



Environmental Risk Assessment - DP3442QV

Hayes Data Centre Emergency Back-up Generation Facility

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1.0 INTRODUCTION

This Environmental Risk Assessment (ERA) has been prepared by HDR on behalf of the operator *Amazon Data Services UK Limited* in support of the application for a new bespoke Environmental Permit (ref DP3442QV).

This ERA relates to the proposed operation of the combustion plant exceeding 50MWth and the associated fuel storage facilities at the *Hayes Data Centre Emergency Back-up Generation Facility* located at Bulls Bridge Industrial Estate, North Hyde Gardens, Hayes, UB3 4DG (Grid reference TQ 10514 79252).

This ERA has been produced in accordance with Environment Agency (EA) guidance – “Risk assessments for your environmental permit”¹.

Please refer to the following reports for detailed risk assessments that have been submitted as part of the application for a permit:

- Air Quality assessment
- Noise assessment
- Climate change risk assessment
- Site condition report / Site Baseline

1.1 Purpose of this document

This ERA aims to identify potentially significant environmental risks associated with the installation’s activities, the applicable source pathway receptors and the control measures in place to help mitigate the identified risks.

¹ <https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit>

2.0 BACKGROUND

We have presented a high-level summary below. Please refer to the Non-technical Summary (NTS) document submitted with the application for a permit for further details.

2.1 Site Summary

The Hayes Data Centre, outlined in blue in Figure 2.1 below, is 1 of 3 Data Centres to be constructed. At the time of writing the other 2 Data Centres are due to be under the control of a separate operator and are likely to be covered under a separate environmental permit.

The construction of the Hayes Datacentre will see 14-no 3.2MWe Rolls Royce MTU DS4000 emergency back-up diesel generators installed over several floors in Energy Centre 1 ("EC1" in Figure 2.1 below)

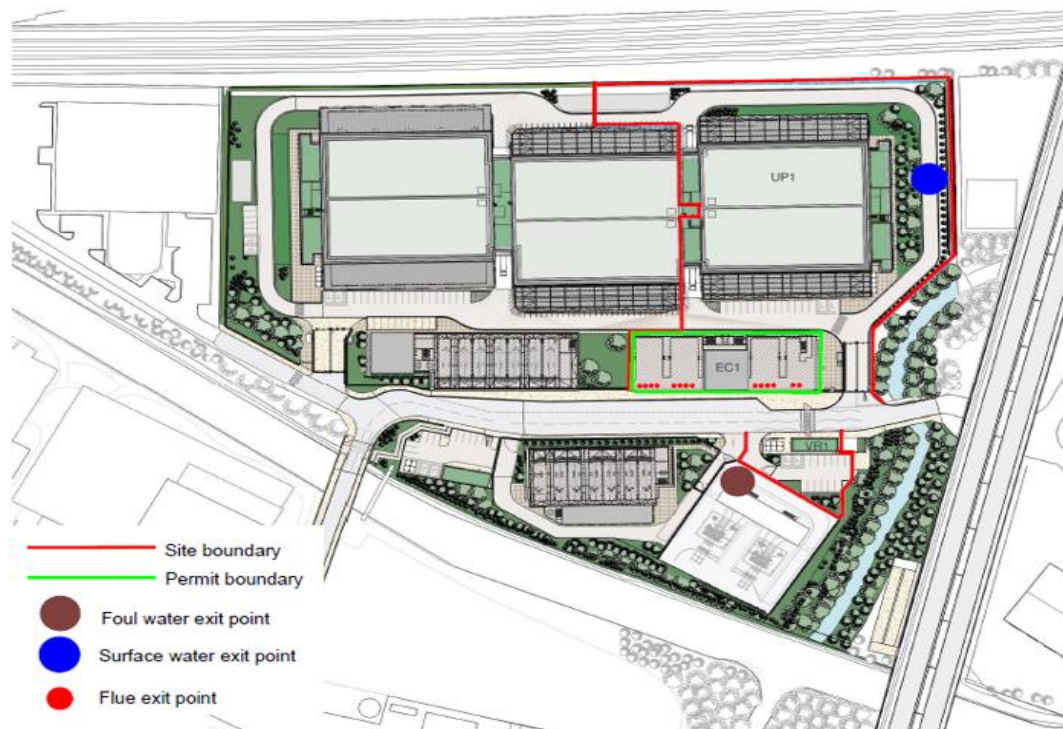


Figure 2.1 : Site Plan showing permit boundary and emissions points

2.2 Site sensitivity

The installation is located within an Air Quality Management Area (AQMA) for NO₂ and near an Air Quality Focus Area (AQFA). As a result, during the planning process, the London Borough of Hillingdon (LBH) required that abatement be implemented on the generators to achieve a NO_x emissions rate of 95mg.m⁻³ (at 5% O₂). In response to this planning requirement, the operator has made significant investment in NO_x abatement technology in the form of Selective Catalytic Reduction (SCR).

2.3 Cumulative impacts

The operator has given consideration of cumulative impacts from the operation of all 3 data centres during planning. Specific focus was given to air quality during the planning process for the entire campus. The Air Quality Assessment (AQA) for planning predicted that "overall impact of the standby generators (during testing and unplanned national grid failure) on local air quality would be not significant".

Despite the above finding, the operators will endeavour to work together to reduce cumulative impacts during normal and abnormal operation of the respective data centres. An example of this would be the intention to reduce operation of the generators so far as reasonably practicable for both maintenance and during an emergency power outage.

2.4 Sensitive receptors

Sensitive receptors are either human/ecological receptors that could potentially be affected by the permitted activities. The sensitive receptors identified as part of this ERA are presented in the tables below.

Table 2.1 Human Receptors

Location / description	X grid ref	Y grid ref
Site drains and sewer systems	various	various
Road pedestrians / foot path users / river users	various	various
Proposed Commercial Units: Nestle Site	510328.41 510204.25 510253.31	179200.16 179266.75 179055.80
Proposed Residential Units: Nestle Site	510144.94 510093.25 510172.16	179311.31 179262.39 179143.77
Guru Nanak School	511216.62	180007.59
Commercial Unit	510346.91	179446.55
Hillingdon Mosque	510237.28	179460.62
Commercial Unit – Tarmac Site	510561.12	179467.86
Commercial Unit	510609.69	179172.95
Commercial Unit	510684.16	179316.38
Residential Dwelling – Copperdale Rd	510336.75	179714.72
Residential Dwelling – Chalfont Rd	510015.84	179619.09
Residential Dwelling – Nestle Avenue	510273.88	178955.31
Residential Dwelling – Nestle Avenue	510099.69	179023.25
Residential Dwelling – Brent Road	511169.41	179247.81
Residential Dwelling – Brent Road	511164.28	179114.12
Proposed Development – Reception	510515.81	179230.41

Table 2.2 Ecological Receptors

Site Name	Distance from Site (m)	Designation	X grid ref	Y grid ref
Yeading Brook and River Crane	<50m		multiple	
South West London Waterbodies	7,205m	SPA	505363	174127
Richmond Park	9,739m	SAC	518540	173833
Priority Orchard	1,100m	Priority Orchard	510068	178240
Priority Woodland	200m	Priority Woodland	510659	179432
Priority Woodland	100m	Priority Woodland	510527	179122
Priority Woodland	400m	Priority Woodland	510125	179080

3.0 METHODOLOGY

3.1 Approach

This ERA has been prepared in accordance with the EAs guidance. This guidance recommends that the following steps are undertaken in preparing a risk assessment:

1. Identify and consider risks for your site, and the sources of the risks.
2. Identify the receptors (people, animals, property and anything else that could be affected by the hazard) at risk from your site.
3. Identify the possible pathways from the sources of the risks to the receptors.
4. Assess risks relevant to your specific activity and check they are acceptable and can be screened out.
5. State what you will do to control risks if they are too high.
6. Submit your risk assessment as part of your permit application.

3.2 Risk scoring

This ERA has been completed using the scoring matrix shown in Table 1 with definitions for each score as follows:

Probability of exposure:

- High – exposure highly likely to occur
- Medium – considered to be likely
- Low – considered to be unlikely
- Very Low – considered to be highly unlikely / very rare event / mitigation in place

Consequence:

- High – potential for significant impact requiring mitigation / remediation
- Medium – potential for moderate impact which may require mitigation / remediation
- Low – negligible impact that may require mitigated
- Very Low – no significant / perceivable impact to receptor

Table 3.1 – Risk Matrix

	Probability of exposure / Likelihood			
Consequence	High	Medium	Low	Very Low
High	High	High	Medium	Low
Medium	High	Medium	Medium	Low
Low	Medium	Medium	Low	Very low
Very low	Low	Low	Very low	Very low

4.0 RISKS IDENTIFIED

Using the guidance and approach outlined above, the following have been deemed to be identified as potential environmental risks which have the potential to cause harm as a result of operating the installation / accidents.

- Controlled releases to air
- Accidents
- Odour
- Noise and Vibration
- Fugitive Emissions (from uncontrolled sources)
- Visible emissions
- Global warming potential
- Waste
- Water discharges

Section 5.0 presents the risk assessment for each of the above including identification of the potential hazard, receptors, pathway, risk management practices, probability of exposure, consequence of exposure and overall risk.

5.0 RISK ASSESSMENT

5.1 Controlled releases to air

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Point source emissions to air- NO _x , CO, SO ₂ , PM ₁₀ emissions from generator stacks	Employees, local residents, and adjacent premises / pedestrians / road users immediately surrounding the installation.	Airborne	<p>An Air Quality impact assessment & Dispersion model has been completed and submitted as part of the permit application ("Air Quality Assessment v2). This report concluded that the "the proposed development's impacts were not anticipated to have an overall significant effect on local air quality." Please refer to Air Quality Assessment v2.2 for further details.</p> <p>The generators are emergency standby plant designed to provide power in the event of grid failure. A report on the electrical supply to the site has confirmed that grid reliability is approx. 99.999605% (please see "grid reliability letter"). This equates to approx. 22mins of downtime per year. No grid outages from the supplying substation have been reported to date and there is no Distribution Network Operator (DNO). As such a grid outage is considered to be a highly rare event. Operation is therefore likely to be limited to testing and maintenance for approx. 20 hours / generator / year.</p> <p>All generators have been fitted with Selective Catalytic Reduction (SCR) to reduce NO_x to 95mgNm³ (at 5% O₂) The flues / stacks for all generators terminate vertically at approx. 23m, above building height at 21.1m.</p> <p>The data centre is located within an Air Quality Management Area where the Local Planning Authority has a particular concern with air quality. The emissions will be significantly lower than a normal operating permit for data centres with standby generators due to the requirements of the local planning authority.</p> <p>Where possible the operator will seek to minimise the frequency of generator runs, test outside of 'rush-hour' and stagger testing so generators are likely to be tested individually rather than testing all generators simultaneously.</p> <p>The complaints procedure will be followed in the event the site receives an Air Quality complaint relating to the generators.</p>	<p>Low – maintenance and testing</p> <p>Very low – grid failure</p>	<p>Emissions to air have an adverse impact to human health and ecological receptors in surrounding areas.</p>	<p>Low – maintenance and testing</p> <p>low – grid failure</p>

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
			<p>Once the site is operational there are plans to implement an Air Quality management plan (AQMP) which is intended to control exposure in the event of grid failure and to notify sensitive receptors/ the EA in the event of a prolonged grid outage (e.g. generators operate over several hours). This will be based on the air dispersion model findings and will likely include observations on the current weather conditions/ wind direction/ time of day/ day of the week and the likely impact on local air quality.</p>			

5.2 Accidents

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Accidents relating to fuel storage e.g. Spills, overfilling during refuelling / disposal / transfers, failure in secondary containment, pipe ruptures, valve failure, user error, collision.	Groundwater, surface water, sewer system, soils.	Land/ water	<p>Generators and associated diesel tanks located internal to main Energy Centre building. Tanks and pipework will be banded to 110% and fitted with leak detection and high-level alarms to prevent overfilling. This reduces the risk of accidental impact, theft, vandalism and fugitive emissions.</p> <p>Main risk is during refuelling activities which as discussed are rare events given the standby nature of the generators (0-3 deliveries per year). Dedicated drainage interceptors / separators to be installed acting as tertiary containment to prevent spilled fuel entering surface waters. Inspected regularly.</p> <p>Spill kits (including drain covers) in close proximity of fuel storage and fill points. Drip trays to capture spillages from fill points and associated pipework.</p> <p>Fuel delivery, Emergency preparedness and spill response procedures to be implemented once site operational. Suppliers to adhere to procedures. Deliveries to be carried out by competent individual(s) and supervised by site staff.</p> <p>PPM regime to include visual checks for leaks / spills. Hazardous waste to be disposed of by licenced carrier with duty of care information retained as evidence.</p> <p>Surrounding area covered in good quality hardstanding. For more information see drainage plan submitted with the application, identifying foul / surface water drains.</p>	<p>Very low – bulk tanks</p> <p>Low – refuelling</p>	Leaks of fuel or other substances associated with site operations into the surrounding environment can cause adverse impacts to the ground water course as well as adjacent water courses.	<p>Very low – bulk tanks</p> <p>Medium – refuelling</p>

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Flooding of drainage network and generators.	Groundwater, surface water, sewer system	Floodwater, surface waters, drainage system etc	<p>A Flood Risk Assessment has been completed as part of the development of the site drainage strategy. This concluded that the site is predominantly located within a Flood Zone 1 area which is deemed to have less than a 1 in 1000 (0.1%) chance of river or tidal flooding. Other Sources of flooding have been investigated and are considered to be low risk (see drainage plan submitted with application).</p> <p>The generators and their fuel tanks are located internal to the Energy Centre building which will provide some level of protection from surface water flooding.</p> <p>Emergency procedures (amongst others) are to be developed and implemented once the site is operational.</p>	low	Flooding / water damage to the generators could impact resiliency for operations.	Medium
Fire	Emissions to Air / Water	Air & Water	<p>Prior to the site becoming operational, all generator enclosures will be fitted with fire detection systems. ,Generators and tanks are to be fitted with valves that will automatically shut in the event of a fire shutting off the fuel supply.</p> <p>Fire suppression systems will rely on mains water to extinguish fires. In the unlikely event of a fire, there is potential for fire water from either site suppression systems / emergency services to enter the environment and cause harm. Emergency preparedness and response plans are to be produced once the site is operational to mitigate this risk.</p>	Very low	<p>Fire would also cause emissions to air, having an adverse impact to local environment and receptors.</p> <p>Firewater could infiltrate local water courses, adversely impacting the local environment.</p>	Very low
Vandalism	Land / Surface Water / Ground Water / Air	Drainage systems, air, surface	Once the site is fully operational it will be manned 365 days a year with monitoring by security staff from a security office using an extensive CCTV system. Entry and exit to the site will be tightly controlled via a security gate and turnstiles. The ~2.5m palisade security fence will act as an impenetrable perimeter to prevent unauthorised access to the site.	Very low	Damage arising from vandalism to the generators / storage tanks could impact emergency back-up potential	Very low

5.3 Odour

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Odour from storage and combustion of fuel	Employees & local residents	Airborne	<p>The fuel tanks are located internal to the Energy Centre building in sealed bulk / day tanks. Emissions are not expected to be significant, and an odour Management Plan is not required.</p> <p>The complaints procedure will be followed in the event the site receives an odour complaint relating to the permitted activities.</p>	Very low	Nuisance to on site staff and local residents. May lead to complaints.	Very low

5.4 Noise and Vibration

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Noise and Vibration from start-up and operation of generators	Employees, local residents, and adjacent premises / pedestrians / road users immediately surrounding the installation.	Air	<p>A noise impact assessment has been completed and submitted as part of the permit application ("Noise Impact Assessment v1"). This report concluded that the "noise levels are predicted to achieve the noise limits at the nearest noise sensitive properties." Please refer to this report for further details.</p> <p>Generators are located internal to the main Energy centre building which provides extensive noise attenuation. The flues / stacks for all generators terminate vertically at approx. 23m, above building height at 21.1m.</p> <p>The generators are emergency standby plant designed to provide power in the event of grid failure. This is a highly rare event given grid reliability. As such, annual operation is likely to be limited to testing and maintenance for approx. 20 hours / generator.</p> <p>Generators are to be maintained in accordance with manufacturer guidelines as part of a planned preventative maintenance (PPM) regime.</p> <p>The complaints procedure will be followed in the event the site receives a noise complaint relating to the generators.</p>	<p>Low – maintenance and testing</p> <p>Very low – grid failure</p>	<p>Complaints from local residences.</p> <p>Potential harm to human health due to elevated noise levels.</p>	<p>Low – maintenance and testing</p> <p>low – grid failure</p>

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Noise from site traffic e.g. fuel deliveries	Employees, local residents, and adjacent premises / pedestrians / road users immediately surrounding the installation.	Air	The generators are emergency standby plant that is operated infrequently as discussed above. As such fuel consumption is low meaning fuel deliveries are infrequent e.g. 0-3 deliveries per year. In reality the site may have no deliveries in a year therefore noise from associated traffic is not expected to be significant.	Low	Complaints from local residences. Potential harm to human health due to elevated noise levels.	Very low

5.5 Fugitive Emissions (from uncontrolled sources)

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Fuel spills during refuelling / leaks / accidents e.g. damaged tanks / pipework.	Groundwater, surface water, sewer system, soils.	Surface run off / surface waters via drainage or vertical leaching.	<p>Generators and associated diesel tanks located internal to main Energy Centre building, this reduces the risk of accidental impact, theft, vandalism Tanks and pipework are to be bunded to 110% and fitted with leak detection and high-level alarms to prevent overfilling.</p> <p>Main risk is during refuelling activities which as discussed are rare events given the standby nature of the generators (0-3 deliveries per year). Dedicated drainage interceptors / separators to be installed acting as tertiary containment to prevent spilt fuel entering surface waters. Inspected regularly.</p> <p>Spill kits (including drain covers) in close proximity of fuel storage and fill points. Drip trays to capture spillages from fill points and associated pipework.</p> <p>Fuel delivery, Emergency preparedness and spill response procedures to be implemented once site operational. Suppliers to adhere to procedures. Deliveries to be carried out by competent individual(s) and supervised by site staff.</p> <p>PPM regime to include visual checks for leaks / spills. Hazardous waste to be disposed of by licenced carrier with duty of care information retained as evidence.</p> <p>Surrounding area covered in good quality hardstanding. Drainage plan available identifying foul / surface water drains.</p>	<p>Very low – bulk tanks</p> <p>Low – refuelling</p>	Leaks of fuel or other substances associated with permitted installation into the surrounding environment can cause adverse impacts to the ground water as well as adjacent water ways.	<p>Very low – bulk tanks</p> <p>Medium – refuelling</p>

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
VOCs / fumes from storage / delivery of fuel	Employees & local residents,	Air	The fuel tanks are located internal to the Energy Centre building in sealed bulk / day tanks. Emissions are not expected to be significant. Fuel tank filling will be carried out by trained fuel tanker drivers. This removes any significant risk of vapour release and spillages during deliveries.	Very low	Emissions to air have an adverse impact to human health and ecological receptors in surrounding areas.	Very low

5.6 Visible emissions

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Visible Emissions from generator stacks	Local residents	Visual	Smoke may be visible during the first 10-15s of operation as the engine starts up. After this time visible plumes are not anticipated due to high exhaust temperatures (approx. 450°C). Visible emissions after this time are to be investigated as part of generator maintenance. Plumes may not be visible due to line of sight, weather conditions, and the timing of generator operation as tests may be outside of working hours. They may also be infrequent therefore are not considered to be likely / significant. The installation of SCR, the site's PPM regime and regular fuel polishing is intended to remove impurities, and to help ensure the engine burns as cleanly as practicable to reduce visible emissions. The complaints procedure will be followed in the event the site receives complaints relating to the visible emissions from the generators.	Low	Potential visual impacts, particularly during the generator start-up.	Very low

5.7 Global warming potential

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Global Warming Potential from combustion of fuel by generators	Global population	Airborne	The generators are emergency standby plant designed to provide power in the event of grid failure. This is a highly rare event given grid reliability. As such, annual operation is likely to be limited to testing and maintenance for approx. 20 hours / generator. This level of operation is not considered to provide a significant impact. A climate change risk assessment has been submitted as part of the application for a permit.	Very low	Contribute to climate change, due to increase in greenhouse gases present in the atmosphere.	Very low

5.8

Waste

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Waste associated with generators e.g. waste fuels, oil sorbents and rags, lubricants & hydraulic fuels, solid wastes (air filters, packaging and spare parts) and end of life plant.	Ground, soil, ground water, surface water, sewer system.	Land/ water	<p>Small quantities of wastes may be generated from routine maintenance activities or in the event of a spillage/leakage. This is likely to be low given the standby nature of the generators.</p> <p>Once the site is operation, procedures for licenced and responsible collection of any waste oils and other hazardous wastes are due to be implemented. This will require appropriate waste containers are to be suitably located to capture the various waste streams and for waste to be uplifted by a suitable waste carrier, and duty of care information retained as evidence.</p>	Very low	Potential to contaminate water/ land.	Very low

6.0 CONCLUSION

This ERA has identified and assessed the potential risks and hazards associated with the operation of the facility and from accidents.

Various measures have been taken to help reduce to mitigate against these as far as reasonably practicable and to a level considered to be acceptable for a Datacentre Facility of this size, nature and location.