
Virtus Holdco Ltd.

Saunderton Data Centre Campus

ENVIRONMENTAL PERMIT APPLICATION – ENVIRONMENTAL RISK ASSESSMENT



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Prepared for:

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1 Introduction

1.1 General

This environmental risk assessment (ERA) has been prepared in support of the application submitted under the Environmental Permitting (England and Wales) Regulations 2016 amended, Schedule 1, Section 1.1 Part A (1) (a) activity as a combustion activity having thermal input of >50 MWth. The data centre will be operated by Virtus Holdco Ltd (Virtus) and will consist of 57 diesel-powered generators with a net aggregated rated thermal input capacity of >50MWth.

The environmental risk assessment has been prepared in accordance with the Environment Agency's guidance¹ for the preparation of risk assessments for bespoke permits and is structured as follows

- Identification and consideration of risks at the installation, and sources of the risks;
- Identification of the receptors (people, animals, property and anything else that could be affected by the hazard) at risk from the installation;
- Identification of the possible pathways linking the sources of the risks to the receptors;
- Assessment of risks relevant to the installation activities and determination of whether the risks can be removed or mitigated to acceptable levels with respect to human health and the environment; and
- A statement of measures that will be put in place to control identified risks.

The EA guidance states that the risk assessment must identify whether any of the following risks could occur and what the environmental risks could be:

¹<https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit> Environment Agency Website. Accessed on 17/01/2025

- any emission to air or discharge, for example sewage or trade effluent to surface or groundwater;
- accidents;
- odour (not for standalone water discharge and groundwater activities);
- noise and vibration (not for standalone water discharge and groundwater activities);
- uncontrolled or unintended ('fugitive') emissions, for which risks include dust, litter, pests and pollutants that should not be in the discharge;
- visible emissions, for example smoke or visible plumes; and
- release of bioaerosols, for example from shredding, screening and turning, or from stack or open point source release such as a biofilter.

1.2 Background Information

The Saunderton data centre campus will comprise four data centre buildings known as London 15 – London 18, associated plant located in gantries to service the building, 57 No. backup diesel generators and associated fuel storage. The site will be connected to the electricity network via an on-site primary substation; however, the backup generators are required to ensure the continuity of electricity supply required for data centres in the event of an emergency scenario where the regular supply of electricity to the site is interrupted. The generators will therefore only be operational for back-up electricity generation and during routine testing and maintenance.

A total of 57 high power density diesel generator sets are proposed for installation across the Site. Of this total, 7 Baudouin generators are proposed for installation in building LON15; two have a power rating of 3.3 MW (engine model: 16M55G6D2/5), whilst the other 5 have a power rating of 2.7 MW (engine model: 12M55G10D2/5). The 2.4MW plant located at London 15 each have a thermal input of 6.3MWth per set, whilst the 2.8MW plant have a thermal input of 7.86MWth per set.

The other 50 generator sets proposed for installation on buildings LON16, LON17 and LON18 are 2.4MW Baudouin generators (engine model: 16M55G3000/5). The 2.4MW plant located at London 16, 17 and 18 have a thermal input of 6.18MWth per set. All proposed generators are certified to the US EPA Tier II standard and therefore meet the minimum requirement for Best Available Techniques (BAT). No selective catalytic reduction has been recommended by the air quality assessment, submitted separately in support of this application.

The total permitted rated thermal output of all the generators across the Saunderton Campus will be 356.22 MWth upon completion of all four data centre buildings.

1.3 Objectives of the Environmental Risk Assessment (ERA)

The aim of this ERA is to identify any significant environmental risks which may be associated with the operation of the backup generators only as the permitted activity, and to demonstrate how the risk of environmental pollution or harm will be minimised through appropriate measures, best practice, and Best Available Techniques (BAT).

1.4 Emergency Response Plan

The Saunderton Data Centre Campus will be managed in accordance with Virtus' ISO 14001 certified Environmental Management System (EMS), which includes procedures for managing accidents, incidents and complaints. All incidents are reported to the Compliance Manager, who is responsible for assessing the actions completed, updating procedures and escalating the incident or accident where necessary.

Records of all environmental accidents, incidents and complaints will be kept and be accessible to the management team.

The full emergency response plan is included in Chapter Two of Virtus' Operations Manual which is available on request.

2 Site Setting

Installation Address

The address of the Saunderton Data Centre is:

Virtus Saunderton Data Centre

Haw Lane, Saunderton,

Buckinghamshire, HP14 4JD

The Site's Ordnance Survey National Grid reference is 480790 198500

The site is located to the south of Haw Lane, approximately 400m to the west of Wycombe Road (A4010), 300m to the west of the London to Birmingham railway line and 500m northwest of Saunderton railway station. The site occupies an area of approximately 96,650m², and is generally flat with a gentle slope from approximately 120m Above Ordnance Datum (AOD) in the north to approximately 140m AOD in the south of the site.

The Saunderton campus is in a predominantly rural area, with two residential properties located adjacent to the northern site boundary immediately off Haw Lane.

Further details on the site setting, surrounding and on-site historical land use can be found in the Site Condition Report (document reference 24027-TEM-ZZZ-ZZ-RP-Y-0007) submitted separately in support of this application.

3 Risk Assessment Methodology

A qualitative assessment for generic risks for the Installation is provided in Table 5.1, and assessments derived from specific operations and release points are provided in Table 6.1.

For the qualitative assessment, each actual or possible hazard will be identified and outlined within the assessment table considering:

- the hazard – for example dust, bioaerosols, litter, type of visible emission;
- the process that causes the hazard, for example the operation and refuelling of the generators
- the receptors – people, animals, property and anything else that could be affected by the hazard;
- the pathways – how the hazard can get to a receptor;
- what measures will be taken to reduce risks;
- probability of exposure, for example whether a risk is unlikely or highly likely;
- consequences – what harm could be caused; and
- what the overall risk is, based on what you've already stated in the table – for example 'low if we apply the management techniques.

For the quantitative assessment, it is possible to 'screen out' potential risks from emissions to air, discharges to water or deposition onto land by carrying out quantitative tests to check whether they're within acceptable limits or environmental standards. If they are, the risk to the environment is considered to be insignificant and no further assessment is required.

The risk assessment sets out the potential hazards posed by the proposed combustion plant at the site, receptors and pathways along with the management and assessment of the identified risks.

The probability of exposure is the likelihood of the receptors being exposed to the hazard and is defined as:

- Very low – exposure is considered to be very unlikely;
- Low - exposure is considered to be unlikely;
- Medium - exposure is considered to be likely; and

- High - exposure is considered to be highly likely.

The consequence of the receptors being exposed to the hazard is defined as:

- Very low – negligible impact to the receptor;
- Low – Low impact that can be easily rectified;
- Medium - medium impact that will require a moderate level of mitigation; and
- High – significant mitigation is required to rectify damage to the receptor.

Following the determination of the likelihood and consequences for the relationships developed using the source-pathway-receptor concept, the matrix in Table 3.1 below is used to determine the overall risk of the pollution event occurring.

Table 3.1 – Risk Matrix

Consequence	Probability			
	Very Unlikely	Unlikely	Possible	Likely
Major	Low	Medium	High	High
Moderate	Low	Medium	Medium	High
Minor	Low	Low	Medium	Medium
Negligible	Very Low	Low	Low	Low

4 Identification of Risks

As part of the application, Virtus is required to identify the potential environmental risks which could occur during the operation of the Installation, including accidental risks. The EA guidance states that, as the operator of the site, Virtus must consider the potential risks set out in 1.1.

In considering the risk, the client can determine that a potential risk is not considered to be significant in terms of its potential impact on the environment. However, a justification must be provided for any risk which is 'screened out'.

Based on the guidance summarised above, the potential environmental risks at the installation have been identified and have been determined as either applicable or not applicable based on the potential environmental impact arising from the risk. A summary of these risks is presented in the table below which also provides justifications where risks are considered to be insignificant. The risks which have been identified as significant have been included in the risk assessment in Table 6.1 of this report. Applicable risks to the installation are set out in Table 4.1 below.

Table 4.1 – Identification of risks

Environmental Risk	Applicability	Justification
Accidents	Applicable	Accidents resulting in negative impacts to receptors could occur at the installation due to: • Equipment Failure • Human error • Materials handling (e.g. spills and leaks of fuel during filling of bulk fuel storage tanks) • Vandalism • Flooding • Fire
Noise and vibration	Applicable	There is the potential for noise and vibration emissions from the operation of the generators.
Controlled releases to air	Applicable	Air emissions associated with the permitted activity comprise flue gases arising from the operation of the backup generators.

Environmental Risk	Applicability	Justification
Visual impact	Not Applicable.	The installation is in an area with a rural character, with limited residential properties located within the immediate vicinity. Visible emissions from the permitted activity will be limited to flue gasses emitted during the operation and testing of the generators. The generators are anticipated to be only used as emergency backup and will be maintained in line with SFG20, any observed plumes will be investigated immediately in line with the EMS. Visual impacts are therefore not considered significant and are not assessed further.
Discharge to surface and/or groundwater	Not Applicable	There are no direct discharges to surface water or groundwater planned from the operation of the combustion activities at the site.
Odour	Not Applicable	There are no odour emissions associated with the operation of the site. Odour at the site is associated with the fuel delivery. Fuel deliveries are predicted to be infrequent, and it is not foreseen that odours will be emitted as a result of the procedures in place. This risk has not been considered further.
Uncontrolled or unintended ('fugitive') emissions	Not applicable	Fugitive emissions are not anticipated to be made to the surroundings during the operation of the site.
Release of bioaerosols	Not applicable	There will be no release of bio aerosols.

5 Potential pollution pathways

Potential pollutant pathways linking potential pollutants and receptors are summarised in the table below. Those risks which have been screened out have been excluded.

Table 5.1. – Potential pollution pathways

Source	Potential pathway	Receptor
Accidents May occur during fuel delivery and transport because of the failure of safety measures or errors with equipment or operator error. Accidents may also occur at any time through the failure of fuel storage equipment or the fuel delivery system. Additionally, they may occur as a result of adverse environmental factors (fire, flooding) or vandalism.	Via the site hardstanding and the fuel delivery infrastructure. Site drainage and utilities that penetrate the hardstanding can act as preferential pathways to underlying soil and groundwater. Damaged areas of hardstanding as well as gaps may also act as preferential pathways.	Environmental receptors Groundwater, soil, surface water. Human receptors Employees at the data centre, nearby residents or employees, transient receptors (visitors to site or passing pedestrians)
Noise and vibration May be created by the operation of generators and from vehicle movement.	Transmitted through ground vibration and through the air.	Human receptors Employees at the data centre, nearby residents or employees, transient receptors (visitors to site or passing pedestrians)
Controlled releases to Air Emissions from point sources (generator flues)	Transmitted through the air	Environmental receptors Atmosphere Human receptors Employees at the data centre, nearby residents or employees, transient receptors (visitors to site or passing pedestrians)

6 Environmental Risk Assessment

Table 6.1– Environmental Risk Assessment

Source of Pollution	Pathway	Receptor	Mitigation Measures	Probability of exposure	Consequence	Overall risk
Accident during fuel delivery (spillage, equipment failure)	Via the site drainage and fuel delivery pipework	Environmental receptors Groundwater, soil, surface water. Human receptors Employees at the data centre, nearby residents or employees, transient receptors (visitors to	- Surfacing for all fuel delivery areas will be impermeable hardstanding. The surface will be checked regularly and maintained. - The generator and fuel delivery area will only comprise surface water drainage network. The surface water drainage network in the area will consist of a class 1 forecourt separator within the fuel delivery area. The forecourt separator will be designed to accommodate the containment of a catastrophic fuel spill of a single fuel delivery tank compartment of 7,600l and will have spare capacity for additional run-off in case spillage happens during a 1:100-year rainfall event, with a duration of 6 hours. - The forecourt separator will be fitted with an alarm indicating when the tank is full In line with the Environment Agency's and DEFRA's guidance "Oil Storage Regulations for Businesses." - The forecourt separator will be fitted with a manual penstock valve on the manhole downstream, to be closed during refilling operations. - The Facilities management team will inform both Virtus and site security that fuel delivery is taking place	Very unlikely	Major	Low Provided that equipment is operated in accordance with the manufacturers recommendations and infrastructure maintained in accordance with preventative maintenance programme.

Source of Pollution	Pathway	Receptor	Mitigation Measures	Probability of exposure	Consequence	Overall risk
		site or passing pedestrian(s)	- Where necessary, the local area will be appropriately cordoned off using barriers and cones. - The tanker and its crew must always be supervised, and a permit to work shall be enforced. - All fuel delivery pipework (external or buried) will be in double walled "pipe in pipe" type with leak detection - All fuel pipework will be EN10255 red heavy carbon steel pipe - Pipework will be insulated and trace heated for frost protection.			
Accident during fuel storage and transport within the site	Via the site drainage and the fuel delivery infrastructure	Environmental receptors Groundwater, soil, surface water Human receptors Employees at the data centre, nearby residents	Fuel storage tanks at the site will be fitted with overfill protection devices and level alarms which will be connected to the building management system. Belly tanks for fuel storage will have spillage containment, level gauges and overfill alarms and the generators will have belly/day tanks. Fuel will be stored in integrally bunded belly/day tanks to contain no less than 110% of the total fuel volume in the event of a leak in the primary tank. Any leaks in fuel tanks will be notified to site operatives via the BMS, and mitigating measures will be implemented as per site procedures.	Very unlikely	Major	Low Provided that equipment is operated in accordance with the manufacturers recommendations and infrastructure maintained in accordance with preventative maintenance programme.

Source of Pollution	Pathway	Receptor	Mitigation Measures	Probability of exposure	Consequence	Overall risk
		or employees, transient receptors (visitors to site or passing pedestrians)				
Accidents caused by fire or flooding	Flooding Via flood waters through and over the site hardstanding and associated site infrastructure. Fires	Environmental receptors Groundwater, soil, surface water the atmosphere. Human receptors Employees at the data	Fire detection at the data centre will be to the L1 level of detection with non-accessible areas utilising low sensitive or high sensitivity air sampling detection systems. Data centre buildings will include the following fire detection and alarm systems: • Fire alarm panels – main and repeater • Smoke detectors complete with integral sounder bases • Heat detectors • Manual call points • Addressable input/output interface units to connect to the access control system • Xenon beacons • Electronic sounders • Disabled fire refuge panels	Very unlikely	Major	Low Provided that equipment is operated in accordance with the manufacturers recommendations and infrastructure maintained in accordance with preventative maintenance programme.

Source of Pollution	Pathway	Receptor	Mitigation Measures	Probability of exposure	Consequence	Overall risk
	Via the site hardstanding and the fuel delivery infrastructure and through the air.	centre, nearby residents or employees, transient receptors (visitors to site or passing pedestrians)	- Fire-rated cabling for communication and interfacing between fire alarm panels and the FMS system - All cabling will be enhanced fire-rated cabling complete with a red outer sheath. - Surface water manholes will be fitted with automatic shut off valves connected to the fire alarm system, required to prevent fire water runoff being discharged from site. - The external fire hydrant network will be compliant with BS9990 and will not be provided nearer than 6m to the building and within 90m and no more than 90m apart. They shall be below ground and in accordance with BS750 and BS EN 143339. The final location and quantity shall be agreed with the Buckinghamshire Fire and Rescue Service. The site will incorporate the following flood mitigation measures: - Surface water infiltration trench along the western site boundary to prevent overflow from third party land - Surface water infiltration trench along the eastern site boundary to prevent site overflow into third party land - Attenuation tanks with automated shut off valves triggered by the fire alarm system will be installed upstream of the proposed infiltration basin. - Permeable paving in the car park area.			

Source of Pollution	Pathway	Receptor	Mitigation Measures	Probability of exposure	Consequence	Overall risk
			- Infiltration basin in the northeastern corner of the site to allow gravity discharge from below ground attenuation tanks. - Berms to prevent surface water runoff on retaining walls.			
Accidents caused by vandalism	Via the site drainage, the pipework and through the air.	Environmental receptors Groundwater, soil, surface water. Human receptors Employees at the data centre, nearby residents or employees, transient receptors (visitors to	Fuel fill point cabinets shall be IP65 rated, lockable with drip tray and leak detection. The site includes the following, but not limited to, security measures: - The site is a secure area with a perimeter fence with pedestrian and vehicle gates. - Access on to the campus is via the security control room which is operational 24/7. - Video surveillance system complete with edge analytics to provide extended security functionality. - Access control is provided throughout the site.	Very unlikely	Major	Low Provided that equipment is operated in accordance with the manufacturers recommendations and infrastructure maintained in accordance with preventative maintenance programme.

Source of Pollution	Pathway	Receptor	Mitigation Measures	Probability of exposure	Consequence	Overall risk
		site or passing pedestrian(s)				
Noise and vibration caused by operation of onsite generators	Airbourne and ground-borne vibration.	Environmental receptors Local ecology Human receptors Employees at the data centre, nearby residents or employees, transient receptors (visitors to site or	An operational noise impact assessment has been undertaken and has been undertaken to determine the potential noise impact of the installation. The generators will be in attenuated containers with inlet and outlet/exhaust. The acoustic assessment indicated that the predicted rating noise level of the mechanical plant will meet local authority plant noise requirements during standard day and nighttime operation, as well as during monthly generator maintenance and testing based on the current design. During emergency operation during full power outages, the predicted rating level will exceed local authority noise limits by up to 5 and 10 dB during the day and night time respectively at the worst affected receptor. It is considered that the emergency scenario is anticipated to be an exceptionally rare event. The generators will be maintained and inspected in line with Original Equipment Manager (OEM) instructions and best practice (SFG20). This is outlined in Chapter 6 of the Operations Manual.	Very unlikely	Moderate	Low Provided that equipment is operated in accordance with the manufacturers recommendations and infrastructure maintained in accordance with preventative maintenance programme.

Source of Pollution	Pathway	Receptor	Mitigation Measures	Probability of exposure	Consequence	Overall risk
		passing pedestrian(s)	Any abnormal noise or vibration caused by the generators would be investigated immediately in accordance with the EMS. Any complaints regarding noise and vibration would be recorded and acted upon in line with the EMS.			
Controlled releases to air through generator emissions	Through the air	Environmental receptors The atmosphere. Human receptors Employees at the data centre, nearby residents or employees, transient receptors (visitors to site or	The generators run infrequently. The generators will be maintained in line with the manufacture requirements and best practice (SFG20). An air quality assessment was carried out for the proposed Installation, this concluded that the impacts of changes in annual mean NOx concentrations is insignificant at all assessed receptor locations for ecology. The hourly mean NO PC will exceed the screening threshold of 10% for the short-term environmental standard for human receptors. However, the hourly mean AQO is not breached at any receptor location, therefore the impact of the emissions is not considered significant.	Very unlikely	Moderate	Low Provided that equipment is operated in accordance with the manufacturers recommendations and infrastructure maintained in accordance with preventative maintenance programme.

Source of Pollution	Pathway	Receptor	Mitigation Measures	Probability of exposure	Consequence	Overall risk
		passing pedestrian(s).				

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7 Conclusions

The proposed installation has been assessed to have a range of potential impacts from accidents, the release of emissions to air, land and water as well as noise and vibration emissions. The measures outlined within the risk assessment are considered to represent BAT and will reduce the risks of the proposed installation activities.

Measures to reduce the risk of accidents causing the unintentional release of pollutants include suitable drainage protection measures, protected fuel storage and transport systems and effective fire suppression infrastructure.

Additionally, the risk of accidents caused by vandalism will be mitigated by the installation and maintenance of suitable security measures.

Noise and vibration and air quality have been assessed for the proposed installation and with measures such as attenuated containers and suitable generator selection, these are assessed to be of low risk provided that equipment and infrastructure are maintained in accordance with the manufacturer's recommendations and the preventative maintenance programme.



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