Linmere Island Data Centre Environmental Permit Application

Environmental Risk Assessment

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1. Introduction

1.1 Overview

This Report has been produced by Ove Arup & Partners Limited (Arup) on behalf of Amazon Data Services UK Limited ('Amazon'), to accompany a bespoke application for an Environmental Permit (EP) for a data centre in Houghton Regis, Luton (herein referred to as the 'Proposed Development'). The Proposed Development will connect to the Sundon UK Power Networks (UKPN) substation via a new electrical connection.

The Site is largely greenfield and forms part of a wider masterplan for a strategic mixed-use development known as 'Houghton Regis North 1'. The strategic development is subject to an extant outline planning consent (Central Bedfordshire Council reference CB/12/03613/OUT).

A future detailed planning application will seek permission for the Proposed Development under the Town and Country Planning Act 1990, as amended.

Amazon seek to gain a bespoke environmental permit for the operation of standby generators required in the event of loss of power from the grid to power the Data Centre. The EP for the Site comprises the emergency back-up generation facility and the directly associated activities only, and therefore the EP is not for the whole of the Data Centre.

The application is made by Amazon Data Services UK Limited (Amazon) which is the legal entity that will be responsible for operating the generating installation.

The purpose of the Environmental Risk Assessment (ERA) is to identify any potential significant risks to the environment that may be associated with the proposed operations at the Data Centre and demonstrate that the associated risks will be acceptable once the proposed mitigation and management are accounted for.

1.2 Assessment Approach

Risk assessments are an effective tool for identifying potentially hazardous or polluting consequences of activities and providing mitigation systems that reduce the risk of those activities causing pollution.

The assessment aim is to reduce the potential risk of emissions from the facility or the impact of the emissions on the environment, through specific mitigation measures identified for each specific risk.

The assessment has been completed in accordance with the Environment Agency's Technical Guidance 'Risk Assessments for your Environment Permit'[1] dated August 2022, using the following approach:

- Identify and consider risks for your Site, and the sources of risks;
- Identify potential receptors which could be affected;
- Identify pathways from the sources of risks to the receptors;
- State and risk control measures; and
- Assess risks relevant to the activities and whether they can be screened out or need further detailed assessment.

1.3 Identifying Risks

The risk assessment approach is based on the potential frequency or probability of the event occurring and the resulting consequence or potential effect of the event on the environment.

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

These potential risks however are considered following the implementation of effective controls or mitigation to limit the potential for emissions and/or impacts. Once all of these factors are considered, the overall risk is the residual risk of any impact from the emission, following the mitigation.

As a result, assessment of the following aspects is required, where applicable:

- Risks from emissions to air;
- Risks to surface water from hazardous pollutants;
- Risks to surface water from sanitary and other pollutants;
- Risks to groundwater;
- Noise and vibration;
- Odour;
- Accidents and fugitive emissions;
- Global Warming Impact; and
- Installations must also decide how to treat, recycle or dispose of waste.

2. The Site

2.1 Overview

The Site is located in Houghton Regis, Luton and is bound to the east by A5505 Woodside Link, to the south by B5790 Chantry Way and to the west by B5790 Sundon Road. Immediately to the north of the Site is a small area of greenfield land, which is located between the Site and the A5 Dunstable Northern Bypass.

The surrounding area is characterised by a mix of warehouse/industrial and residential uses that are currently under development or recently built. There is a public park to the west, a supermarket to the south, and a Lidl Distribution Centre to the east.

Several major roads are located in proximity to the Site, including the M1 approximately 200m to the north-east and the A5 Dunstable Northern Bypass approximately 50m to the north.

The Site forms part of a wider network of Sites that comprise a strategic mixed-use development for the area, known as ‘HRN1’ (Horton Regis North 1) or “Linmere”.

The Proposed Development will connect to the Sundon UKPN substation, approximately 1.5km to the north of the Site, via a new underground electrical connection.

Detailed ground investigations were carried out on the Site in 2022. The corresponding interpretive reports are Appended to the EP application Site Condition Report (302321-ARP-XX-XX-RP-Z-1004).

Figure 1: Site Location Plan

2.2 Geology, Hydrogeology and Hydrology

2.2.1 Geology

According to the British Geological Survey (BGS) Geology map of Britain[2] no superficial deposits data is available for the western side of the Site; however the eastern side is underlaid by Lowestoft Formation and Glaciofluvial Deposits in the southeastern corner of the Site. Geological data obtained through ground investigation show there to be made ground over large areas of the Site primarily comprising grey gravelly silty fine to coarse sand (see Site Condition Report for this EP Application).

British Geological Survey (BGS) Geology map of Britain shows the bedrock geology for the western side of the Site to be West Melbury Marly Chalk Formation, with a narrow band of Totternhoe Stone Member (Chalk) and Zig Zag Chalk Formation underneath the eastern side of the Site.

A summary of the geological data recorded during the 2022 Ground Investigations works on the Site is shown in Table 2-1.

Table 2-1: Summary of geology underlying the Site (Ground Investigations, 2022)

Stratum	Typical top of stratum (mbgl)	Thickness (m)	Typical description/formation
Topsoil	0	0.4	Dark brown gravelly clayey silt with occasional pockets of dark brown clav and rootlets. Gravel comprises angular to subrounded fine to coarse flint and chalk fragments.
Made Ground [2]	0	0 – 1.9	Grey gravelly silty fine to coarse sand. Gravel comprises angular to subrounded fine to coarse asphalt, granite, chalk fragments, 1No rope, plastic piece and 1No work glove. Dark orangish slightly sandy slightly gravelly clayey silt with occasional pockets of brown slightly sandy silty clav and rootlets. Gravel comprises angular to subangular fine to coarse flint. brick, concrete, granite and clinker fragments. Sand is fine to coarse. Vegetation over soft to firm, dark brown slightly gravelly sandy silty clay with occasional shell and plastic fragments.
Glacial till deposits	0.15 – 0.9	0 – 5.6	Orangish brown and white slightly clayey sandy gravel with low flint cobble content. Gravel comprises angular to rounded fine to coarse flint and chalk fragments. Brown slightly clayey very gravelly silty fine to coarse sand with occasional pockets of brown silty clay and shell fragments. Gravel comprises angular to subrounded fine to coarse flint and chalk fragments. Brown and white slightly clayey silt with occasional pockets of brown silty clay. Gravel comprises angular to subangular fine to coarse flint and chalk fragments. Light brown slightly gravelly silty clay. Gravel is angular to subangular chalk.
Weathered light grey Chalk (structureless)	0 - 7.1	0 – 4.7	Brown and white chalk recovered as: angular to subrounded fine to coarse flint and chalk gravel. Light brown and white chalk recovered as: Slightly sandy gravelly calcareous SILT with occasional pockets of iron stained Silt. Gravel is angular to Subangular fine to coarse chalk.
Light grey Chalk	0.6 – 7.2	3.9 – 8.3	Weak, medium density light grey chalk with occasional shell fragments and brown and dark grey staining. Fractures closely to

[2] British Geological Survey (no date) *GeoIndex Onshore – bedrock geology*. [Online] Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.50698345.1154182254.1717081573-233619999.1717081573

Stratum	Typical top of stratum (mbgl)	Thickness (m)	Typical description/formation
Grey Chalk	6.5 – 14.8	Not proven[1]	medium spaced, sub-horizontal, partly open, undulating, rough with frequent dark brown staining. Light grey chalk recovered as: gravel and cobbles. Gravel is extremely weak to very weak, low to medium density light grey fine to coarse chalk fragments with rare yellowish-brown Staining and dark grey specks. Cobbles are medium strong, high density chalk fragments with occasional dark grey and yellowish-brown discoloration. Light grey chalk recovered as: sandy gravelly calcareous silt.

[1] This means that the extent of the grey chalk below ground level was not determined during the GI.

[2] Most of the Made Ground is less than 0.9m thick but was 1.9m thick at BH2 located in the south east of the Site, this does not include soil embankment located to the north of the Site.

2.2.2 Hydrogeology

Information from the BGS GeoIndex Onshore mapping[2] and the Environment Agency indicates that the hydrogeology of the Site comprises of superficial aquifers and a bedrock aquifer, including:

- Lowestoft Formation – Diamicton which is a Secondary Undifferentiated superficial aquifer;
- Glaciofluvial Deposits, Mid Pleistocene – Sand and Gravel which is a Secondary A superficial aquifer; and
- Chalk bedrock aquifer, which is the principal aquifer on Site, composed of 3 groups of Chalk. Zig Zag Chalk Formation and Melbourn Rock Member forming the bedrock in the eastern half of Site, and west Melbury Marly Chalk Formation forming the bedrock in the western half of Site.

Department for Environment, Food and Rural Affairs (Defra) MAGIC mapping[3] and the Central Bedfordshire Council Level 1 Strategic Flood Risk Assessment (SFRA)[4] shows that the Site is not within a Source Protection Zone (SPZ). The closest SPZ is a Zone III (total catchment), which comes within 50 m of the southeast corner of the Site. The closest Zone II (outer) SPZ is approximately 1.9 km southeast of the Site. The closest Zone I (inner) SPZ is approximately 3.8 km southeast of the Site.

2.2.3 Hydrology

According to the EA Flood Map for Planning[5] the Site is located within a Flood Zone 3 with the annual probability of flooding classified as greater than 1 in 100 (1%) for fluvial and tidal flooding.

The Site is located across two catchment areas. The southeast side of the Site is within the Upper Lee catchment and the northwest side is within the Upper and Bedford Ouse Catchment. The nearest surface water feature is a drainage ditch which runs inside the Site boundary. The final point of discharge for the drainage ditch is unknown. The Site is located approximately 25 m north of the Ouzel Brook, an ordinary watercourse. The nearest main river is the Houghton Brook which is approximately 840 m to the southeast of the Site. EA Flood mapping[5] for rivers and seas, and reservoirs indicates the Site is not at risk of flooding from these sources.

[3] Department for Environment, Food and Rural Affairs (no date) MAGIC Map. [Online] Available at: https://magic.defra.gov.uk/MagicMap.aspx (Accessed May 2024)

[4] Central Bedfordshire Council (2017) Level 1 Strategic Flood Risk Assessment. [Online]. Available at: https://centralbedfordshire.oc2.uk/docfiles/12/level_1_sfra.pdf (Accessed May 2024)

[5] Gov.UK Flood Map for Planning. Available at Flood map for planning - GOV.UK (flood-map-for-planning.service.gov.uk)

EA Flood mapping[5] indicates that the Site is located within Flood Zone 1. The annual probability of fluvial floodings is classified as less than 0.1% at this Site. The risk of river flooding is therefore considered to be very low.

2.3 Ecology and Cultural Heritage

2.3.1 Ecology

There are no statutory or non-statutory designated conservation sites or priority habitats within the Site. The Site is isolated from the surrounding landscape by A roads and the M1 motorway.

MAGIC[3] map identified two statutory designated Sites within 2km from the planning application boundary, Sundon Chalk Quarry Site of Special Scientific Interest (SSSI) located approximately 1.06km north of the Site and Fancott Woods and Meadows SSSI located approximately 1.7km north of the Site. There are three non-statutory designated sites within 1km of the Site: Chalton scrub and grassland CWS, River Flit CWS and Sundon Chalk Pits CWS. The closest priority habitat is located 380m from the Site, further separated by the A5.

MAGIC[3] map identified two statutory designated Sites within 2km from the planning application boundary, Sundon Chalk Quarry Site of Special Scientific Interest (SSSI) located approximately 1.06km north of the Site and Fancott Woods and Meadows SSSI located approximately 1.7km north of the Site.

2.3.2 Cultural Heritage

The only designated features within 1km of the Site boundary are Yew Tree Farmhouse, The Willows, Manor Farmhouse, Gostelow House, Barn End and Common Farmhouse. These Grade II listed buildings are approximately 500m north-west of the Proposed Development in Chalton. The Proposed Development is not located within a Conservation Area.

2.3.3 Air Quality

The Site is located within the Central Bedfordshire Council authority area, which has three AQMAs, according to the Defra website[6]. However, these AQMAs are not within the 2km study area and the closest AQMA to the Proposed Development is the Luton Borough Council (LBC) Luton AQMA No. 1, which is located approximately 1.2km south-east of the Proposed Development. This AQMA was declared in 2003 for exceedances of the annual mean NO_2 air quality standards. The Luton AQMA No.2 is located approximately 1.8km south-east of the Proposed Development and was declared in 2005 for exceedances of the annual mean for NO_2.

2.4 Sensitive Receptors

A summary of the sensitive receptors with the potential to be affected by the Data Centre are set out in Table 2-2 and Table 2-3 which are displayed in Figure 2: Receptor Plan.

Table 2-2: Human Receptors

ID	Receptor	National Grid Reference		Height (m)
		X	Y	
HR1	Chalton Heights	503208	226155	1.5
HR2	Unnamed Road 1	503613	226047	1.5
HR3	Sundon Road	504067	226163	1.5
HR4	Unnamed Road 2	503137	225364	1.5
HR5	The Chiltern School	503127	225129	1.5

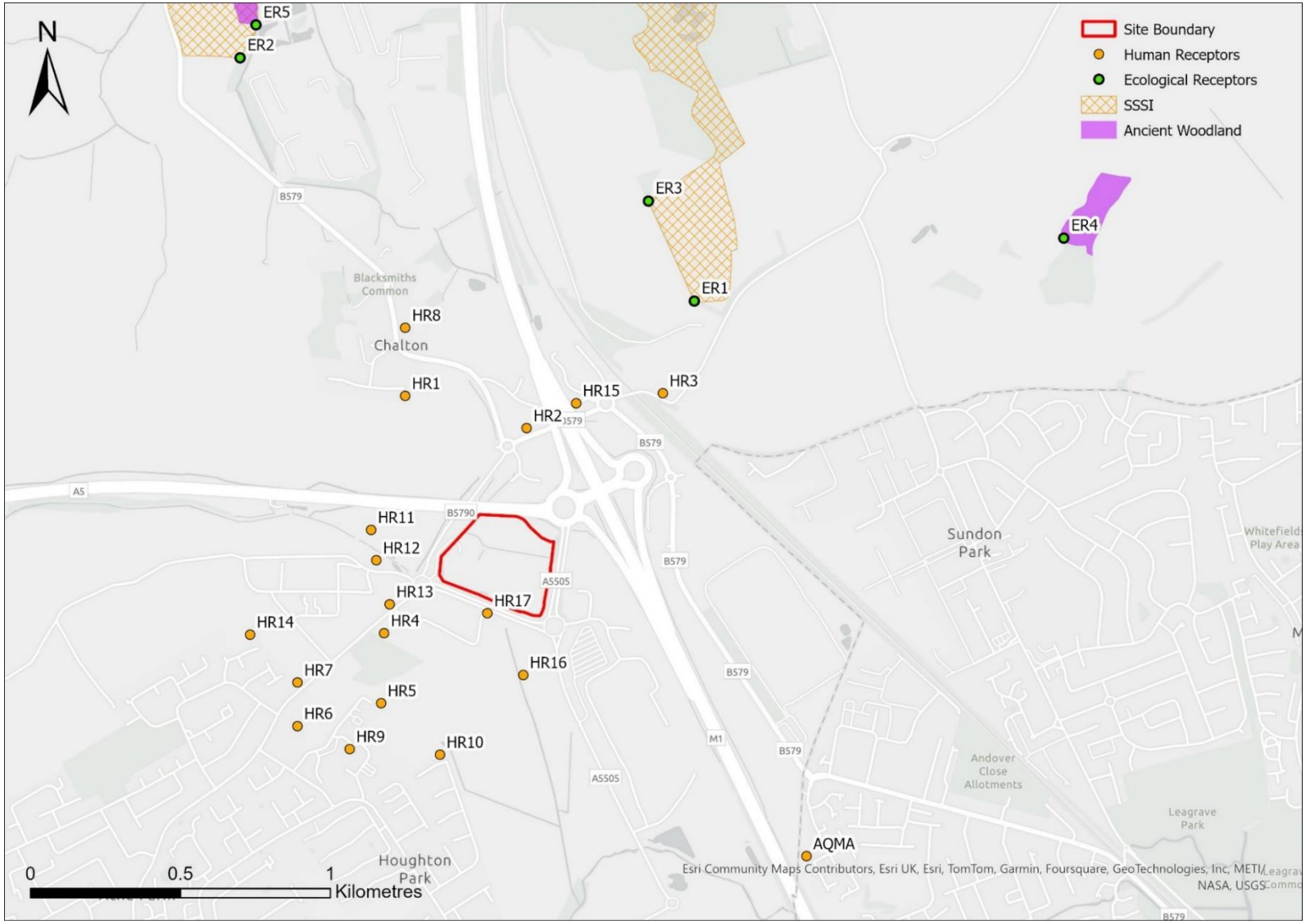
[6] Defra, List of Local Authorities with AQMAs. Available at: https://uk-air.defra.gov.uk/aqma/list [Accessed June 2024]

ID	Receptor	National Grid Reference		Height (m)
		X	Y	
HR6	Haughton Regis School	502849	225054	1.5
HR7	Sundon Road	502849	225199	1.5
HR8	Chalton Lower School	503208	226382	1.5
HR9	Priory Parkside Preschool	503022	224977	1.5
HR10	Houghton Park Road	503323	224959	1.5
HR11	New Receptor 1	503094	225708	1.5
HR12	New Receptor 2	503111	225606	1.5
HR13	New Receptor 3	503156	225460	1.5
HR14	New Receptor 4 – Thornhill Primary School	502690	225359	1.5
HR15	Sundon Feeder Station House	503777	226130	1.5
HR16	New Receptor 5	503601	225224	1.5
HR17	New Receptor 6	503482	225430	1.5
AQMA	Luton AQMA No. 1	504546	224620	1.5

Table 2-3: Ecological Receptors

ID	Receptor	National Grid Reference		Height (m)
		X	Y	
ER1	Sundon Chalk Quarry (SSSI)	504307	226017	0
ER2	Fancott Woods and Meadows (SSSI)	502657	227281	0
ER3	Sundon Chalk Quarry (SSSI)	504018	226804	0
ER4	Ancient Woodland (AW) – unnamed	505404	226681	0
ER5	Fancott Woods and Meadows (AW)	502710	227391	0

Figure 2: Receptor Plan



3. Environmental Risks Assessment

3.1 Overview

The following tables in this section assess the potential risk to receptors from the following hazards, taking into account the measures proposed to reduce those risks.

The method relies on a scoring system that is based on the frequency or probability of the event occurring and the resulting consequence or potential effect of the event on the environment.

Controls or mitigation are also identified in the assessment, which consist of measures or actions that can be carried out to limit the potential for impacts.

The probability of exposure is the likelihood of the receptors being exposed to the hazard, and is defined as low, medium or high. These terms are qualified as follows:

- Low: exposure is unlikely, barriers in place to mitigate against exposure;
- Medium: exposure is fairly probable, barriers to exposure less controllable; and
- High: exposure is probable, direct exposure likely with few barriers.

The aim is it to reduce the risk of fugitive emissions from the facility or the impact of the emissions on the environment, through specific mitigation measures identified for each specific risk.

Control and mitigation measures have been identified for all risks identified in the assessment, based on the Best Available Techniques (BAT) measures set out in the guidelines and on operational experience. The measures specific to each risk are described in the assessment. The mitigation measures will be incorporated into the Site management processes and Site operatives will be made aware of these measures during training.

More general mitigation measures to avoid emissions, in line with indicative BAT standards, are also set out in the relevant sections of the Summary Technical Report (302321-ARP-XX-XX-RP-Z-1003).

Figure 3: Risk Assessment Matrix

Consequence	Exposure probability		
	Low	Medium	High
Low	Low Risk	Low Risk	Medium Risk
Medium	Low Risk	Medium Risk	High Risk
High	Medium Risk	High Risk	High Risk

The risk assessment matrix for the climate change adaptation risk assessment in Table 3-9 uses the following matrix:

Table 3-1: Climate Change Adaptation Risk Assessment Matrix

Risk Assessment	Definition	Score Range
Frequency (or probability)	Describes the likelihood of the event occurring.	1 (least frequent) – 6 (most frequent)
Consequence	Describes the potential effect of the event on the environment.	1 (least consequent) – 6 (most consequent)
Risk	Risk is frequency multiplied by consequence.	1 – 36 (36 greatest risk)

3.2 Primary Risks

The primary risks to the environment as a result of the Installation are considered to be from emissions to air as a result of the generator use, together with the potential for leaks from associated fuel tanks and delivery systems to water and land. These items are set out in the tables below in Section 3.5.

Other potential environmental Risks such as Noise and Vibration, Odour, Accidents and fugitive emissions, Global Warming Impact and Climate Change.

3.3 Emissions to Water

There are no point source emissions to and from the generators or associated fuel storage.

3.4 Waste Generation

There will be no industrial waste generated on-site and therefore it is not discussed any further in this risk assessment.

Minimal solid waste generation is anticipated on Site. In general staff will only be required on Site during testing and routine inspections. All staff will be trained in waste management procedures by their supervisors.

All wastes produced during maintenance tasks will be immediately removed by vendors (specialist contractors) from the installation following completion of the relevant maintenance task.

3.5 Risk Assessment Tables

The following section contains the assessment tables following the EA's risk assessment approach for potential factors which could cause environmental impact.

Table 3-2: Emissions to air

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Emissions from generator stacks during routine maintenance/testing; emergency outage	Receptors listed in Table 2-2 and Table 2-3	Air	A detailed air quality assessment has been undertaken and is provided as part of the EP Application (see 302321-ARP-XX-XX-RP-Z-1006). The assessment looks at both routine testing and emergency scenarios (a single event where 42 generators will operate simultaneously at 100% load, 8760 hours per year) and concludes no significant impacts are likely as a result of the operation of the generators. A planned testing and maintenance regime is for a total of 29 hours per year per generator, which is below the designated 50 hours per generator, and well below the 500 hours per generator as per the MCPD. A stack height assessment was undertaken as part of the design process where the height of 25m was considered the best solution to minimise the potential impacts. The generators have been assessed and are considered to be in-line with BAT (see Summary Technical Report 302321-ARP-XX-XX-RP-Z-1003) meeting the TA Luft 2g equivalent emission limits. Monitoring ports will be installed on the stacks to allow for flue gas measurements. Plant will be maintained in line with manufacturer's recommendations. This includes checking for deterioration of plant conditions. Repairs will be undertaken as appropriate to rectify any identified defects. Where an emergency scenario occurs, the local authority and EA will be informed immediately.	Low due to chosen generator and stack height and limited operational hours and regular maintenance.	Low adverse impact on human health and ecological receptors in surrounding area.	Low
Visible generator emissions during start-up	Receptors listed in Table 2-2 and Table 2-3	Air	Plant will be maintained in line with manufacturer's recommendations. This includes checking for deterioration of plant conditions. Repairs will be undertaken as appropriate to rectify any identified defects. The operator will implement visual checks for visible emissions from the generators during start up.	Low due to limited operational hours and regular maintenance.	Low adverse impact on human health and ecological receptors in surrounding area.	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
			Visible plumes are not anticipated to occur for the majority of the time the generators are in use due to the diesel being combusted and resulting high exhaust gas temperatures. The engines will not be in operation the majority of the year when there would be zero visible plume during this time. Any visible plumes observed during normal operation will be reported and investigated.			

Table 3-3: Fugitive emissions

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
To air						
Vapour release through leakages from fuel tanks and pipes during fuel delivery	On-site staff and receptors listed in Table 2-2 and Table 2-3	Air	All tanks, pipes and valves are designed to appropriate industry standards and flanged connections between pipes are kept to a minimum by the proximity of the tanker fill point which are located within designated laybys adjacent to the fill points. There will be a combination of above and below ground transport fuel lines. Any below ground transport fuel lines will be double piped and be fitted with leak detection. Above ground pipelines will be single piped but situation as close as possible to building perimeters. The Operator will carry out regular checks for signs of leakage. All tanks, silos, pipes and valves have a preventative maintenance programme to ensure ongoing integrity and effectiveness. Fuel tank filing will be carried out by trained fuel tanker drivers. This removes any significant risk of vapour release and spillages during deliveries. The fuel tanks will be fitted with vents however these will only allow minimal potential for fumes to escape. No other oils will be stored on site. Lubricating oil is present within the generators, but this will be within a closed loop system with no emissions.	Low due to design and on-site management processes.	Low adverse impact on human health and ecological receptors in surrounding area.	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Dust generating activities or dusty materials	Off-Site receptors identified in Table 2-2 and Table 2-3.	Air	There are no significant dust generating activities or dusty materials used or stored within the installation. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Low due to design and on-site management processes.	Low adverse impact on human health and ecological receptors in surrounding area.	Low
To water and land						
Spillage of waste, fuels or other materials	Water / Land	Surface water / ground water	All fuel storage tanks are enclosed and integrally bunded to 110% to contain any spills / tank failure and will have internal means of leak detection. All tanks, pipes and valves are designed to appropriate industry standards. There will be a combination of above and below ground transport fuel lines. Any below ground transport fuel lines will be double piped and be fitted with leak detection. Above ground pipelines will be single piped but situation as close as possible to building perimeters. The Operator will carry out regular checks for signs of leakage. The Operator will carry out regular checks for signs of leakage. Both of the refuelling laybys will have a dedicated drainage system containing full retention oil separators with a capacity of 10,000 litres before ultimately joining the foul water system sent to sewer. The drainage serving the generator areas and any surfacing beneath above ground fuel transport lines will be directed towards the attenuation pond. The attenuation pond will be lined with an impermeable liner to prevent infiltration. Once the surface water passes through the attenuation pond it will pass through an oil separator controlled by a flow device before ultimately leaving the site. All tanks, pipes and valves have a preventative maintenance programme to ensure ongoing integrity and effectiveness. High standards of housekeeping will be maintained across the Site. Fuel tank filing will be carried out by trained fuel tanker drivers. This removes any significant risk of vapour release and spillages during deliveries.	Low due to design and on-site management processes.	Medium adverse impact on ground / water courses	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
			Trained personnel will ensure that any spills are cleaned as soon as practicably with the correct safety measures being taken. In the event of a spill within the refuelling laybys spill kits will be available to deal with any spills/leaks. Relevant spill response equipment will be situated at various locations around the Site designed for the particular hazard characteristics of the materials (fuel) present. All spillages will be logged, investigated and corrective action will be taken.			
Leaks from tanks, containers or pipework	Water / Land	Surface water /groundwater	All fuel storage tanks are enclosed and internally bunded to 110% to contain any spills / tank failure and will have internal means of leak detection. All tanks, pipes and valves are designed to appropriate industry standards and flanged connections between pipes are kept to a minimum by the proximity of the tanker fill point. There will be a combination of above and below ground transport fuel lines. Any below ground transport fuel lines will be double piped and be fitted with leak detection. Above ground pipelines will be single piped but situation as close as possible to building perimeters. The Operator will carry out regular checks for signs of leakage. Both of the refuelling laybys will have a dedicated drainage system containing full retention oil separators with a capacity of 10,000 litres before ultimately joining the foul water system sent to sewer. The drainage serving the generator areas and any surfacing beneath above ground fuel transport lines will be directed towards the attenuation pond. The attenuation pond will be lined with an impermeable liner to prevent infiltration. Once the surface water passes through the attenuation pond it will pass through an oi separator controlled by a flow device before ultimately leaving the site. before ultimately joining the foul water system sent to sewer. Fuel tank filing will be carried out by trained fuel tanker drivers; this removes any significant risk of spillages and leaks. The operator will carry out daily checks for signs of leakage.	Low due to design and on-site management processes	Medium adverse impact on groundwater / water courses	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
			The risk of fuel escaping from the storage of oil is therefore considered to be minimal. In the event fuel does escape containment a spill procedure will be implemented Relevant spill response equipment will be situated at various locations around the Site designed for the particular hazard characteristics of the materials (fuel) present. All spillages will be logged, investigated and corrective action will be taken.			

Table 3-4: Nuisances

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
To water and land						
Mud/litter carried onto highway	Water / Land	Public	All internal roads, storage and processing areas will be hard-surfaced with concrete or tarmac and swept when required.	Low due to design and on-site management processes	Low adverse impact on ground and water courses.	Low
Pest, vermin and scavengers	Land	Staff and Public	Waste that is likely to attract pests, vermin and scavengers will be transferred to the main waste handling area. The facility will contract a local specialised company to implement a pest control management plan. This will include vermin, flies and birds.	Low due to design and on-site management processes	Low adverse impact on ground	Low
Waste generation	Land	Staff and Public	Minimal solid waste generation is anticipated on Site. In general staff will only be required on Site during testing and routine inspections. All staff will be trained in waste management procedures by their supervisors. All wastes produced during maintenance tasks will be immediately removed by vendors (specialist contractors) from the installation following completion of the relevant maintenance task.	Low due to design and on-site management processes	Low adverse impact on ground	Low

Table 3-5: Noise

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Noise from operation of generators during routine maintenance / testing; emergency power outage	On-site staff and receptors listed in Table 2-2 and Table 2-3	Air	Each generator exhaust outlet will have a silencer. Each generator cooling air discharge outlet will have a 900mm long attenuator. The noise assessment found that for 'normal' and 'generator testing' operational scenarios, the results show that predicted plant noise would not exceed the noise limits during the day and night-time periods at the nearest sensitive receptors. Routine testing and maintenance would also only occur during the day-time hours. Plant will be maintained in line with manufacturer's recommendations. This includes checking for deterioration of plant conditions (e.g. bearings becoming worn). Repairs will be undertaken as appropriate to rectify any identified defects. Under an emergency scenario predicted sound levels at the closest residential areas to the south around the assessment locations exceed the day and night-time noise limits by 3dB. All generators would only become operational during a power outage across the whole site. Therefore, given the rarity, potential scale and assumed short term duration of such an event, plant noise arising from the proposed data centre in this context, is not expected to cause a significant adverse impact at the nearest sensitive receptors.	Low due to design mitigation, limited operational hours and regular maintenance.	Statutory nuisance - low	Low
Noise from vehicles delivering fuel	On-site staff and receptors listed in Table 2-2 and Table 2-3	Air	Heavy Goods Vehicle reversing will be minimised where possible. Fuel deliveries will be in daytime working hours to minimize potential disturbances out of hours. Engines will be switched off when not in use. Personnel responsible for the generator installation will be part of the staffing of the wider Data storage installation Site therefore there will be no additional staff vehicle movements over and above those employed within the adjacent Data Centre. Additional vehicle movements will be associated with planned maintenance and deliveries which will take place during normal working hours. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring if necessary.	Low due to design and on-site management processes	Statutory Nuisance - low	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Vibration from the installation	On-site staff and receptors listed in Table 2-2 and Table 2-3	Ground	Significant vibration effects are not anticipated for the installation. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Low due to design mitigation, limited operational hours and regular maintenance	Statutory Nuisance - low	Low

Table 3-6: Odour

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Odour from the loading and storage of fuel	On-Site staff. Receptors listed in Table 2-2 and Table 2-3	Air	Fuel tank filing will be carried out by trained fuel tanker drivers. Staff training will include raising employee awareness with respect to normal plant operational odour levels and actions to be taken to rectify any faults.	Low due to design and on-site management processes	Statutory Nuisance - low	Low
Odour release from generator	On-Site staff. Receptors listed in Table 2-2 and Table 2-3	Air	Regular maintenance of the generators will reduce the level of emissions from the combustion process.	Low due to design and on-site management processes	Statutory Nuisance - low	Low

Table 3-7: Accidental Releases

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Fuel delivery						

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Major vehicle accident – leading to significant loss of fuel	On-Site staff. Receptors listed in Table 2-2 and Table 2-3	Air Ground Water	Traffic entering Site will be managed by the reception. The internal road layout is designed to accommodate the vehicles that will visit the facility. Junction radii, carriageway widths and layouts are designed to minimise the risk of vehicle conflicts. The use of mobile phones will be prohibited during driving. Drainage will be regularly maintained to keep standing water off roads and Site roads will be cleaned regularly to remove any scum, oils etc.	Low due to design and on-site management processes	Medium adverse impact on air / ground / water courses	Low
Fuel tanks overfill	On-Site staff. Receptors listed in Table 2-2 and Table 2-3	Groundwater	All tanks, pipes and valves are designed to appropriate industry standards and flanged connections between pipes are kept to a minimum by the proximity of the tanker fill point. The design will include a high level alarm to prevent the central fill tank from overfilling. There will be a combination of above and below ground transport fuel lines. Any below ground transport fuel lines will be double piped and be fitted with leak detection. Above ground pipelines will be single piped but situation as close as possible to building perimeters. The Operator will carry out regular checks for signs of leakage. All fuel tanks will be integrally bunded to a capacity of 110% of the volume of the primary tank and will be fitted with leak detection and alarm. Fuel tank filing will be carried out by trained fuel tanker drivers. This removes any significant risk of spillages and leaks. The operator will carry out regular checks for signs of leakage. Relevant spill response equipment will be situated at various locations around the Site designed for the particular hazard characteristics of the materials (fuel) present. All spillages will be logged, investigated and corrective action will be taken.	Low due to design and on-site management processes	Medium adverse impact on air / ground / water courses	Low
General Site issues						
Fire	On-Site human and	Air Land	In accordance with BS 5410-2: 2018, the generators are located at least 6 m distance from the external wall of the building and 1.8 m from external exit doors to avoid the provision of fire resistance construction for the building elevation or providing any additional	Low due to design and on-site	Medium adverse impact on air / ground / water courses	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
	ecological receptors	Water	fire screens as the total volume of fuel stored is greater than 3,500 litres. Fire hydrants will be located along the internal roads. The Site will benefit from a fire alarm system and associated fire suppression systems inside the Data Centre buildings.	management processes		
Security and vandalism	On-Site human and ecological receptors	Air Land Water	The Site will be secured by a 3m high perimeter fence and security controlled and monitored gates. Access will only be available via a secure entrance requiring reporting to the Site reception. A secondary access is situated on the western side of the site however this is only to be used in the event of an emergency. CCTV equipment and thermal cameras will be positioned around the Site mounted to poles to detect and determine the location of an intruder.	Low	Low adverse impact on the environment	low
Flooding	On-Site human and ecological receptors	Land Water	Environment Agency (EA) Flood Maps confirm that the site is wholly located within Flood Zone 1 (FZ1), defined as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%) – very low. The drainage design provides resilience for all storm events up to and including the 1 in a 100 year event, plus 40% climate change realised over that time period.	Low	N/A	Low

Table 3-8: Global warming potential

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
Generation of CO_2e emissions	National and global climate change	air	Operation of the generators will involve the combustion of diesel fuel to generate electricity for use at the Site in the event of an emergency power outage. The generators will be subject to planned maintenance and testing will result in the generation of CO_2e emissions of 1,835 tonnes per year (t/yr). This figure is based on the operational regime and generator fuel use set out in the Summary Technical Report, using the gas oil (diesel) emission factors contained within the 2024 UK	Low	Low adverse impact on the environment	Low

Hazard / Process	Receptor	Pathway	Risk reduction measures	Exposure probability	Potential consequences	Overall risk
			Government GHG Conversion Factors for Company Reporting, together with a CO_2 factor of 0.25 from H1 Annex F.			

Table 3-9: Climate change risk assessment

Potential change	Impact	Likelihood	Severity	Risk	Mitigation	Likelihood (after mitigation)	Severity (after mitigation)	Residual Risk
1) Summer daily maximum temperature may be around 7°C	An increase in cooling water temperature may cause a drop in efficiency, higher temperature discharge or decreased operation	1	3	3	Environmental conditions have been incorporated into water consumption calculations. Water consumption estimates shall be based on 8760-hour local climatic data.	n/a	n/a	n/a
	Potential for greater use of back-up generators on-Site (with increased emissions to air and diesel use) through more frequent	1	2	2	The National Grid recognise that with increasing temperatures there is also an increase in potential for impact on electricity supply through damage to assets. The Air Quality Assessment (302321-ARP-XX-XX-RP-Z-1006) states that an emergency scenario there is no risk of significant effect. In addition, the Site has built in redundancy so that the emergency generators are only used as a last resort.	n/a	n/a	n/a
2) Winter daily maximum temperature could be 4°C more than the current average, with the potential for more extreme temperatures, both warmer and colder than present resulting in	No negative impact expected	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Potential change	Impact	Likelihood	Severity	Risk	Mitigation	Likelihood (after mitigation)	Severity (after mitigation)	Residual Risk
potential impacts on the Site.								
3) Daily rainfall intensity could increase by up to 20% on today's values resulting in flooding on the Site.	Flash flooding on Site Surface water run-off systems need to be cleared and account for increased flows to prevent them being overwhelmed Potential for increased Site surface water flooding	1	3	3	The Drainage and Flood Risk Assessment (FRA) report (Appendix 03-04 of this EP Application which is based on a flood risk assessment outlines that the system has been designed for no flooding during the 1 in 100 year storm. The surface water drainage system will flow into an attenuation pond which has been designed with provide 4000 m^3 and control discharge to the agreed rate of 15.3l/s in all storms up to and including the 1 in 100 year event plus 40% climate change. No further mitigation will therefore be implemented.	n/a	n/a	n/a
4) Average winter rainfall may increase by over 40% on today's averages resulting in potential increased risk of Site surface flooding and could impact Site wide drainage capacity.	As above	1	3	3	The Drainage and FRA report (Appendix 03-04 of this EP Application which is based on a flood risk assessment outlines that the system has been designed for no flooding during the 1 in 100 year storm. The surface water drainage system will flow into an attenuation pond which has been designed with provide 4000 m^3 and control discharge to the agreed rate of 15.3l/s in all storms up to and including the 1 in 100 year event plus 40% climate change. No further mitigation will therefore be implemented.	n/a	n/a	n/a
5) Sea level rise which could be as much as 0.6m higher compared to today's level.	Fluvial flooding on the Site	1	1	1	The Drainage and FRA report (Appendix 03-04 of this EP Application completed for the Site determined the risk of fluvial, tidal. Artificial sources and infrastructure failure flooding is low.	n/a	n/a	n/a

Potential change	Impact	Likelihood	Severity	Risk	Mitigation	Likelihood (after mitigation)	Severity (after mitigation)	Residual Risk
					The FRA concluded that for groundwater and pluvial flooding the risk is medium. For groundwater flooding, though the risk is a medium the Site is located on a high productivity chalk aquifer. For pluvial flooding the EA's flood mapping[7] for 1 in 100 year flood event shows that surface water flooding will be concentrated in the lower elevation points to the east of the site. It has bene concluded that no mitigation is necessary.			
6) Drier summers which could see potentially up to 40% less rain than now.	No negative impact is expected. Water use is not integral to the back-up generator use. On Site water tanks will be available on Site for the use of the fire hydrants in the event of a fire.	1	1	1	Water tanks for firefighting purposes will be provided on-site.	n/a	n/a	n/a
7) Flows in river could be 50% more than now as its peak and 80% less than now at its lowest	The Site may be subject to cooling water restrictions of temperature and volume.	1	1	1	n/a	n/a	n/a	n/a
	Surface flooding	1	3	3	The Drainage and FRA report (Appendix 03-04 of this EP Application) which is based on a flood risk assessment outlines that the system has been designed for no flooding during the 1 in 100 year storm. The surface water drainage system will flow into an attenuation pond which has	n/a	n/a	n/a

[7] Environment Agency, Flood Mapping Data for Fluvial and Pluvial Sources, October 2018.

Potential change	Impact	Likelihood	Severity	Risk	Mitigation	Likelihood (after mitigation)	Severity (after mitigation)	Residual Risk
					been designed with provide 4000 m^3 and control discharge to the agreed rate of 15.3l/s in all storms up to and including the 1 in 100 year event plus 40% climate change. No further mitigation will therefore be implemented.			
	Potential for increased impact on the river due to an increased temperature and the impact of the emission on lower flows.	1	1	1	The site is wholly located within Flood Zone 1 (FZ1), defined as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%) – very low. No further mitigation will therefore be implemented.	n/a	n/a	n/a