

# Thorney Lane Data Centre Emergency Back-up Generation Facility

Environmental Permit Application EPR/SP3224LP  
Noise Impact Assessment

Amazon Data Services UK Limited

Project Reference: EPR/SP3224LP/A001  
Project number: 60753942  
SP3224LP-APP-NIA

February 2026

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# 1. Report Context

## 1.1 Introduction

AECOM Limited ('AECOM') has been commissioned by Amazon Data Services UK Ltd ('the Operator') to prepare an application for an environmental permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) ('the EPR Regulations') for the emergency back-up generation facility for the proposed data centre at Thorney Wood Business Park, Thorney Lane North, Iver in Buckinghamshire. The environmental permit will be for the operation of the emergency backup generators and associated fuel storage and handling ('the Proposed Installation').

This document is the Noise Management Plan which has been prepared to support the permit application and details noise management arrangements during generator testing and maintenance as well as grid power failure for the Proposed Installation. The report should be read in conjunction with other supporting application information.

## 1.2 Proposed Installation

The Environmental Permit application will be made for the combustion activities (including fuel storage and handling) associated with emergency backup generators only and not the wider data centre operations. The installation boundary for the Environmental Permit will include the areas covered by these activities only.

The wider data centre development consists of the construction of commercial buildings to comprise the data centres, ancillary offices, associated plant, equipment and emergency backup generators and associated fuel storage, landscaping, sustainable drainage systems and parking.

## 2. Noise Sensitive Receptors

The nearest noise-sensitive receptors (NSR) are detailed below in Table 1. A location plan of the local area depicting NSRs and noise monitoring locations is provided in Appendix A.

**Table 1 Environmental Noise Receptors**

<b>Receptor ID</b>	<b>Description</b>	<b>Approx. Distance from Planning Application Site Boundary (m)</b>	<b>Direction</b>
R1	Market Lane	670	South-west
R2	Bathurst Walk	200	South-east
R3	Mansion Lane caravan/halting site	270	West
R4	Mansion Lane	460	North-west

## 3. Site Operations and Site Noise Sources

### 3.1 Operating Hours

Generator testing and maintenance will take place during the daytime (07:00 – 23:00) Monday to Friday.

The emergency (back-up) generators will be utilised to maintain power supply in the event of a loss of power supply, i.e. temporary grid blackout.

These generators are designed to automatically activate and provide power to the plant pending restoration of mains power. Every effort will be made to ensure that the emergency generators would not be required in practice, as described below.

Power for the data centre will be supplied from/by the National Grid which operates its transmission system in accordance with the Security and Quality of Supply Standard which is a requirement of its Transmission Licence. In accordance with this standard, a level of redundancy is also built into the transmission system. The most recent reported reliability data shows grid reliability of 99.999998% with <2.7% of grid events resulting in an interruption of supply to the customers.

In addition, the site has been designed to be supplied from/by the National Grid by a dual-circuit supply which provides security of supply in the event of a fault or loss of supply from one source; the other circuit is capable of supplying full load to the site. This will minimise the need for the generators to be operated.

### 3.2 Proposed Installation

A bank of emergency generators will be provided to support the data centre operation in the event of a power outage. Each individual generator will be classed as medium combustion plant (MCP) with an aggregated thermal input for the site which will exceed 50 MWth.

The installation will include 36 containerised generators to provide backup power supply for the main data centre buildings, a smaller 'house' generator for each building to cover non-critical operations in an emergency such as offices, the proposed generator fuel storage and handling areas, and associated emission points only.

Plant associated and its quantities with the Proposed Installation is summarised in Table 2.

**Table 2 Data Centre Noise Sources**

Plant Name	Number of Plant DC-A	Number of Plant DC-B
Fresh Air Intake Louvre non-Gen side	6	10
Fresh Air Intake Louvre Gen side	6	10
Exhaust Fan (Single and 2-storey)	76	124
VRF Condensers	4	4
Split Unit condensers	11	12
Toilet Exhaust Fan	1	1
Admin AHU (Air Inlet)	1	1
Admin AHU (Air Exhaust)	1	1
Admin AHU (Breakout)	1	1
CRAC Condensers	56	96
Emergency Generators <sup>1</sup>	15	23
80MVA Transformers		2 <sup>2</sup>

<sup>1</sup> Number includes 1 house generator for each building to cover non-critical operations in an emergency.

<sup>2</sup> 2 in total for the Proposed Installation.

### 3.3 Site Layout

A site plan showing the permit boundary in green and site layout is presented in Figure 1.



## 4. Noise Control Measures

The potential for sound of a tonal, impulsive or intermittent nature has been designed out of the proposed installation from the selection of appropriate quiet plant, including generator enclosures with in-built acoustic attenuation, louvre attenuators and exhaust fan attenuators.

As part of the operational assessment, the proposed installation was assessed based upon plant data provided by the Operator. Embedded mitigation has been incorporated into the assessment and includes generator enclosures with in-built acoustic attenuation and the use of louvre attenuators on both the generator (gen) and non-generator (non-gen) sides of both data centre buildings, as well as attenuators on all exhaust fans.

Table 3 shows the insertion loss of louvre attenuators and exhaust fan attenuators.

**Table 3 Insertion loss of attenuators**

Attenuator type	Item of Plant	Insertion Loss dB at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1000	2000	4000	8000
Q-nis LDM Acoustic Module 4500mmx2200mmx2700mm	Fresh Air Intake Louvre Gen side	13	24	44	50	50	50	50	50
Q-nis LDM Acoustic Module 4500mmx2800mmx1600mm	Fresh Air Intake Louvre non-Gen side	9	17	29	44	50	50	46	33
Danaan Air DH Extract Unit 1200 mm with fan flow grids	Exhaust Fan (Single and 2-storey)	8	13	22	36	45	45	36	24

During generator testing and maintenance scenario, predicted noise levels at all receptors are compatible with the noise limits at daytime. A negligible, not significant impact is predicted at all receptors.

During the emergency operation scenario with embedded mitigation, one significant adverse impact is predicted at R2 based on the BS 4142 methodology. However, due to the unlikelihood and infrequency of the emergency occurring, as well as the limited duration of the event, it is considered acceptable and no further additional mitigation measures were deemed necessary.

The application of Best Available Techniques (BAT) can also be used to reduce noise levels of plant equipment at receptors. General principles include, but are not limited to, the measures set out in the NMP Risk Assessment and Control Measures shown in Table 4 NMP Risk Assessment and Control Measures.

**Table 4 NMP Risk Assessment and Control Measures**

Potential Source or Pathway	Identified Receptors	Control Measures	Probability	Consequence	Overall Risk
Noisy equipment/ plant	Residential NSRs along Bathurst Walk to the south-east, Market Lane to the south-west, Mansion Lane to the north-west and the caravan/halting site to the west of the proposed installation	Quiet equipment to be procured for the installation where possible and practicable. This applies to all new and replacement equipment.	Low. Design and selection of equipment should minimise noise emissions	Noise heard at NSRs	Low
Noise from operation of installation	Residential NSRs along Bathurst Walk to the south-east, Market Lane to the south-west, Mansion Lane to the north-west and the caravan/halting site to the west of the proposed installation	Good working practices at the installation, to include <ul style="list-style-type: none"> <li>Regular inspection of plant equipment at set intervals</li> <li>Maintenance of equipment</li> <li>Closing of doors and windows of building and enclosed areas, where possible</li> <li>Experienced and appropriated trained staff operating the equipment</li> <li>Avoidance of noisy activities at night if possible</li> </ul> All staff being trained in noise management and the prompt reporting of any abnormal noise so it can be investigated and rectified	Low. Good working practices to help minimise normal and abnormal emissions	Noise heard at NSRs	Low
Noise from installation plant or buildings	Residential NSRs along Bathurst Walk to the south-east, Market Lane to the south-west, Mansion Lane to the north-west and the caravan/halting site to the west of the proposed installation	The following factor has been accounted for during the development of the Proposed Installation and will continue to be addressed during the detailed design stage: <ul style="list-style-type: none"> <li>Reducing the breakout noise from plant using attenuation on louvres and exhaust fans.</li> </ul>	Low. The control measures should reduce noise emissions	Noise heard at NSRs	Low

## 5. Compliance Noise Monitoring Protocol

### 5.1 Noise Monitoring Schedule

Compliance noise monitoring will only be undertaken in the event that:

1. A noise limit or monitoring has been stipulated (e.g., within environmental permit or planning conditions) and compliance must be demonstrated; or
2. In circumstances where complaints have been received and one of the following conditions are met:
  - Corrective action has not resolved the problem; or
  - Monitoring will assist in determining source/cause and what further remedial action may be required.

Where compliance monitoring is required, it will be completed in accordance with the sections below.

### 5.2 Instrumentation

Noise monitoring will be undertaken with a tripod mounted Class 1 integrating sound level meter (SLM), meeting the requirements of in BS EN 61672-1:2003 'Electroacoustics. Sound level meters. Specifications.'

The SLM and associated calibrator will have valid calibration certificates.

The SLM will be fitted with a suitable windshield.

### 5.3 Noise Monitoring Locations

Noise monitoring shall be undertaken at locations adjacent to the receptors as in shown in Table 1 and the receptor plan shown in Appendix A.

### 5.4 Noise Monitoring Procedure

Noise monitoring will be undertaken during generator maintenance scenario.

Measurements will be undertaken during suitable meteorological conditions (i.e., no precipitation, winds below 5 m/s and no snow on the ground).

The noise monitoring equipment will be sited in free-field conditions (i.e., at least 3.5 metres from any reflecting surface apart from the ground), with the microphone between 1.2 and 1.5 metres above ground level.

Noise monitoring will be undertaken by a suitably qualified person and in accordance with good acoustical practice.

$L_{Aeq}$ ,  $L_{A90}$  and  $L_{Amax}$  noise will be logged in 1-minute intervals over a 1-hour period. This will enable the exclusion of measurement data significantly affected by short term extraneous sources of noise not attributed to the Proposed Installation.

All results will be recorded on a suitable log sheet, which will include time of day, duration of measurements and a description of audible noise sources, together with site activities over the time of monitoring. Prevailing weather conditions, including wind direction and speed, air temperature and degree of cloud cover, will also be recorded with each set of measurement results.

An example log sheet is provided as Appendix B; alternative forms may be used but would still need to record the required information.

A permanent record of all noise monitoring undertaken will be kept on site and made available for inspection by relevant parties. The Operator will furnish the relevant authoritative body with the particulars of measurements recorded within two working days of a request.

## 5.5 Noise Nuisance

In accordance with environmental permit requirements, where the Environment Agency notifies that noise from the activities are giving rise to pollution outside the site, the Site Manager will be notified. Remedial actions will be determined based on the nature of the notification and agreed with the Environment Agency.

Once the remedial actions have been put in place, noise monitoring at the receptor locations will be carried out according to the noise monitoring procedure and the measured noise levels will be assessed.

Full details of the remedial actions taken, and the post action noise monitoring will be entered on the log sheet.

## 6. Complaint Management

### 6.1 Procedure

Should complaints arise from nearby residents regarding noise from site activities, a log of the complaint will be made, to include the:

- date and time that the complaint was received by the site;
- name, address and telephone number of the complainant; and
- nature of the complaint.

The Site Manager shall be notified as soon as possible that a complaint has been received, and if required, contact the complainant to obtain further details.

The relevant authoritative body shall be notified of any complaint within two working days of the complaint being received.

If the complaint relates to an event in the past, then the likely cause of the complaint will be investigated as soon as possible via records of site activities. The complainant will be advised of the results of the investigation and any remedial action taken as a result of the complaint, within two working days of the complaint being received.

If the source of the complaint is still ongoing, it will be investigated as soon as reasonably practicable. If initial investigations identify that the noise levels are unusual or the site noise limits (if applicable) may be being breached, then remedial action may be taken to reduce noise levels.

If the source of the complaint relates to normal day to day activities, noise monitoring will be undertaken to determine if such works are likely to result in a breach in the future. The results will be discussed with the complainant and explained with regard to any site noise limits (if applicable) and the influence of other noise sources outside the site. Remedial measures such as adjustments to the working methods may be considered and implemented as appropriate.

Complaints should be directed to the appointed Site Manager.

### 6.2 Complaint Records

Details of any complaint will be recorded in the compliance database which will ensure data is collected and recorded in a systematic way. The compliance database is accessible by the Site Manager and other Senior Managers and will be reviewed at least quarterly for trend analysis.

## 7. Record Keeping

Records relating to the management and monitoring of noise shall be maintained, to include:

- results of routine inspections;
- results of compliance noise monitoring and any additional quantitative noise monitoring undertaken;
- details of any complaints, to include date, time, location of complainant, prevailing weather conditions and outcome of the complaint investigation;
- details of any remedial action taken in response to issues identified by members of staff or via a complaint, and any subsequent change to normal operating procedures; and
- plant maintenance schedule.

The records will be kept in the main site office.

The records shall be available for inspection by the relevant authoritative body.

The relevant authoritative body will be provided with the results of any noise monitoring within two working days.

## 8. Review / Update

This NMP is a controlled document, and forms part of the Integrated Management System and Environmental Management System (EMS). Records relating to the management and monitoring of noise resulting from the implementation of this NMP will also form part of the Integrated Management System.

The NMP is intended to be a live document which serves as a reference during day-to-day operations, and as such would be reviewed on an annual basis. The NMP will also be reviewed and updated should any of the following occur:

- significant changes are made to the process or operational practices;
- there is a change to the management structure, designation of responsibility or training provision; and
- complaints are received, which on subsequent investigation result in the identification of further control measures or remedial action, in addition to those set out within this NMP.

## **Appendix A Environmental Noise Receptors and Measurement Locations Map**



# Appendix B Example Monitoring Log Sheet

Noise Monitoring Sheet		Sheet 1 of <span style="border: 1px solid black; padding: 2px;">  </span>				
Project Title						
Job No						
Site						
START TIME:	(DD-MM-YY, HH:MM) <span style="border: 1px solid black; padding: 2px;">  </span> - <span style="border: 1px solid black; padding: 2px;">  </span> - <span style="border: 1px solid black; padding: 2px;">  </span> : <span style="border: 1px solid black; padding: 2px;">  </span> : <span style="border: 1px solid black; padding: 2px;">  </span>	Staff Initials <span style="border: 1px solid black; padding: 2px; background-color: #ffffcc;">START</span>				
END TIME:	(DD-MM-YY, HH:MM) <span style="border: 1px solid black; padding: 2px;">  </span> - <span style="border: 1px solid black; padding: 2px;">  </span> - <span style="border: 1px solid black; padding: 2px;">  </span> : <span style="border: 1px solid black; padding: 2px;">  </span> : <span style="border: 1px solid black; padding: 2px;">  </span>	<span style="border: 1px solid black; padding: 2px; background-color: #ccffcc;">END</span>				
METER	<span style="border: 1px solid black; padding: 2px;">SLM XX / VLM XX</span>	Tick <span style="border: 1px solid black; padding: 2px;">  </span>				
CALIBRATOR	<span style="border: 1px solid black; padding: 2px;">CAL</span> SAME CALIBRATOR USED AT END? <span style="border: 1px solid black; padding: 2px;">  </span>	< 2 YEARS SINCE CALIBRATION? (SEE LABEL) <span style="border: 1px solid black; padding: 2px;">  </span> < 1 YEAR SINCE CALIBRATION? <span style="border: 1px solid black; padding: 2px;">  </span>				
CORRECT MICROPHONE AND PREAMP? (Refer to equipment sheet) <span style="border: 1px solid black; padding: 2px;">  </span>		Memory card ID <span style="border: 1px solid black; padding: 2px;">  </span>				
<b>METER CHECKS AND SET UP</b>						
Sufficient battery? <span style="border: 1px solid black; padding: 2px;">  </span>	Date and time correct? <span style="border: 1px solid black; padding: 2px;">  </span>	Correct windshield correction set <span style="border: 1px solid black; padding: 2px;">  </span>				
Sufficient memory? <span style="border: 1px solid black; padding: 2px;">  </span>	Clocks synchronised? <span style="border: 1px solid black; padding: 2px;">  </span>					
<b>CALIBRATION (See Reference sheet 2 for meter specific procedure)</b>						
	Start	End				
Calibration Level						
Sensitivity Setting		Do Not change at end				
Low noise level (if cable used) :						
Cal Measurement Saved						
Cal within ±0.5 dB						
* Adjust sensitivity at start. Note value but do not adjust at end						
LOGGING PERIOD						
AUDIO SETTING	SECS / MINS EVERY <span style="border: 1px solid black; padding: 2px;">  </span>	MINS / HOURS <span style="border: 1px solid black; padding: 2px;">  </span> or CONTINUOUS <span style="border: 1px solid black; padding: 2px;">  </span>				
File name / Number						
	RANGE <span style="border: 1px solid black; padding: 2px;">  </span> TO <span style="border: 1px solid black; padding: 2px;">  </span>	OR N/A <span style="border: 1px solid black; padding: 2px;">  </span>				
<b>WEATHER CONDITIONS</b>						
	Wind direction (arrow) START	Wind direction (arrow) END				
WIND SPEED (m/s)	N W      E S	N W      E S				
CLOUD COVER (eighths)	AV m/s	AV m/s				
TEMPERATURE (°C)	MAX m/s	MAX m/s				
<b>PRECIPITATION (Tick)</b>						
	NONE	DRIZZLE	RAIN	SNOW	HAIL	FOG/MIST
START						
END						
<b>ROAD CONDITIONS (Tick)</b>						
	DRY	DAMP	WET	ICE/SNOW		
START						
END						
<b>GROUND CONDITION (Tick)</b>						
	SOFT	HARD	ICE/SNOW	FROZEN		
START						
END						
<b>Subjective description of sound climate (close your eyes and describe what you hear)</b>						
Dominant Noise (Start)		Dominant Noise (End)				
Other Sources (Start)		Other Sources (End)				





