Attachment-8-1-2 Waste Management and Waste Hierarchy

1.0 WASTE STREAMS

The operation of the Installation gives rise to a small number of waste streams with minimal amounts of solid and liquid wastes produced. Attachment-8-1 Waste Generated outlines the expected waste types by LoW Code and includes further detail on the period or periods of generation of the waste.

The main site process (data storage) does not give rise to large volumes of waste. Wastes are typically generated from auxiliary activities and from the staff present onsite. These wastes can be allocated into the following types:

- **Domestic type wastes**, including recyclable waste and organic / food waste from staff areas.
- **Wastes from site maintenance** including paints, filters, wastes from minor spills, used oil, and oily water from the hydrocarbon interceptors, fluorescent lamps.
- **E-waste** including batteries, miscellaneous parts, and equipment (including fans, hard drives, PCBAs, servers, switches, cables) and central processing units (CPUs).

In addition, waste urea solution will be produced from the SCR abatement system. The quantities presented in Attachment-8-1 Waste Generated are estimates of waste generation (based on waste generation at the data storage facilities on the campus as well as other Amazon Data Services Ireland Ltd., (ADSIL) facilities). The actual quantities of waste generated will be advised to the Environmental Protection Agency (EPA) each year as part of the Annual Environmental Report (AER) for the installation.

1.1 Domestic Type Wastes

Non-hazardous waste from domestic type waste streams forms the largest waste quantity from the data storage facilities.

Organic waste and dry mixed recyclables are generated daily from the employee activities, primarily in the kitchen and offices.

Most wastes are generated from staff that are present on a shift basis, so numbers vary throughout the day and night. Operational hours of the site are 24 hours a day, 7 days a week.

In addition to the typical waste materials that are generated daily, there are some additional waste types generated less regularly that need to be managed separately including:

- Glass;
- Wooden pallets;
- Printer Cartridges/toners; and
- Other office wastes (e.g. domestic batteries).

Glass may also be generated from staff activities from time to time. When generated, this is segregated on site and collected by a nominated appropriately licensed waste contractor.

Wooden pallets arise from time to time from deliveries from suppliers. When generated, this is segregated on site and collected by a nominated appropriately licensed waste contractor.

Other office wastes including used printer cartridges and other office items (e.g. household batteries) may also be generated in the administration areas. These are segregated locally at each data storage building for collection by a nominated appropriately licensed waste contractor for recovery/disposal offsite.

1.2 Wastes from Maintenance Activities

The following wastes are generated on occasion from site maintenance activities. These wastes are predominantly managed by external vendors in charge of maintenance activities.

- Waste mineral and lubricating oil,
- Waste sludge from hydrocarbon interceptors,
- Waste arising from minor spill clean-ups (both hazardous and non-hazardous) (e.g. waste oil, absorbent mats, and booms etc.) if arising;
- Waste filters (air filters, evaporative media, and containment curtains) from filter change outs; and,
- Other liquid and solid wastes from general and maintenance activities (e.g. pesticides, paints & adhesives, other chemical residues in empty containers, aerosol cans, fluorescent tubes, etc.).

The maintenance and commissioning of the emergency backup generators involves the consumption of industrial oils and the generation of used oils and oily rags / filters. These are considered hazardous waste and are managed as such.

Maintenance activities will also include air filter and containment curtain change outs. An external company is employed to maintain the units and the used filters are collected and removed from site by the relevant vendor. These wastes are not typically hazardous.

Landscaping and wider site maintenance is undertaken by an external company. All wastes generated are collected and removed from site by the relevant external contractor. This includes hazardous and non-hazardous wastes.

The hydrocarbon interceptors within the stormwater network will generate oily water wastes from onsite vehicle movements and possibly occasional minor spills/leaks. The interceptors are inspected and cleaned every 6 months by the maintenance contractor. This waste is classified as hazardous and is managed as such.

1.3 E-Waste

Electrical and electronic waste or E-waste is generated as equipment is repaired and/or replaced. The main E-Waste types generated include:

- Batteries (both hazardous and non-hazardous) from the UPS systems;
- Waste electrical and electronic equipment (WEEE) (non-hazardous) some of which requires further refining offsite;
- Plastic waste from equipment; and
- Metal waste (i.e. from equipment maintenance and change outs).

It should be noted that a low rate of waste generation associated with the replacement or repair of materials and equipment is expected, taking into account the lifetime of the equipment used at the data storage facilities (e.g. air conditioning AHUs have been designed for an operating lifetime of 50 years, the life of lithium batteries is estimated at 10 years and that of VLRA batteries between 7 and 8 years).

In the event of breakdown or when electrical and electronic equipment becomes obsolete, the equipment will have to be replaced or repaired during the implementation of both preventive and corrective maintenance tasks.

Considering the characteristics of the installations, the potential E-waste arisings have been estimated. E-Waste generated will be non-hazardous and hazardous and will be segregated onsite.

2.0 WASTE MANAGEMENT

Waste procedures are already in place for the operation of the data storage buildings. These ensure the proper management and recycling of wastes generated at the data storage facilities. The waste procedures will enable the data storage facilities to contribute to the targets and policies outlined in the Regional Waste Management Planning Offices, *The National Waste Management Plan for a Circular Economy 2024 – 2030 (2024).*

Wastes arising from the facilities will be, in the first instance, collected locally at each building. Mitigation measures to manage potential impacts arising from waste generated during operation of the data storage facilities are included in the waste procedures.

Wastes will be reused, recycled, or recovered where possible with the exception of those waste streams where appropriate facilities are currently not available, where waste will be disposed of as a last resort.

2.1 Waste Management Standard Operating Procedures (SOPs)

Specific procedures for waste management have been developed to address the control of waste generation and management at the Installation, and which include the following aspects:

- **Storage (and segregation) of wastes**: information on the storage location of each type of waste, in particular giving indications on the storage of hazardous waste. The instructions needed to avoid mixing waste, and to ensure the correct separation of waste, are described while making clear that the presence of waste outside the storage areas is not allowed. All waste materials will be stored in bins or other suitable receptacles in a designated, easily accessible area of the data storage facilities.
- **Waste labelling:** correct signage and labelling of waste, with particular emphasis on the labelling of hazardous waste to ensure compliance in all cases. Requires that all wastes will be classified, labelled, and stored in accordance with the prevailing requirements of the Waste Management Act 1996-2015 (as amended) and associated regulations.
- **Waste management:** appropriate management process for each type of waste is included. All waste leaving the site will be transported by appropriately licenced contractors and taken to suitably registered, permitted and/or licensed waste facilities.

- **Documentation associated with waste management:** a list of all documents associated with waste management both internally and externally. Internal delivery notes that will allow internal control of waste management as well as external control related to withdrawals (quantities, dates, etc.), and all the certificates of final management issued by the waste managers to ensure traceability of management, and the appropriate destination and final treatment of waste, are included. All waste leaving the site will be recorded and copies of relevant documentation maintained.
- **Other obligations and information to authorities:** other legal or internal obligations are included and will be updated to include those issues related to the IE Licence that have to do with the annual reporting.
- **Roles and responsibilities of waste management:** roles and responsibilities of relevant parties are outlined in the waste procedures. Waste management at the data storage building is the responsibility of the DCEO Facilities Manager.

2.2 Environmental Management System

An accredited (ISO14001) Environmental Management System (EMS) is in place for the site. The purpose of the EMS is to present the environmental objectives and targets and action plans for the site. This contains waste-reduction goals as applicable.

3.0 WASTE HANDLING AND STORAGE

3.1 Hazardous Waste Storage and Handling

Hazardous wastes generated onsite is stored in a covered hardstanding space inside each building or in covered bunds in designated areas external to the building. Mobile retention bunds are available should liquid waste need to be stored at any given time. The storage areas house all hazardous wastes generated at the data storage facilities that are awaiting collection by the nominated hazardous waste contractor for recovery and / or disposal off-site.

The main source of hazardous wastes onsite is waste oils from the interceptors and / or generators. Appropriate management of these liquid wastes (as outlined below) will ensure adequate protection from unauthorised discharges to ground, groundwater and / or surface water.

Oil captured by the hydrocarbon interceptors is held within the interceptor tanks. The oily water is removed directly from each interceptor by a specialised contractor by means of a vacuum tanker. The contractor removes the waste at the time of cleaning for offsite recovery and / or disposal. These tanks are manufactured by specialised companies and are made of materials that are resistant to the substances they contain in order to ensure water tightness.

The quantity of waste oil from the generators is minor. An external contractor is employed to maintain the generators and replace the oils as required. Waste oils as well as oily rags and used filters are collected and removed from site by the external contractor.

As indicated above, no waste used oil or filters are stored as these are removed from the site by the maintenance contractors for recovery and / or disposal at authorised waste facilities. However, ADSIL require the maintenance contractors to provide all the relevant permits and waste management documentation.

In the event of a minor fuel spill onsite, trained staff would apply skill kits. The used materials would be stored in sealed drums in the designated hazardous waste storage area in each building pending collection by the nominated hazardous waste contractor for recovery and / or disposal off-site.

Waste commercial batteries are not stored onsite. These are removed offsite for appropriate recovery and / or disposal by the contractor in charge of maintaining the electrical equipment.

Other hazardous site maintenance materials (e.g. pains, aerosols, pesticides) are removed directly by the relevant external contractor and not be stored onsite.

3.2 Non- Hazardous Waste Storage and Handling

All non-hazardous waste generated from day-to-day operations at the data storage facilities is segregated for recycling/recovery at source using dedicated receptacles located throughout the installation. These are then emptied into skips / larger bins externally. Appropriate segregation of wastes at the source reduces the risk of cross-contamination and provides the greatest potential for recycling / recovery.

When waste receptacles are full, the DCEO Chief Engineer or Engineering Operations Technician (EOT) organises a collection for offsite reuse, recovery and/or disposal by the nominated (third party) authorised waste management contactor(s).

Dry Mixed Recyclable (DMR) material is placed in DMR bins for collection. Cardboard is segregated from other DMR waste where possible and placed in a designated bin for collection.

Organic (food) waste from staff facilities is disposed of in the designated organic waste bins in the canteens. The organic waste bins are serviced on a regular basis by the nominated authorised waste contractor.

All obsolete or broken E-Waste is removed to a designated storage location in the designated waste storage area at each of the data storage facilities. The majority of E-Waste generated is subject to confidential storage and disposal requirements.

As outlined above, site maintenance wastes (including non-hazardous wastes) are removed directly by the relevant external contractor and not be stored onsite. Waste filters and non-hazardous containment curtains requiring change out are removed directly by the relevant external contractor and not be stored onsite.

Other office wastes including used printer cartridges and other office items (e.g. household batteries) generated in the administration areas are segregated locally at each data storage building. Designated bins are provided for printer cartridge wastes within the offices. These are collected by the manufacturer. Similarly, designated bins are provided for waste domestic batteries and collected by a nominated waste contractor for recovery off site.

3.2 Summary of Waste Storage

Table 1 below summarises the storage of the main waste types generated at the installation.

Waste Type	Hazard Y/N	On-site Storage/Treatment Method (anticipated)	Method of Treatment or Disposal (offsite)
Packaging Waste	N	Segregated bins/skips	Recycle
Office Waste	N	Segregated bins/skips	Recycle
General Non-Hazardous Waste	N	Segregated bins/skips	Recovery
Empty Containers	N	Segregated bins/skips	Disposal to landfill
Canteen/Kitchen Waste	N	Segregated bins for compost, mixed recyclable, and general waste	Compost food waste. Recycle mixed dry recyclable waste. Recovery of other general waste
Non-hazardous WEEE	N	Segregated bins for waste electric and electronic equipment	Recovery
Hazardous WEEE	Y	Segregated bins for waste electric and electronic equipment	Recovery
Landscaping waste	N	Composting bins	Vendor managed
Waste Oil	Y	Oil drum in external waste storage area	Vendor managed
Waste sludge from oil separator	Y	Storage tank connected to oil separator	Vendor managed
(Wet) Batteries	Y	Specialised container in waste storage area	Return to supplier
(Dry) Batteries	Y	Specialised container in waste storage area	Vendor managed

Table 1 *Waste Management Strategy*

4.0 ON AND OFF-SITE ARRANGEMENTS FOR THE RECOVERY OR DISPOSAL OF SOLID AND LIQUID WASTES

The Chief Engineer and EOTs regularly inspect the onsite waste storage facilities and infrastructure, manage the waste contractors, audit, and maintain a full paper trail of waste documentation for all waste movements from the site. The Regional Environmental Engineer provides advice on waste segregation requirements, prepares and controls documented procedures for waste management, and ensures that all waste contractors engaged by the Installation and all recovery/disposal outlets are suitable for use, appropriately authorised and audited as required.

Waste management companies authorised by ADSIL are responsible for the transfer of waste off-site to authorised recycling/recovery/disposal facilities. An approved waste vendor list is in place at the installation for waste contractor selection. ADSIL's contracts with Waste Vendors require that all waste contractors conform to the relevant legislations and standards as well as ADSIL's environmental requirements.

A chronological record is also kept showing the date, the amount, nature, origin, destination, treatment method and, means of transport and frequency of collection of the hazardous and non-hazardous waste generated.

Waste is only collected by Waste Contractors who have been properly evaluated and are on the ADSIL Approved Waste Vendor List and only if they have the appropriate licences/permits to handle the waste

Waste is not stored onsite for more than six months.

5.0 WASTE HIERARCHY

ADSIL is committed to minimising the quantities of hazardous and non-hazardous waste generated from direct and indirect operational activities. In order to minimise the potential impact to the environment, ADSIL have developed site waste management SOPs that seek to meet the intent of the waste management hierarchy (Refer to Figure 1 below) and this is incorporated into the site EMS as per licence requirements.

The waste hierarchy states that the most preferred option is prevention of waste, followed by preparing for reuse and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

The entire operations process has been designed with waste prevention/reduction in mind and waste quantities generated will be very small compared to other industrial sites.

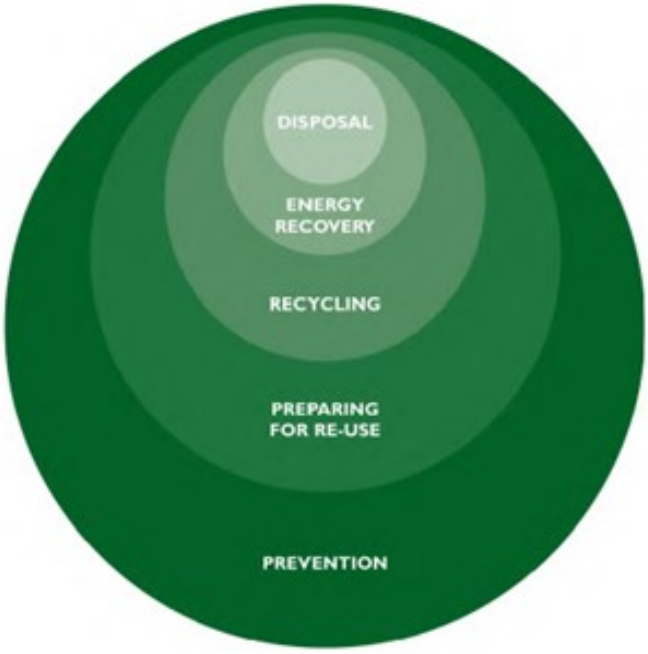

Figure 1 Revised Waste Management Hierarchy

It is company policy that the data storage facilities must use the highest-prioritized waste-elimination/disposal method in the following list that is practicable for the particular waste stream:

a. Waste reduction at source of generation (waste elimination and prevention)
b. Reuse or recycling on site
c. Reuse or recycling off site at another Company site (assuming the waste-receiving site satisfies all regulatory requirements to do this)
d. Reuse or recycling off site at a properly licensed and properly operated non-Company waste-receiving site
e. Incineration with energy recovery
f. Waste treatment, incineration without energy recovery or other destruction method
g. Landfilling or other land application

6.0 WASTE PREVENTION / MINIMISATION OF WASTE

The aspect of the installation which has the greatest potential impact on waste generation is that of the ongoing maintenance and the replacement of equipment at the end of their useful life.

In order to address waste minimisation, the installation has been designed, and the equipment has been chosen, taking into account their useful life. A longer useful life will result in reduced waste generation as replacement is minimised

Specific waste management procedures, as outlined above, are implemented to keep all employees informed of how to manage waste correctly, relevant employees receive frequent online training on these procedures. Training records are retained onsite. The necessary measures are implemented to enable the proper segregation and classification of both hazardous and non-hazardous waste, thereby reducing the amount of waste sent for disposal and facilitating recovery.

A maintenance programme is in place for the auxiliary equipment contributing to waste generation. This includes primarily the maintenance of the generators, UPS batteries, and hydrocarbon interceptors. ADSIL shall strictly comply with the maintenance procedures specifically in accordance with the manufacturers' guidelines so as to not generate more waste than is technically necessary.

7.0 WASTE RECYCLING AND RECOVERY

Improvements in environmental performance are encouraged in the organisation’s EMS, by setting a series of objectives and targets commonly associated with reducing resource material use (e.g. water, energy, paper) and waste production generally. ADSIL has established targets for improvements in the areas of waste reduction throughout the lifetime of the operation of the installation.