Environmental Risk Assessment

Longcross Data Centre: *SP3004SB/A001*

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APPENDICES

1.0 INTRODUCTION

This Environmental Risk Assessment (ERA) has been prepared by HDR on behalf of the operator Ark Estates 1 Ltd. (Ark), in support of the application for a new bespoke Environmental Permit (EP), ref SP3004SB/A001.

This ERA relates to the proposed operation of the combustion plant and the associated fuel storage facilities at the proposed data centre site to be located at:

Longcross Data Centre,
Chobham Lane,
Longcross,
Chertsey,
KT16 0EE

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.

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
- Site condition report / Site Baseline assessment

The requirement to complete a Climate Change Risk Assessment (CCRA) as part of the application for a new bespoke Installation EP was withdrawn in August 2022[2]. As is now required, this will be integrated into the sites management system.

[1] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit
[2] https://www.gov.uk/guidance/adapting-to-climate-change-risk-assessment-for-your-environmental-permit

2.0 METHODOLOGY

2.1 Approach

This ERA has been prepared in accordance with EA 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.

2.2 Risk scoring

This ERA has been completed using the scoring matrix shown in Table 2.1 – Risk Matrix 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 2.1 – 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

3.0 SITE CONTEXT

This section contains a high-level site summary. Please refer to the Non-technical Summary (NTS) document submitted with the application for a permit for further details.

3.1 Site location

The installation is located approx. 6km (3.373 miles) to the west of Chertsey, located to the north of the M3 motorway, south of the Reading to London Waterloo railway line, and to the east of Chobham Common. The Site lies wholly within Runnymede Borough and borders Surrey Heath Borough to the West. The specific location is Longcross Film Studios, Chobham Lane, Longcross, Chertsey, KT16 0EE, with National Grid Reference SU 97896 65526.

The site is in a rural location; the area is an industrial estate predominantly made up of hardstanding and numerous buildings of varying style and height. A motorway and woodland make up the southern and western perimeter. There is also a newly built residential development in the surrounding area. Beyond the direct site boundaries, to the South and West (approx. 300m), is an area of heathland, Chobham Common which is classed as a Site of Special Scientific Interest (SSSI). Longcross train station is approximately 500m north of the site. See Appendix A for a plan of the surrounding area.

3.2 Site activities

When operational, the installation will be a functioning data centre (DC). Under normal circumstances electricity to the site will be provided by the Independent Network Operator (IDNO) UK Power Distribution (UKPD). Reliability of the electricity supply is critical to a DC and as such current plans are to install x28 no. emergency standby generators (ESGs) to provide standby power in the event of an outage / failure in the electricity supply. The ESGs are on site solely to support the campus in times of an electricity supply failure.

The total rated thermal input of the 28 ESGs is approximately 224.25 MWth (Refer to Thermal Schedule v1 in supporting information). Current plans are for commissioning of the ESGs to commence in Summer 2024 with handover and operation to follow.

It should be noted the proposed ESGs are each 4MVA emissions optimised generator sets, achieving NOx emissions of 2,172mg/m^{3}N at 75% load at 5% O2, which is as close as to the 2000mg/m^{3}N recommended in the EA Draft FAQ as is possible with generators of this size. Smaller generators 2.5 – 3MVA in size could have been chosen for this site, but the cumulative air quality impact of 38no. 3MVA sets @ 2000mg/m^{3}N would be significantly greater than the proposed installation of 28nr 4 MVA generators with the above emissions.

The location of the generators, fuel tanks, emissions points (flues / stacks) and surface water connections are shown in the Site plan found in Appendix B. The installation boundary encompasses the listed activities only.

3.3 Site history

As per the Phase 2 site investigation report submitted with the application,

> *"Historical mapping indicated that the site was open, undeveloped woodland / scrubland for most of its history until structures were recorded on site on mapping editions from 2002 onwards. It is known from online research that the site was a military site long before this used for research and experiment relating to vehicles and tanks. Between 1941 and 2005 the site was used by various government military agencies until it became the Defence Evaluation & Research Agency site (DERA) and finally the Defence Logistics Organisation (DLO) Chertsey. The most recent use of the site was for the testing, evaluation and certification of the full range of British Army vehicles. It is understood that the site was later sold off and was then used by Longcross Film Studios."*

3.4 Site sensitivity

Please refer to the site condition / baseline report for a description of the following:

- Geology
- Hydrogeology
- Hydrology
- Ecology & heritage

3.5 Sensitive receptors

Identified sensitive receptors (human / ecological) that could potentially be affected by the permitted activities are presented in the tables below.

Please also refer to Appendix C for the EA Nature And Heritage Conservation Screening Report. The same list is also provided in the Air Emissions Risk Assessment supplied as part of the application.

Table 3.1 Human Receptors

Location / description	Distance (m)	X grid ref	Y grid ref
Longcross studio, Burma Road	1.5	497843	165508
Longcross studio, Burma Road	1.5	497818	165571
Industrial Building, Burma Road	1.5	497819	165674
Industrial Building, Burma Road	1.5	497967	165692
Discovery Building, Burma Road	1.5, 4.5, 7.5	498035	165767
Estienne House, Chieftain Road	1.5, 4.5, 7.5, 10.5, 13.5	498070	165779
Estienne House, Chieftain Road	1.5, 4.5, 7.5, 10.5, 13.5	498100	165773
Albury House, Cromwell Road	1.5, 4.5	498089	165743
Cromwell House, Cromwell Road	1.5, 4.5	498098	165714
Cromwell House, Cromwell Road	1.5, 4.5	498133	165696
Longcross Film Studio	1.5	498243	165612
Longcross Film Studio	1.5	498304	165480
21 Albury Close, Longcross Road	1.5, 4.5	498136	165336
19 Albury Close, Longcross Road	1.5, 4.5	498108	165310
Farifields, Longcross Road	1.5, 4.5	497972	165298
Longcross House, Longcross Road	1.5, 4.5, 7.5	498299	165159
Carne Cottage, Longcross Road	1.5, 4.5	499015	165216
Longcross Film Studios	1.5, 4.5	498994	165719
Wild Woods, Trumps Green Road	1.5, 4.5	499109	166409
Heatherlands South Drive	1.5, 4.5	498284	166479
Pipits Hill, West Drive	1.5, 4.5	497526	166615
Wentworth, West Drive	1.5, 4.5	497190	166859
Longcross Train Station	1.5	497913	166063

Table 3.2 Ecological Receptors

Site Name	Within distance from Site (m)	Designation
Lowland Fens	500	Protected Habitat

Site Name	Within distance from Site (m)	Designation
Ancient Woodland	2000	Nature and Heritage Conservation Sites
Local Wildlife Sites (multiple)	2000	
Chobham Common - National Nature Reserve and Site of Special Scientific Interest	2000	
South West London Waterbodies -Ramsar and Special Protection Area	10000	
Thames Basin Heaths	10000	
Thursley, Ash, Pirbright and Chobham Special Areas of Conservation	10000	
Windsor Forest and Great Park Special Areas of Conservation	10000	

4.0 RISKS IDENTIFIED

Using the guidance and approach outlined in Section 2.0, the following risks have been identified as having potential to cause harm to the environment and / or human receptors:

- Discharges to air, surface or groundwater
- Global warming potential
- Fugitive Emissions (from uncontrolled sources)
- Odour
- Noise and Vibration
- Visible emissions
- Waste
- Accidents

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.

The methodology outlined in Section 2.0 has been employed to score potentially significant environmental risks associated with the installation's activities.

5.0 ENVIRONMENTAL 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, residents, and adjacent premises / pedestrians / road users immediately surrounding the installation. Any future developments within the area are potential receptors.	Airborne	An Air Quality Impact Assessment & Dispersion Model has been completed and submitted in support of this permit application ("Air Quality Emissions Risk Assessment"). This report concluded that "with regard to annual mean NO_2 and PM_{10} human health impacts, no significant PEC have been predicted and all results were well below the annual mean AQALs. With regard to 1-hour mean NO_2, there is a <1% chance that the maximum allowable 18 exceedances of 200µg/m^3 would be breached. Finally, with regard to the 24-hour mean AQAL for PM_{10}, no significant impacts have been predicted. On this basis, the overall effect on human health is considered 'not significant'." The report indicated that significant short-term impacts on NO_2 as a result of a prolonged emergency grid failure are not anticipated. The ESGs are designed to provide power in the event of grid failure, and during operation are a point source of emissions to air. The National Grid report for 2021-2022 stated the overall reliability of grid supply was 99.999936% for substations above 132kV supplies. This equates to the probability of a 1-minute outage occurring once in 5.8 years and a 1 hour outage occurring once in 346 years. Reliability in 2020-2021 was 99.999966% and 99.999974% in 2019-2020. Operation of the ESGs is therefore likely to be limited to two operating scenarios: • Scenario 1 – Maintenance and Testing comprising in general of a total of 63 hours of generator running a year. This will comprise ~7 hours of 28 generators running concurrently in test durations of less than 1 hour at ~25% load. The remaining 56 hours are individual generators being tested one at a time over a range of loads from 25% – 100% as part of the main annual service. • Scenario 2 – Emergency Running when all the generators run due to an interruption to the electricity supply. Data centres generally run at <80% load, and with the resilience provided by the generators, the worst-case operating mode would be 24 generators running at 80% load with 4 generators spare in case of a generator failure. As stated above grid reliability is very high and Scenario 2 is likely to be a very rare event. Notwithstanding this the Air Emissions Risk Assessment has assumed that Emergency	Low – maintenance and testing Very low – grid failure	Emissions to air can have an adverse impact to human health in surrounding areas.	Low – maintenance and testing Low – grid failure

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
			Running may last up to 72 days of continuous running as per the site fuel storage strategy. Where possible the operator will seek to minimise the frequency of generator runs and to stagger tests where possible. In the event a complaint is raised against the operation of the generators, the complaints procedure should be followed.			
Point source emissions to air- NO_x, CO, SO_2, PM_{10} emissions from generator stacks	Ecologically Sensitive Sites	Airborne	The Air Emissions Risk Assessment has identified that the small increases in NOx, Nitrogen Deposition and Acid Deposition may have an impact on three ecologically sensitive receptors (Thursley, Ash, Pirbright and Chobham SAC; Thames Basin Heaths SPA and Chobham Common SSSI). However these are all at 72% of the critical levels for designated ecological sites. The generators are emergency standby plant designed to provide power in the event of an electricity supply failure. This is a highly rare event given electricity supply reliability (See BAT Assessment submitted with application for a permit). As such, annual operation and fuel consumption is likely to be limited to testing and maintenance. This level of operation is not considered to present a significant risk to ecological receptors.	Low – maintenance and testing Low – grid failure	Emissions to air can have an adverse impact to ecological sites in surrounding areas.	Low – maintenance and testing Low – grid failure

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	Current plans are for 28no ESGs to be installed. These will be located in the generator compound in the southeast corner of the site. Each generator will have its own belly tank. Tanks are to be bunded to 110% and fitted with bund and overfill alarms. Tanks are filled via a local double fill point cabinet installed at the front of the building. The cabinets will be locked when not in use, and have a drip tray, instrument mounting panel, 3" filling valve and cap, and a 2" overfill prevention valve with BSP valve. The ground surrounding the ESGs and the fuel storage tanks is to be tarmac / hardstanding. Plans are for spill kits to be located in the vicinity of the generators and also at the fill points. Drain covers are to be colour coded to identify foul (red) and surface water drains (blue). To help reduce the risk of corrosion, all pipework is either painted or constructed of corrosion resistant material. Fuel deliveries are likely rare events (~0-2 deliveries pa) given the standby nature of the plant means they operate infrequently (~<50hours pa). Fuel delivery, emergency preparedness and spill response procedures are to be implemented to minimise the risk of accidents during refuelling. Fuel suppliers are to adhere to applicable procedures when attending site. Deliveries are to be carried out by competent individual(s) and supervised by site staff. The surface water belowground drainage system, serving the car parking and service yard, drains to a petrol separator. A Class 1 full retention petrol separator is proposed downstream of each drainage network to collect the oil that accidentally might be discharged into the wider surface water drainage systems. The surface water belowground drainage system, serving the ESGs refuelling area drains to a Class 1 Forecourt petrol separator. The petrol interceptor is designed in case of spillage, the contents of one compartment of a road tanker(7600 litres) may be contained. Once operational plans are to implement a Planned Preventative Maintenance (PPM) regime that will seek to include visual checks for	Very low – belly tanks constructed and tested in accordance with the Oil Storage Regulations. Low – refuelling	Leaks of fuel or other substances associated with Data Centres operations into the surrounding environment can cause adverse impacts to the ground water course as well as adjacent water courses.	Very low – belly tanks Medium – refuelling

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
			leaks / spills. Hazardous waste generated as part of the PPM regime is to be disposed of by a licenced carrier with duty of care information retained as evidence following uplift.			
Flooding of drainage network and generators.	Groundwater, surface water, sewer system	Floodwater, surface waters, drainage system etc	The site is located within a Flood Zone 1 which is defined as which is deemed to have less than a 1 in 1000 (0.1%) chance of river or tidal flooding in any one year. The underground surface water drainage network has been designed for runoff in the 1 in 100-year event, and it will take into consideration the predicted increase in runoff resulting from climate change. It will accommodate the runoff from storm events up to the 1 in 100 Years +40% climate change. There is noted potential for localised perched water within the Made Ground and the Windlesham Formation. Routine maintenance of the onsite drainage system should help prevent surface water drains from being obstructed by debris. Emergency procedures are to be developed and enacted in the event of flooding.	Very low	Flooding / water damage to the generators could impact resiliency for operations.	Very low
Fire	Emissions to Air / Water	Air & Water	All 28no ESGs are fitted with fire detection systems with fuel shut off, fire alarm, beacons and containment measures. The fire suppression sprinkler systems rely on water mist system served from tanked 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 in place to help mitigate this risk.	Very low	Fire damage to generators could impact resiliency for operations. Fire would also cause emissions to air, having an adverse impact to local environment and receptors. Firewater could infiltrate local water courses, adversely impacting the local environment.	Very low

Hazard	Receptors	Pathway	Controls / Mitigation / Risk management	Probability of exposure	Consequence of exposure	Overall risk
Vandalism	Land / Surface Water / Ground Water / Air	Drainage systems, air, surface	The site is due to 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 dual layer of palisade security fencing, external at 2.4m and internal at 4m above ground, should act as an impenetrable perimeter to prevent unauthorised access to the Data Centre.	Very low	Damage arising from vandalism to the generators / storage tanks could impact emergency back-up potential and/or lead to fugitive emissions	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 & residents	Airborne	Fuel is stored internally in belly tanks for the 28no ESGs. Emissions are not expected to be significant, and an odour Management Plan is not expected to be required. The complaints procedure should be followed in the event the site receives an odour complaint relating to the permitted activities.	Very low	Nuisance to on site staff and local human receptors. Could 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, residents, and adjacent premises / pedestrians / road users immediately surrounding the installation.	Air	A noise impact assessment has been completed and submitted as part of the permit application ('Noise Impact Assessment v1'). This report concluded that "the predicted noise levels indicate compliance with the adopted criteria". The accompanying technical note also identifies that the various forms of mitigation mean compliance with the adopted criteria can be achieved which is not exceeding the existing background noise climate at the nearest residential properties. Please refer to these reports for further details. A bespoke generator acoustic canopy, for every generator pair, has been designed to reduce acoustic sound pressure to 75 dBA at 1m from the exterior of the unit at 1.5m above ground level. Significant noise breakout is not expected as the ESGs operate infrequently as they are emergency standby plant designed to provide power in the event of an electricity supply failure. This is a highly rare event given electricity supply reliability. As such, annual operation is likely to be limited to testing and maintenance as referenced above. Generators are to be maintained in accordance with manufacturer guidelines as part of a planned preventative maintenance (PPM) regime. The complaints procedure should be followed in the event the site receives a noise complaint relating to the generators.	Low – maintenance and testing Very low – grid failure	Complaints from local residences. Potential harm to human health due to elevated noise levels.	Low – maintenance and testing low – grid failure
Noise from site traffic e.g., fuel deliveries	Employees, residents, and adjacent premises / pedestrians / road users immediately surrounding the installation.	Air	The Data Centre is located within the Longcross Studios Industrial Estate (see Appendix A). The Wentworth Estate is located to the north, with the closest residential dwellings approximately 180m to the east. The generators are located on the southeast corner of the site, adjacent to roadway "Chobham Lane" and the M3 motorway. The generators are emergency standby plant operated infrequently as discussed above. As such fuel consumption is low meaning fuel deliveries are infrequent. The Data Centre may have no deliveries in a year therefore noise from associated traffic is not expected to be significant.	Low	Complaints from local receptors. 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.	See Section.5.2.	Very low – bulk tanks Low – refuelling	Pollution and / or harm to environmental and / or human health	Very low – bulk tanks low – refuelling
VOCs / fumes from storage / delivery of fuel	Industrial, commercial, and residential receptors	Air	Fuel tanks are containerised in sealed, bunded belly tanks with fuel volume and leak detection alarms in place, which will minimise the likelihood of release to the environment. Refuelling activities are to be carried out by approved suppliers with trained competent individuals that operate in accordance with the sites refuelling procedures which will be developed as part of the sites Environmental Management System (EMS). Deliveries are likely to be rare, and best practices are to be adhered to in order to limit durations which fumes could escape into the environment.	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	Industrial, commercial, and residential receptors	Visual	Smoke may be visible during the first 10-15s of generator operation. After this time visible plumes are not anticipated due to high exhaust temperatures (approx. 450°C). In the unlikely event that visible emissions after still present, these are to be investigated as part of the sites PPM regime. Plumes may not be visible due to line of sight, weather conditions, and the timing of generator operation (e.g. nighttime / during working hours). They may also be infrequent therefore are not considered to be likely / significant. The complaints procedure should be followed in the event the site receives complaints relating to the visible emissions from the generators.	Low	Potential visual impacts, particularly during generator start-ups.	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 an electricity supply failure. This is a highly rare event given electricity supply reliability (See BAT Assessment submitted with application for a permit). As such, annual operation and fuel consumption is likely to be limited to testing and maintenance as referenced above. This level of operation is not considered to provide a significant global warming impact.	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	Small quantities of wastes may be generated from routine generator maintenance activities or in the event of a spillage/leakage. This is likely to be low given the standby nature of the generators and procedures in place to reduce the risk of spills and leaks spillage/leaks. Procedures for licenced and responsible collection of waste oils and other hazardous wastes are to be developed. This will include the retention of relevant Duty of Care information. Contractors are responsible for waste disposal that arises during maintenance activities.	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 Data Centre of this size, nature, and location.

Appendix A.

Surrounding Area

Appendix B.

Site Plan

Appendix C.

Nature And Heritage Conservation Screening Report