework for Sustainable Development *'Our Sustainable Future'*. ADSIL's designs are constantly evolving, and hardware is chosen with energy efficiency central to the decision-making process. The Operator is committed to continually assessing and improving this technology particularly with respect to minimising power and water consumption, in accordance with the goals of Irelands 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.

The technical design of the facilities on site ensured that the development represents a low energy solution whilst operating as a functional, critical data storage facility development. For example, high efficiency EC direct drive fans will be used in all air supply and extract systems serving the data storage rooms as described above. 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%.

10.2 ALTERNATIVE MITIGATION MEASURES

The Environmental Impact Assessment Report (EIAR) relating to this activity which have been previously submitted to DCC have been submitted to the Agency as part of this application and referenced according to the month of the Final Grant of permission (Attachment-6-3-6-EIAR-Planning-Apr-2017 (AWN, 2016), Attachment-6-3-6-EIAR-Planning-Aug-2018 (AWN, 2018), Attachment-6-3-6-EIAR-Planning-Jan-2019 (AWN, 2018), Attachment-6-3-6-EIAR-Planning-Aug-2021(AWN, 2020), and Attachment-6-3-6-EIAR Addendum-Planning-Aug-2021 (AWN, 2021)of the IE Licence application).

The mitigation measures proposed are outlined in the EIAR completed for the installation at planning phase (operational phase and construction phase)**.** These represent the best practice for achieving minimal impact on the receiving environment.

The mitigation measures proposed are outlined in in the EIS/EIARs completed for the planning permission application for each stage of the development (Listed in Section 3 above)**.** These represent the best practice for achieving minimal impact on the receiving environment. or each aspect of the environment, each EIS/EIAR specialist considered the existing environment, likely impacts of the development and reviewed feasible mitigation measures to identify the most suitable measure appropriate to the environmental setting the project design. In making a decision on the most suitable mitigation measure the specialist considered relevant guidance and legislation.

For each environmental factor considered within the EIAR for each developed (listed in Section 3 above), the specialist considered the existing environment, likely impacts of the development and reviewed feasible mitigation measures to identify the most suitable measure appropriate to the environmental setting the project design. In making a decision on the most suitable mitigation measure the specialist considered relevant guidance and legislation at the time.

In each case, the specialist at the time reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development). The mitigation measures presented in the EIAR reports represent the best options for the site.

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.