Virtus Hayes Ltd

ENVIRONMENTAL PERMIT APPLICATION – NON TECHNICAL SUMMARY

Virtus LON2 Data Centre

70092911/LON2/EPR/NTS
JUNE 2022

PUBLIC

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NON TECHNICAL SUMMARY

Virtus Hayes Ltd (Virtus) is making an application under The Environmental Permitting (England and Wales) Regulations 2016 (as amended) to operate the emergency back up energy plant at the London 2 (LON2) Data Centre, which consists of a single building, with plant situated in two Generator Rooms – in northern and southern zones. The data centre will use ultra low sulphur gas oil (diesel) fired generators for emergency power only, the routine testing of which is the subject of this application. The application will comprise a description of operations, control measures and management systems, an environmental risk assessment, a site condition report and baseline statement, as well noise and air quality impact assessments. Discussions were originally held between Virtus and the Environment Agency (EA) in July 2018.

An enhanced pre-application submission was made on-line using the Environment Agency web service, reference number EPR/EP3247JV/A001. A response was received on 7 June 2022 which contained a Habitats screening report with maps, and an Installations pre-app basic advice summary.

VIRTUS HAYES LTD

Virtus has been designing, building and operating data centres since incorporation in 2008. Data centres are mission critical facilities that are designed to supply uninterrupted power to tenant equipment 100% of the time. Virtus customers have global presence and hence provide global services which they must maintain. Virtus are required to deliver the highest levels of resilience and ensure that new technologies are used which do not compromise reliability.

LOCATION

The address for the installation is:

Virtus Hayes Ltd (LON2)
Western International Park,
Hayes Road,
Southall,
UB2 5XX

OS National Grid Reference: TQ 10860 78698

The site location is shown below:

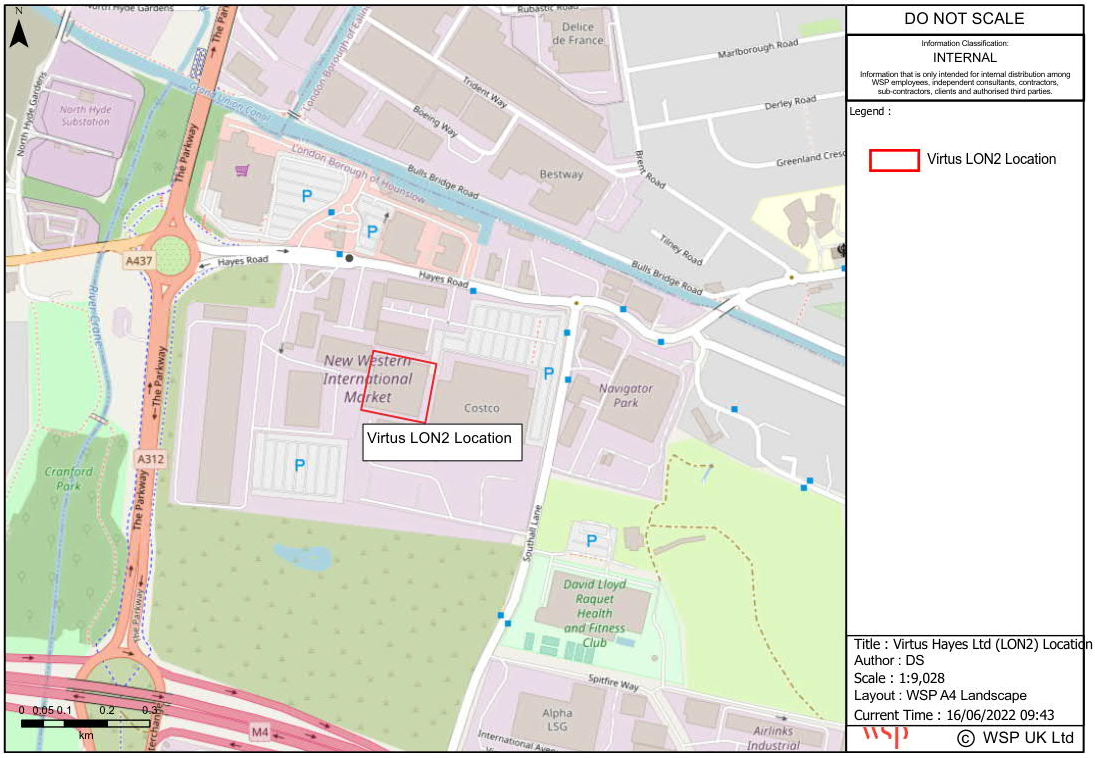

Figure 1 - Site Location

The site incorporates 9 diesel-fired standby generators across 2 separate Generator Rooms in a single Data Centre under the same management system and management structure as the other Virtus Data Centres across Slough and North London.

OPERATION

Virtus data storage services are managed in accordance with, and certified to, the standards detailed in the application via an Integrated Management System (IMS) to ensure delivery of quality data centre services, energy and environmental performance, health and safety, and information security. The scope of certification is 'the design, build and ongoing operation of mission critical data centre facilities.'

The Data Centre uses electricity to operate and is connected to the local electricity transmission network via multiple grid connections; however, given the nature of data centres and their requirement to have an available energy supply at all times, the installation includes generators which will provide power to the site in the event of an emergency situation, e.g. the failure of the electricity transmission network. The likelihood of such an event is considered to be extremely low, based on Virtus experience no such events have occurred in 5 years. The generators are individually tested every month for a short period of time.

The rated generation capacity of the generators is 2.0MWe (megawatt electrical) for the existing eight engines and 1.888MWe for the proposed engine. The total rated thermal input of all generators at LON2 is 51.0MWth (megawatt thermal input). The generators are fitted with underslung belly (or

slab-type) fuel tanks for an independent fuel supply to allow for 48 hour running, as well as smaller so-called dat tanks of 1200 litre capacity. The tanks are purpose built TO British Standard and fitted with level gauges and high level alarms as well as bund alarms.

The proposed engine exhausts (labelled as Emission Points) and the permit Installation Boundary (in green) are shown below.

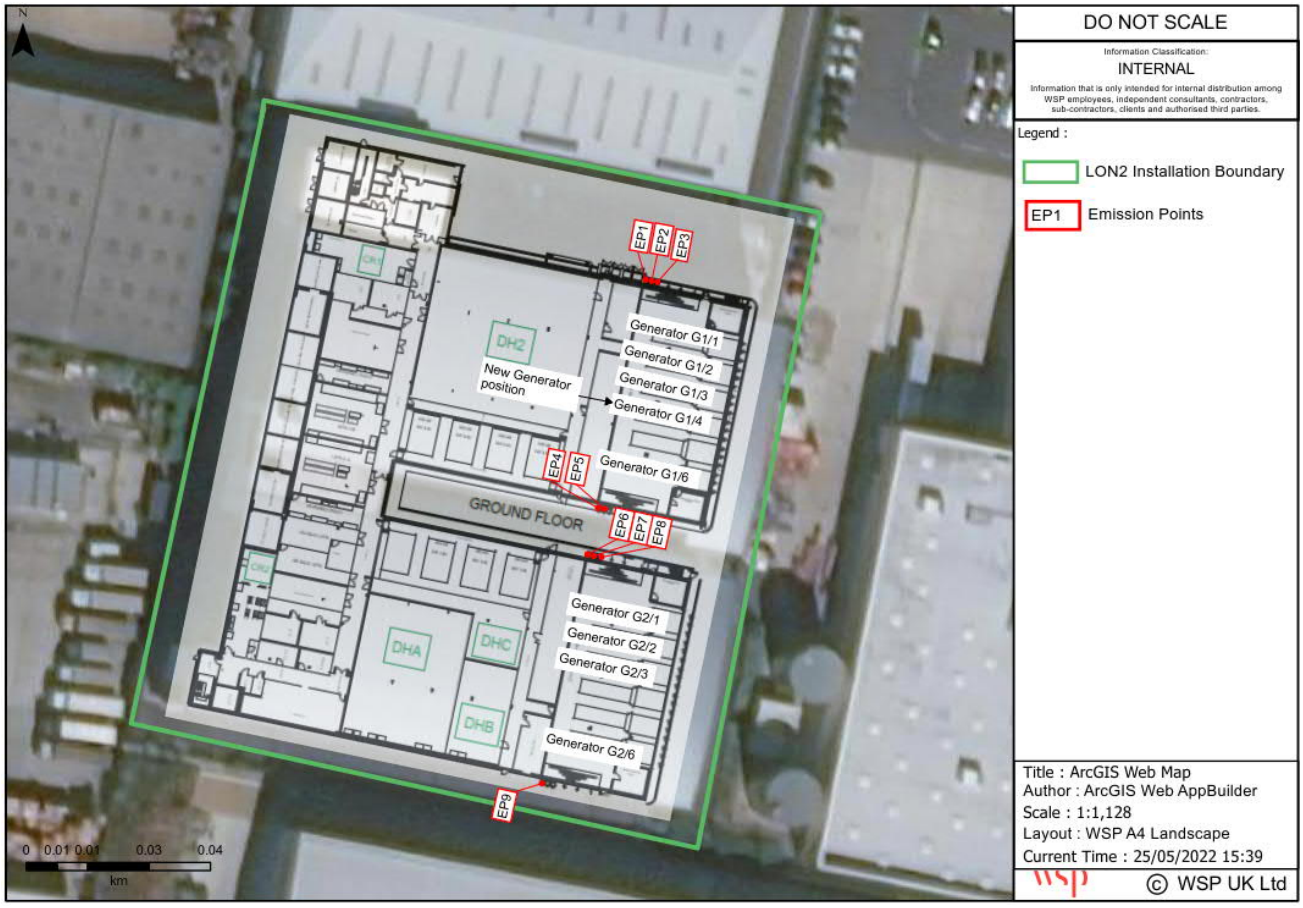

Figure 2 – Emission Points and Installation Boundary

SITE CONDITION REPORT

A site condition report has been developed and forms part of this application, it provides information on the current and previous condition of the land and groundwater at the site. This will be a ‘live’ document and will be updated during the lifetime of the installation and used to inform the surrender SCR at the time of installation closure.

The report describes historical activities on the site as well as remediation works if undertaken and references extensive geo-environmental assessments undertaken prior to the construction of the Data Centre, the latter of which contains the chemical analytical results of soil and groundwater sampling which will provide the site baseline data for future reference.

ENVIRONMENTAL RISK ASSESSMENT

An environmental risk assessment (ERA) has been undertaken, as part of the application, in accordance with GOV.UK guidance Risk assessments for your environmental permit.

Odour, noise, fugitive emissions, visible emissions, discharges and accidental releases from the installation are all considered in the ERA. There are not considered to be any significant risks to the environment from the testing of the generators. There is a very low risk of nuisance to nearby properties from noise emissions, and very low risk of land / water pollution in the event of any leaks or spills of diesel required for the generators. Appropriate mitigation and emergency response procedures will be in place and are detailed in the application.

EMISSIONS TO AIR

There will be 9 point sources to air (numbered EP1 to EP9 in the corresponding plan). Air quality modelling is being undertaken to determine the impact of the generator testing (as well as a worst case emergency scenario) on local air quality, and forms part of this application, however will be submitted at a later date, but prior to the complete determination of the permit application.

Emissions from the site will vary dependent upon the operational scenario of the engines (specifically the testing regime). The engines will only be operational during routine testing. There will be no point source emissions to air outside of these periods.

The primary pollutant of concern is NOx. In the absence of NOx concentration measurement data, likely operational emission concentrations have been based on emissions data from the manufacturer's data sheets adjusted for each scenario. The tests are staggered and multiple generators are not tested at the same time, each generator is tested 12 times per year, 11 times as a start up test (very short duration) and once as an on-load test (between 2 and 2.5 hours duration).

Virtus will apply Best Available Techniques in relation to the testing to ensure that impacts are minimised by for example spreading the tests throughout the year, avoiding peak traffic periods, and not testing engines simultaneously.

Air Quality Assessment Summary

A summary of the atmospheric dispersion model is not yet available.

The latest iteration of ADMS will be used for quantifying the impact of emissions from the generators on oxides of nitrogen (NOx, NO_2) and if considered necessary, particulate matter ($PM_{10, 2.5}$) concentrations. ADMS uses detailed information regarding the pollutant releases, building effects and local meteorological conditions (from nearby Heathrow airport) to predict pollutant concentrations. Background data will be obtained from local council Annual Air Quality Status Reports and from Defra's uk-air.defra.gov website. The models will run assuming all year round operation and then scaled for actual operating periods to obtain process contributions. Statistical analysis will then be undertaken on the results.

Scenarios will be considered for monthly testing only and for monthly testing with a mains failure duration of 72 hours.

The results of the assessment for human receptors will show whether there would be exceedances of the annual mean NO_2 and particulate matter Air Quality Standards objectives at locations where the objectives would apply, and the likely increase in concentrations.

Human receptor locations as well as ecological sites will be considered in the assessment.

EMISSIONS TO WATER OR LAND

There are no direct discharges to surface waters, the two LON2 generator rooms are internal to the building on a suitably engineered concrete floor with floor gully drains serving the two engine rooms which discharge to public foul sewer. The fuel delivery pipe connections are external to the building in an enclosed locked box over a bunded and covered area with surface water drainage discharging via a Class 1 forecourt separator with 10,000 l capacity and high level alarm. This system then discharges via a stormwater attenuation tank with flow control ultimately to the public surface water sewer system.

NOISE EMISSIONS

The generators will only emit noise during operation (individual testing or emergency). A noise impact assessment report is also being prepared which will determine the impact of the proposed testing regime at nearby noise sensitive receptors as well as providing comment on the impact of emergency operations.

The report will provide baseline environmental noise to establish background and residual sound levels at the receptors, and a noise source survey based on identical engines elsewhere to determine the sound levels of the generators.

The report will present the data and the outcome of the acoustic modelling package CadnaA for the test scenario and the emergency scenario.

It is however envisaged from the Environmental Risk Assessment that a negligible or imperceptible impact will occur for off-load start-up and on-load generator tests, especially given the considerable distance to Noise Sensitive Receptors.

MANAGEMENT SYSTEMS

All Virtus' data centre operations are managed in line with their Operations Manual which incorporates the requirements of the IMS (Chapter 6 Occupational Health & Safety and Environmental (OHSE) Management System). Overall responsibility for the IMS lies with the Senior Management Team of Virtus Hayes Ltd.

The environmental management system (EMS) includes an integrated policy (Compliance Policy), management principles, organisational structure, responsibilities, standards/ procedures, process controls and resources which are in place to manage environmental protection across all aspects of the business.

Environmental Policy

The ISO 14001 certified EMS is underpinned by an Environmental Policy which is included as part of an overall Compliance Policy. This defines Virtus' commitment to continual improvement and to developing objectives and targets aimed at preventing pollution and improving environmental performance. The Policy is reviewed annually by the Senior Management Team of Virtus Hayes Ltd. Arrangements, such as inductions, tool box talks and noticeboards, are in place to ensure that all employees are aware of the Policy and its contents and that the Policy is made available to

company stakeholders, including contractors who undertake much of the onsite work around the generators (maintenance, deliveries, etc).

Environmental Aspects & Risk Management

Virtus ensures that internal and external issues relevant to the provision of services, energy & environmental aspects, information security, strategic direction, and in maintaining compliance are captured, evaluated and mitigated through a Risk Management System compliant with the requirements of BS ISO31000:2009 Risk Management.

A Risk Evaluation Register controlled under the Risk Management Process (Chapter 4 of the Operations Manual) is implemented. This register details environmental aspects and risks associated with the organisation's activities, including a significance rating for each aspect. Environmental risks are evaluated in order to identify opportunities for continual improvement. This is undertaken alongside a regular energy performance review, a key aspect to identify opportunities to improve environmental performance. The energy review is used in particular to drive Power Usage Effectiveness figures which is the ratio of total amount of energy used by a computer data center facility to the energy delivered to computing equipment.

So called 'Significant Aspects' are managed by establishing operational controls, processes, procedures, training and the monitoring of activities via an audit programme which covers both site-level and organisation-level activities. All staff are responsible for working in accordance with procedures relating to environmental compliance.

The Operator has identified and documented a list of likely environmental incidents and developed controls around these.

A spill response procedure is in place with spill kits deployed strategically on site.

Training

Environmental training relates to both general awareness and job-specific training. The site is managed by a sufficient number of staff, who are competent to operate the site.

Each individual's knowledge and skills are assessed and matched against the needs of the job position.

Additional experience and/or training requirements necessary to enable an individual to undertake their assigned role are identified, prioritised and planned.

Training records are maintained and training needs regularly reviewed.

All contractors and sub-contractors are given appropriate training prior to the commencement of any works or services.

Onsite training of personnel involved in the operation of the engines is undertaken by the suppliers. The training is both classroom and onsite practical and each trainee is issued with a training manual.

Review and Audit

An annual management review examines the EMS to ensure that it remains appropriate and effective at controlling environmental performance and to identify any areas where opportunities exist for improvement.

The EMS and site activities are internally audited at least annually. Internal audits are carried out by site staff with suitable audit experience and / or training.

Where corrective action is identified as being required, through audit (or otherwise), which for example involves modifications to plant and equipment, the implementation of such changes will be managed via the EMS change management process.

CRITICAL ASSET MANAGEMENT

Virtus identify and manage critical assets comprising of physical, non-computing systems such as power, cooling and life safety systems under a critical asset management process.

It identifies areas of criticality and ensures appropriate levels of planned preventative maintenance, Standard Operating Procedures, and Emergency Operating Procedures as well as an Operation and Maintenance Manual.

Contractor Management

Virtus' approach to contractor management is detailed in their Operations Manual (Chapter 13). Large areas of operation and maintenance, including the data centres at Slough, are contracted to a Facilities Management (FM) Team, Optimum Group Services; who are specialists in Data Centre maintenance. Other assets are maintained and tested by the vendors – including the engines and generator sets.

The management systems are considered to represent Best Available Technique for the installation.

ENGINE AND SET UP CHOICE

The diesel-powered stand-by electrical generating sets envisaged for the data centre installation are fit-for-purpose vendor-supplied units:

- Prime mover: V-16 or V-20 cylinder arrangement engine, four-stroke water-cooled diesel, low fuel consumption, containerised with close couple radiator.

The Uptime Institute regards electricity from utility service providers as an unreliable source of power. Therefore, Tier III data centre specifications require that the data centre must have alternative power generation as a backup for the utility power supply that is in the control of the data centre owner; standby diesel generators are still considered the tried and tested, reliable available technology with the following logic:

- they can accept significant load steps after a power outage, so they can be quickly brought online to take over from a UPS (uninterruptible power supply) system;
- Shorter start up time compared to gas fired generator and gas turbine systems;
- Fuel is stored on site ensuring local control is retained (48 hour supply to all generators);
- The site retains full local control of power outage protection (exempt from utility supply failures);
- The storage of diesel is considerably safer than the storage of alternative fuels;
- The storage of enough alternative fuels to satisfy the Tier 3 24-hour power outage protection requirements requires significant space and considerable Health & Safety controls;
- The Storage of the fuel is required to match the redundancy levels that the system is designed for (therefore a single storage will not be sufficient);
- The availability of diesel and diesel suppliers readily extends emergency operations to support tenant equipment;
- The technology is mature;

- The technology is the most cost-effective technique considering commissioning, availability of spare parts, fuel, servicing and end of life decommissioning.

A review of alternative engines or fuels was also presented, highlighting the current lack of suitable alternatives.

FUEL STORAGE

Fuel (gas-oil) is stored in above ground ‘belly-tanks’, and ‘day tanks’ one each per generator, with sufficient fuel for a 48 hour outage, the storage capacity per belly tank is 21,666 litres and per day tank is 1,200 litres resulting in a site storage capacity of 205,794 litres.

The fuel tanks installed will be double skinned steel tanks built to appropriate standards. Each is fitted with a level probe and overfill valve (preventing overfill), and a High / Low alarm.

Fill points are within the locked cabinet on the outside of the building with a drip tray within the cabinet. Industry standard digital tank gauges are fitted on all tanks with low and high trigger points. Bund alarms are fitted to detect inner tank leaks.

Fuel polishing is undertaken to properly maintain fuel during long periods of storage and non-use. This is to ensure that the fuel supply is not wasted and managed sustainably. Fuel polishing is undertaken by a fuel polishing unit which is fixed within the day tank. The unit contains a filter separator element which is used to remove particulate contaminant and water from diesel fuels and hydrocarbon fuels.

Procedures for fuel oil deliveries are included in Virtus management system and defined in the Operations Manual.

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