

Amazon Data Services Ireland Ltd.

Operational Report

Attachment-4-8-1

May 2022

Licence Application (LA009979)

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1.0 SITE OVERVIEW

The following Operational Report relates to the Amazon Data Services Ireland Ltd. (ADSIL or the applicant) data storage facility (the Installation under this licence application) located in Grange Castle South Business Park South, Baldonnel, Dublin 22. The site context is shown on Site Location Plan 21_123J-CSE-00-XX-DR-C-0001- Overall Site Location Plan included with this application. The application relates to the facility that is leased from CyrusOne Irish Datacentres Holdings Ltd. ('the Landlord') that is c. 2.16 hectares in ('the Site').

The Installation comprises one two-storey data storage facility building (Building A) with associated three storey office block and ancillary elements. The ancillary elements of the development include; loading bays, maintenance and storage spaces, associated water tanks, sprinkler tanks, fire sprinkler pump house, electrical rooms, security and utility spaces, internal road network, underground foul and stormwater drainage network. The site layout and main building is shown on Site Layout Plan Drawing Ref: 21_123J-CSE-00-XX-DR-C-0002- Overall Site Plan included with this application.

The Site Layout Plan Drawing Ref: 21_123J-CSE-00-XX-DR-C-0002- Overall Site Plan shows the site permitted by planning including areas under control of, and maintained by the Landlord ('the Landlords Site') this includes; underground foul and stormwater drainage network attenuation basins, internal road network, the 110kV Substation (known as Aungierstown) including client control building and site landscaping.

The Installation requires a continuous supply of electricity to operate. During normal operation, the facility is supplied electricity from the national grid. Outside of normal operations, the facility is first supplied electricity by some or all 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 Installation once fully operational will have installed a total of 16 no. 6.49 MW_{th} diesel powered emergency back-up generators; and 1 no. 0.45 MW_{th} diesel powered fire sprinkler 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 facility.

The combined thermal input from the emergency back-up generators once operational is 103.84 MW_{th}, 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 standby generators under Activity Class 2.1.

Up to 50 staff will be on site at the data storage facility at any given time (i.e. a maximum of 50-day time staff). It is estimated that up to 35 no. full time data storage facility staff will be on site on a daily basis during standard operation, including security

staff with a further 7 per building no. night shift staff and 15 no. external staff/maintenance contractors/visitors. Operational hours are expected to be 24 hours a day, 7 days a week.

2.0 SITE CONTEXT

The Installation is located on a site of c. 2.16 hectares that consists of a formerly greenfield site within the Grange Castle South Business Park. The site is bounded by the realigned Baldonnel Road to the west; by the Grange Castle South Access Road to the north; by the Google Data Centre Campus to the east.

The overall site is located between the N4 and N7 national primary roads and is served by a good road network that has recently undergone an upgrade as well as the new Business Park road, Grange Castle South Access Road, that provides access into this part of the Grange Castle Business Park from the Baldonnel Road.

The wider context of the site is defined primarily by commercial and industrial development including. Large areas of the surrounding lands to the south and north within the Grange Castle Business Park and Profile Park have been developed in the past 10-15 years and are occupied by industrial campuses including pharmaceutical, data centres and food manufacturing uses. To the immediate north is the ADSIL Grange Castle data centre campus, and further north the Microsoft data centre campus, the EdgeConneX data centre campus is located to the north west. The closest occupied residential properties are located c. 50 m south of the site boundary along the Baldonnel Road.

The surrounding 5 km of the Site includes IE, IPC and Waste Licenced sites including:

- Takeda Ireland Limited (P0693-01) 1.4 km to the north of the Site.
- Grange BackUp Power Limited (P1033-01) 1.5 km to the north of the Site.
- Pfizer Ireland Pharmaceuticals (P0652-01) 1.7 km to the northeast of the Site.
- Lufthansa Technik Airmotive Ireland Limited (P0275-01) 3.2 km to the south of the Site.

The site layout and wider context is presented in 21_123J-CSE-00-XX-DR-C-0002 - Overall Site Location Plan included with this application.

3.0 PLANNING STATUS

The Installation received Final Grant of planning permission on 11th April 2019 from An Bord Pleanála (ABP) under South Dublin County Council (SDCC) Reg. Ref.: SD18A/0134 and ABP Reg. Ref.: ABP-302813-18. The parent permission was amended and received Final Grant 17th February 2021 by SDCC Reg. Ref.: SD20A/0295.

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 (refer to Section 6 of this licence application). Any further information relating to the environmental assessment of the activity is made available and 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 the 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. 2.16 hectares and so does not exceed the limit, quantity or threshold set out in Part 2, Schedule 5 is Class 10(a). Environmental Impact Assessment is not required.

The Environmental Impact Assessment Report (EIAR) relating to this activity, prepared by Marston Planning Consultancy et. al. dated July 2018, which had previously been submitted to SDCC (Reg. Ref.: SD18A/0134), has been submitted to the Agency as part of this application (Attachment-6-3-6-EIAR-Planning-Apr-2019 of the IE Licence application). The EIAR accompanying Reg. Ref.: SD18A/0134 was originally dated April 2018; however, this was revised as part of significant further information request and updated to the July 2018 version.

The installation is to be constructed and operated in accordance with planning SDCC Reg. Ref.: SD18A/0134 (ABP-302813-18), and Reg. Ref.: SD20A/0295, therefore the EIAR submitted to the EPA dated July 2018 (Attachment 6-3-6 of the IE Licence application) is relevant to this IE License activity.

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. 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 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 in Table 3.1 relate to the history of the overall Landlord Site.

Table 3.1 Additional Planning Permissions Outside of Main Activity

Application Details	Description of Development
Applicant: CyrusOne Irish Datacentres Holdings Ltd. Reg. Ref.: SD20A/0244 Final Grant Date: 18/11/2020 GRANT PERMISSION FOR RETENTION	Retention of single storey client control room (248.5sq.m) associated with the planned future substation that will be located to the north-east of the permitted data centre development granted under Reg. Ref. SD18A/0134/ABP Ref. ABP-302813-18; the development will form an amendment and modification of the permission granted for a single storey transformer building (125sq.m) under Reg. Ref. SD18A/0134/ABP Ref. ABP-302813-18; no other changes to the permission granted under this decision are proposed under this application on a site within the townland of Aungierstown & Ballybane.

<p>Applicant: CyrusOne Irish Datacentres Holdings Ltd.</p> <p>Reg. Ref.: SD19A/0300</p> <p>Final Grant Date: 18/11/2019</p> <p>GRANT PERMISSION</p>	<p>Single storey ESB substation (27sq.m) that will be accessed from the north off the Grange Castle South Access Road via the Baldonnel Road and off the permitted internal road granted under Reg. Ref. SD18A/0134, An Bord Pleanála Ref. ABP-302813-18 to the south; the proposal will result in a minor and temporary amendment to the landscaping and fencing permitted under Reg. Ref. SD18A/0134, An Bord Pleanála Ref. ABP-302813-18 that granted permission for a two storey data centre and delivery bays with associated three storey office block and services within the overall lands; no other changes to the permission granted under this decision are proposed under this application.</p>
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4.0 DESCRIPTION OF ACTIVITY

4.1 SITE OVERVIEW

The Installation consists of 1 no. two storey data centre building (Building A) with facilities containing; data storage rooms, electrical and mechanical plant rooms and support areas including offices and welfare facilities, loading bays, back-up generators with emission stacks, water storage tanks, and mechanical plant at roof level.

The data storage facility generally consists 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 diesel belly and day tanks (and associated emissions stacks/flues).
- Evaporative cooling water storage tanks.
- Loading bays and associated infrastructure.

Building A (16,209 m²) comprises of electrical rooms for electronic operations, loading bays, stores, office, and staff facilities. The data centre is separated over two floors with a single data hall on each floor. The building includes, external generator yard, mechanical plant located on the upper level plant gantries to the north of the data hall blocks, and service and technical space around each data hall with a two-storey delivery bay attached to the east of the data centre block. The external generator yard comprises 16 no. 6.49 MW_{th} diesel powered emergency back-up generators, fuel unloading area, with associated diesel fuel day and belly tanks.

In addition to the data storage facility, the Installation also includes:

- 1 no. 150 m³ sprinkler water tanks, compound, and associated pump house for Building A, including 1 no. diesel powered firewater pump;
- Internal site road network, and car parking;
- Underground foul and stormwater drainage network,
- Underground water supply network.

4.2 PRIMARY PROCESSES/ACTIVITIES

4.2.1 Emergency Backup Generators (Generation Compound)

The Installation is supported by containerised diesel-powered emergency back-up generators that are located externally in a generator yard associated with the data storage building. These generators provide the necessary power to ensure the data centre building continues 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.

The data storage building is accompanied by a designated generator compound for the supply of emergency power to that building.

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

The individual double skinned day tanks and belly 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, should hydrocarbon be detected in the base of the container, the system sends an alarm signal to the BMS to alert EOTs of a leak. The onboard controller for individual generators is connected to the Building Management System (BMS).

4.2.2 Data Storage Building

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 help meet this need.

4.3 SECONDARY PROCESS/ACTIVITIES

4.3.1 Ancillary infrastructure

There are integrated administration areas, associated with the data hall building. 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 stormwater drainage network,
- utility ducts and cables,
- Internal road network and car parking spaces including disabled car parking spaces, and sheltered bicycle parking spaces,
- Security hut and security fencing

4.3.2 Data Hall Cooling Systems

The computer servers and other IT equipment in the data hall generates heat which must be removed. This is achieved by using a closed loop chilled water circuit which removes the heat from the data hall via Computer Room Air Handling Units (CRAHU) and rejects the heat to atmosphere. The closed loop chilled water circuit contains a 20% ethylene glycol and water solution. The closed loop is filled on occupation with infrequent top-up required thereafter. There are leak detection within the system to identify if there are leaks from the chilled water.

The cooling system for the chilled water circuit is provided by acoustically attenuated chillers and fans that are located on the upper-level plant gantries to the north of the data halls. There are two systems in place to reject this heat free coolers, and refrigerant chillers. The free cooling is used when the ambient temperature is sufficiently below that of the chilled water temperature. The air is moved by motorized cooling fans placed on top the chillers and operate continuously. If the ambient temperature level is sufficiently low the system uses these free cooling coils to provide the cooling duty.

If the ambient temperature increases and the free cooling coils cannot provide the required duty the refrigerant chillers supports this by the addition capacity from a refrigerant system. The refrigerant chillers use a refrigerant compression cycle (R134A refrigerant) to mechanically reject this heat. Each system is independently controlled and powered to optimize the system performance and reduce the energy consumption of the facility.

All fan motors are Electronically Commutated EC motors to incorporate integrated electronics to convert AC power to DC for efficient and accurate speed control and shall be adjustable via the microprocessor display keypad. The fans shall offer maximum air flow performance while keeping sound levels to a minimum.

The facility will maximize efficiency by preventing hot air contamination and increased return air temperatures; this will improve the achievable hours for free cooling and enable high density computing. The system is configured to operate in a redundant manner. The system is monitored to analyse its operation and improve its efficiency.

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. R32 refrigerants are used in these systems.

The fresh air ventilation system for the office area 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

A feasibility study was undertaken at planning application stage for heat recovery and export, it concluded that the costs of such a project would be prohibitively high.

4.3.5 Electricity Supply and 110kV Substation

The power requirements for the Installation are to be provided via a direct connection to the 110 kV Gas Insulated Switchgear (GIS) Substation Compound located east of the Site. The 110kV Substation (known as Aungierstown) is shown on the Site plan ref 21_123J-CSE-00-XX-DR-C-0002- Overall Site Plan. The 110kV Substation Compound, and dropdown 110 kV transmission lines connecting to the 110 kV Overhead lines is permitted under SD19A/0300.

In addition to the mains connection, provision for an array of PV panels shall be made to generate on site renewable energy up to a peak of 40 kW_e, 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.

4.4 WATER, SEWER, AND STORMWATER DRAINAGE INFRASTRUCTURE

4.4.1 Potable Water Supply

The water supply is sourced from mains water via a metered connection from the existing main to the east of the Installation in accordance with the SDCC Reg. Ref.: SD18A/0134 (ABP-302813-18), and Reg. Ref.: SD20A/0295. The Installation has a demand for general potable supply, for cleaning, drinking and sanitary facilities, cooling equipment, and for firefighting.

Water supply to the Grange Castle Business Park South is provided through mains supply (450mm water main). Estimated water demand is 912 m³/annum. This water is required for potable drinking water, cleaning and sanitary facilities.

Fire water

A fire water ring main will be installed around the Site to provide firefighting water to hydrants to be used in the event of a fire. The development will include fire water sprinkler pump room and adjacent storage tank (150m³) to the west of the proposed data storage facility building.

A 250-300mm fire ring main is in place to provide firefighting water to the Site in accordance with the SDCC Reg. Ref.: SD18A/0134 (ABP-302813-18), and Reg. Ref.: SD20A/0295. The sprinkler pump house is equipped with 1 diesel fired sprinkler pump, and 1 electric pump for the supply of firefighting water to the sprinkler systems.

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

4.4.2 Stormwater Drainage Systems

Rainwater runoff from impermeable areas of the Site is collected via the onsite stormwater drainage network in accordance with the SDCC Reg. Ref.: SD18A/0134 (ABP-302813-18), and Reg. Ref.: SD20A/0295.

This network conveys stormwater via hydrocarbon interceptors to the Landlords attenuation basin (2,063 m³ capacity) to the north-east of ADSIL's site. The outfall from the Site network to the Landlords network is at 2 no. Emission Points (SW1 and SW2) as shown on Drawing 21_123J-CSE-00-XX-DR-C-1100 Surface Water Layout Plan.

There is 1 no. hydrocarbon interceptor located upstream of the inflow into the attenuation basin for flows from the car park and roads to the northwest of the Site, and 1 no. hydrocarbon interceptor located upstream of the inflow into the attenuation basin for flows from the car park and roads from the south of the Site. All the drains to the attenuation ponds have interceptors.

Located immediately downstream of the landlord's attenuation basin and there is a 1 no. stormwater flow control device to control to the maximum permissible discharge flow rate into the public stormwater network. It is intended to install a penstock at the outfall prior to the discharge into the public stormwater network.

The fuel unloading bay at the emergency generation compound is surrounded by ACO drainage channels that direct stormwaters to the Site network, to pass through the hydrocarbon interceptor prior to entry to the attenuation basin.

The Landlords stormwater system discharges attenuated flows to the existing South Dublin County Council (SDCC) network in the Grange Castle South Access Road to the north-west of the site. The public network(s) eventually discharges to the River Griffeen and the River Liffey which flows to the Liffey Estuary transitional water body (c. 12 km hydrologically downgradient). The River Liffey is ultimately connected with the South Dublin Bay and River Tolka Estuary SPA c. 12 km to the east and the other Natura Designated Sites within Dublin Bay (South Dublin Bay and North Dublin Bay SAC's).

There is a stormwater flow control device located downstream of the Landlords attenuation basin to control to the maximum permissible discharge flow rate from the

Site. The Landlords Site stormwater system outfalls to the public storm sewer in Grange Castle South Access Road which ties-in to an offsite stormwater drainage network via a 525 mm connection. This stormwater network is shown on 21_123J-CSE-00-XX-DR-C-1100 Surface Water Layout Plan.

4.4.3 Wastewater Drainage System

The foul drainage network comprises of 150-225 mm pipes take domestic effluent arising from occupation of the Site to the Landlords foul sewer (at Emission Points SE1). Refer to Drawing 21_123J-CSE-00-XX-DR-C-1200 for the foul drainage layout.

The Landlords foul network foul sewer ultimately discharges to a 225 mm diameter public foul sewer. The foul water connection to the public foul sewer on Grange Castle South Access Road is in accordance with SDCC Reg. Ref.: SD18A/0134 (ABP-302813-18), and Reg. Ref.: SD20A/0295.

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

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

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 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, and the chiller systems for cooling. No refrigerants are stored onsite. R32 refrigerants are held within this enclosed 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 the building in appropriate waste receptacles in covered bunds.

Hazardous 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 management 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

Fuel (diesel) for the emergency back-up generators is stored in multiple locations across the Site; that includes belly tanks and day tanks contained within each emergency back-up generator container.

All fuel tanks and pipelines have been designed for the specific purpose and contents. The structures will be rendered impervious to the materials stored therein. All fuel pipelines are integrity tested following installation by vendor.

Diesel is supplied from the belly tank to the individual double-skinned day tank within the generator container. Each of the 16 no. 6.49 MW_{th} emergency backup generators at Building A are accompanied by a double skinned belly tank (32,000 litres each) and double skinned day tank (1,000 litres each) for immediate supply to the generator.

These belly and day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

Furthermore, there is 1-no. diesel powered fire pumps at the sprinkler house that has 1 no. double skinned day tank (400 litres) for immediate supply to the fire sprinkler pump.

There is a total diesel storage capacity on site of 528,400 litres 528 m³ or approximately 454 tonnes (assumed density of 0.86 kg/l). The tanks on site are filled to 80% capacity under normal conditions; therefore, the total diesel stored on site is 422,720 litres, 422 m³ or approximately 363 tonnes (assumed density of 0.86 kg/l).

There is 1 no. fuel unloading bay on site located at the generator compound. The fuel unloading bay at the emergency generation compound is surrounded by ACO drainage channels that direct stormwaters to the Site network, to pass through the hydrocarbon interceptor prior to entry to the attenuation basin. At this unloading bay, there are 2 fill locations each servicing 8 no. emergency diesel generators. Diesel is piped to from the fill point to double-skinned belly tanks via above ground Carbon Steel fuel pipelines.

In accordance with the Commission for Energy Regulation (CER) regulations, low sulphur diesel is used. Fuel delivery takes place within designated fuel unloading areas under strict Standard Operating Procedures.

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)	247,470 MWh
Total Electricity (generated and used) (MAX CONSUMPTION)	247,470 MWh
Electricity (generated and exported)	N/A
Natural Gas	N/A
Diesel (Gas Oil)	188 tonnes annually
Water (Public Supply & Rainwater Harvesting)	912 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 OR 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, the waste will comprise mainly 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 designated storage areas. 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 these areas 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.

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 are above ground and are Carbon Steel.

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. The fuel unloading bay at the emergency generation compound is surrounded by ACO drainage channels that direct stormwaters to the Site network, to pass through the hydrocarbon interceptor diesel tanker delivery bay to capture any spills.

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). All bunds are integrity tested by the vendor.

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

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 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 Drawing No. 21_123J-CSE-00-XX-DR-C-2000 Air Emission Layout Plan.

- Building A: 16 no. 6.49 MW_{th} diesel powered emergency back-up generator stacks with a minimum height of 20 m above ground level;
- Sprinkler Pumphouse: 1 no. 0.520 MW_{th} diesel powered emergency back-up fire pumps.

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 is set out in Section 7; Attachment-7-1-3-2-Air Emissions Impact of this license application.

Potential Emissions

These 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 are included as minor emission sources due to the routine testing and maintenance.

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. 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 emergency back-up generators 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. 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 be discharged to the Landlords foul sewer(s). The foul sewerage from the Site will discharge via 225mm

pipes into the existing foul network at one location to the west of the Site. The western outfall (SE1) will cater for foul flows from Building A.

The emission discharge points are labelled SE1 on the Foul Water Drainage Drawing 21_123J-CSE-00-XX-DR-C-1200 Layout included with the application. The wastewater discharged from the Site will ultimately discharge to the Ringsend Wastewater Treatment Plant and will not materially impact on its capacity.

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 or process water produced from the facility. This will be treated offsite at the Ringsend Wastewater Treatment Plant.

As there are no food preparation areas within Building A 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

As there is no separate process and foul water network on site, no monitoring of the overall sewer discharge is proposed.

The emission / offsite discharge point is labelled SE1 on the Foul Water Drainage Drawing 21_123J-CSE-00-XX-DR-C-1200 Layout included with the application.

7.3 SURFACE WATER EMISSIONS

The surface water drainage network for the development collects runoff from roofs, roads and other hard standing areas in a sealed system of pipes and gullies.

The stormwater outfalls at 2 no. Emission Points (SW1 and SW2) to the Landlords stormwater network which takes stormwater to the Landlords attenuation basin, this basin ultimately discharges to the 450 mm public storm sewer to the north of the Site post attenuation. Prior to the stormwater network entering the Landlords attenuation basin, the stormwater passes through hydrocarbon interceptors to ensure that the quality of the stormwater discharge is controlled. The surface water system as shown on Drawing 21_123J-CSE-00-XX-DR-C-1100 included with this application.

7.3.1 Treatment and Abatement systems

The site stormwater network conveys the stormwater through hydrocarbon interceptors to the stormwater attenuation systems constructed on the Landlords Site.

The site stormwater network conveys the stormwater from yards and the road network via Class 1 hydrocarbon interceptors to capture any hydrocarbons prior to outfall. These hydrocarbon interceptors are located upgradient of the landlord's stormwater attenuation basin, and they ensure the quality of stormwater prior to entry attenuation basin and outfall to the SDCC stormwater network.

The discharge from site passes through offsite hydrocarbon separators to remove any hydrocarbons from the surface water. The hydrocarbon separators are located

immediately up gradient of the attenuation basin to ensure the quality of stormwater discharge is controlled prior to attenuation and discharge to public system.

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 day tanks, with high- and low-level alarms;
- Bulk diesel delivery bay has drainage channels that direct waters to the stormwater network, the stormwater network includes hydrocarbon interceptors to contain any spill;; and
 - Standard operating procedures for fuel delivery.

7.3.2 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 Points SW1-1 and SW2-1).

It is intended to install a penstock on the outfall prior to the discharge into the stormwater basin. Once installed, the penstock will allow the outfall of the stormwater network to be closed off to inhibit the outflow in the event of a spill or a fire. Any stormwater of unacceptable quality will be pumped out or otherwise removed of the stormwater network and disposed of appropriately.

Due to the lack of bulk chemicals storage on site, and the robust control measures outlined above it is considered that no further monitoring or control methods are required.

7.4 EMISSIONS TO GROUND

There are no process emissions to ground from the Installation.

7.5 NOISE EMISSIONS

During operational, 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.

Assessments have taken place during the Installation's design process to ensure that the Site operates within the constraints of best practice guidance noise limits adopted as part of the detailed noise 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 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 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.

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

Most 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, and waste batteries 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 facility 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 BMS/EPMS is 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.

8.7 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 facility.

Based on the available information which includes site specific data available from the site investigations undertaken in 2017, prior to the construction of the facility an assessment of source-pathways-receptors has been completed. The following conclusions have been made:

- Bedrock is shallow at the site and the aquifer underlying the site is locally important, with extreme vulnerability.
- The site was used as agricultural land up to 2020 and there are no previous uses that could lead to historical contamination at the site.
- Site specific soil quality data show no evidence of any historical contamination at 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 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. Interceptors are installed on the surface water drainage. A leakage from tanks 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.
- Based on the assessment of the source-pathway-receptor linkages, there is no potential for impact of any downgradient Natura site South Dublin Bay and River Tolka Estuary SPA or the South Dublin Bay and North Dublin Bay SAC's.

9.3 ALTERNATIVES

9.3.1 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 the Operator as a part of each of its designs based on many factors including technical feasibility, environmental impact, efficiency, security, reliability and cost.

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 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 Environmental Impact Assessment Report (EIAR) relating to this activity, prepared by Marston Planning Consultancy et. al. dated July 2018, which had previously been submitted to SDCC (Reg. Ref.: SD18A/0134), has been submitted to the Agency as part of this application (Attachment-6-3-6-EIAR-Planning-Apr-2019 of the IE Licence application). The EIAR accompanying Reg. Ref.: SD18A/0134 was originally dated April 2018; however, this was revised as part of significant further information request and updated to the July 2018 version.

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.

For each environmental factor considered within the EIAR, 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. The selected mitigation measures are set out in the EIAR Chapters (Attachment 6-3-6 of the IE Licence application).

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 report 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.