

# Permitting decisions

## Bespoke permit

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We have decided to grant the permit for Brick Lane Data Centre operated by Interxion Carrier Hotel Limited.

The permit number is EPR/QP3434DR.

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

### Purpose of this document

This decision document provides a record of the decision making process. It:

- provides a description of the installation
- highlights key issues in the determination
- summarises the decision making process in the decision checklist to show how all relevant factors have been taken into account
- shows how we have considered the consultation responses.

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Read the permitting decisions in conjunction with the environmental permit. The introductory note summarises what the permit covers.

## Description of the installation

Brick Lane Data Centre is an installation centred on National Grid Reference TQ 33799 82048. The installation comprises standby generators supporting three adjacent data hubs; “Lon 1”, “Lon 2” and “Lon 3”, which require an uninterruptible power supply for critical computing equipment such as servers, telecommunications, network and storage systems in the event of a failure of supply from the National Grid.

Brick Lane Data Centre has 13 standby generators housed at Lon 1 and Lon 2 (Lon 1: 2 x 3.62 MWth, 1 x 4.85 MWth, 5 x 4.25 MWth. Lon 2: 5 x 4.85 MWth) with a total aggregated net thermal input of 57.59 MWth. The 13 standby generators provide back-up power to all three data hubs.

The operation of this plant constitutes a Schedule 1 activity under Part A(1) Section 1.1 of the Environmental Permitting Regulations for the burning of any fuel in an appliance with a rated thermal input of 50 or more megawatts (MW).

Apparatus on site will bring the generators online should grid supply fail, whilst batteries provide instantaneous emergency power prior to generator start up. It takes approximately 7-10 seconds for the generators to start and accept load.

The installation has the capacity to store up to 121,120 litres of fuel via a number of tanks of varying size, which are integrally banded and/or contained within buildings.

Each generator has its own stack which vents the products of combustion to air. Clean and uncontaminated surface water run-off from the site is discharged to the Thames Water Combined Sewer.

The installation is sited in a heavily built up area in close proximity to a range of buildings including residential properties, commercial premises, schools and workplaces. The site falls within the Tower Hamlets Air Quality Management Area.

Epping Forest Special Area of Conservation and Lee Valley Special Protection Area and Ramsar are located within 10 kilometres of the installation.

The operating scenarios for the installation are as follows:

- **Monthly maintenance test:** Each generator operates in turns (one at a time) for up to 30 minutes every month on a weekday during the daytime (9am to 4pm) at 10% load.
- **UPS maintenance test:** Each generator is tested twice a year for 6 hours on weekends during daytime (10am to 4pm) in pairs at 30% load.
- **Emergency operations:** Loss of power from the National Grid during outages. The site has a resilience level of n+1, meaning that the site load can be met with one of the generators in each bank not running.

There is no other combustion plant on site  $\geq$  1MW.

# Key issues of the decision

## Air Quality Impacts

The data centre is located within the Tower Hamlets Air Quality Management Area (AQMA) which is managed for NO<sub>2</sub> and PM<sub>10</sub>.

## **Modelling assessment**

The Applicant has submitted an air dispersion modelling report which assessed the potential impact of the emissions of PM<sub>10</sub> and NO<sub>2</sub> from the generators on local air quality.

Having regard for the likely operating scenarios, the following conservative assumptions were incorporated into the model:

- The generators have been assumed to run at operating loads above reality which has given rise to emission rates higher than is likely to occur.
- Assumed two full hour grid outages in the worst two meteorological hours of the year. This number of outages is much more than historic outage data shows is likely in a year, and the model has assumed that they will occur during the least dispersive met conditions.
- Assumed that a monthly and annual test are carried out on the two days of the year that give rise to the highest daily concentrations.
- The meteorological year that gives rise to the highest short term concentrations at sensitive receptors has been used in the assessment.

Our Air Quality Modelling and Assessment Unit (AQMAU) audited the air dispersion modelling and report submitted with the permit application. Both the maintenance testing and emergency scenarios within the model were assessed.

In terms of PM<sub>10</sub>, the model demonstrated that the predicted long and short term Process Contributions are insignificant as they are considerably less than the relevant significance thresholds.

For NO<sub>2</sub>, whilst the model demonstrated that the predicted long term Process Contribution at 3% of the EQS cannot be deemed as insignificant (>1%); we are satisfied that the predictions of the Predicted Environmental Concentrations (PEC) are unlikely to cause an exceedance of the Environmental Standard for NO<sub>2</sub> based on the statistical analysis of the 'worst case' operating scenarios.

The operator also modelled the impacts based on a potential increase in stack height to 34 metres, the outcome demonstrated a reduction in the overall process contribution to 1.1%.

## **Permit conditions**

Given the local issues regarding air quality, including the designation of the AQMA, we have included IC1 and IC2 as an improvement programme requirement in the permit. This requires the operator to produce an Air Quality Management Plan and undertake a cost/benefit analysis of the increased stack heights (to enable better dispersion). This is based on the outcome of the modelling assessment and the 'standalone' controls required in addition to those in the EMS and permitted Operating Techniques.

The permit will also include a maximum 500 hour 'emergency/standby operational limit' for any or all the plant producing on-site power under the limits of the combustion activity. Therefore, emission limit values ELVs to air (and therefore emissions monitoring) are not required within the permit. Emergency hours' operation includes those unplanned hours required to come off grid to make emergency repair of electrical infrastructure associated but occurring only within the data centre itself.

In addition, each individual generator with its own discharge stack can each be maintained, tested and used in a planned way for up to 50 hours per calendar year without ELVs or associated monitoring under IED/MCPD. The maintenance scenarios are detailed above and controlled through permitted Operating Techniques.

The permit has a limit on the activity to exclude voluntary 'elective power operation' such as demand side response (i.e. on-site use) or grid short term operating reserve (STOR) (i.e. off-site export of electricity) and Frequency Control by Demand Management (FCDM) for grid support.

This is primarily to differentiate data centres from 'diesel arrays' that voluntarily operate within the balancing market, and importantly a clear way to demonstrate minimisation of emissions to air as 'emergency plant'.

Operations and management procedures should reflect the outcomes of the air quality modelling by minimising the duration of testing, phasing engines into subgroups, avoiding whole site tests and planning off-grid maintenance days and most importantly times/days to avoid adding to "at risk" high ambient pollutant background levels. This is controlled in the permit through the operating techniques.

The permit application must assess and provide evidence of actual reliability data for the local electricity grid distribution (including data centre internal electrical design) for the Environment Agency to judge the realistic likelihood of the plant needing to operate for prolonged periods in an emergency mode (especially if emissions model so as to exceed short term air quality standards).

The site is served via Finsbury Market electricity substation, a highly resilient 33 kW source. Grid reliability is very good with historical few outages (the most recent being in May 2016 for an hour and before that in March 2010 for a few minutes). As described above, there is also battery back-up available at this site.

Reporting of standby engine maintenance run hours is required annually and any electrical outages (planned or grid failures regardless of duration) requires both immediate notification of the Environment Agency and annual reporting.

### **Best Available Techniques (BAT)**

We accept that oil fired diesel generators are presently a commonly used technology for standby generators in data centres. The Applicant submitted a complete BAT appraisal with the permit application. The key findings are as follows:

- Fuel cell technology may have potential in future but as there are not yet a significant set of examples proving it as a reliable option for backup power provisions it is unlikely to be appropriate for application at such a critical facility.
- Backup power solutions that rely on piped natural gas are unlikely to be able to provide sufficient resilience due to risk that the natural gas supply could be cut off at the same time as a mains failure – for example due to a natural disaster or domestic industrial action. On-site storage of natural gas has not been considered in detail due to the excessive storage space requirements that this would entail on such a constrained site.
- Phosphoric Acid Fuel Cells (PAFCs) and Molten Carbonate Fuel Cells (MCFCs) have been developed for stationary power generation, such as combined heat and power. They both share characteristics that make them unsuitable for providing back up power due to their high operating temperatures and consequential slow start up time. This is a particular problem for MCFCs which operate at 650°C and have a load ramping of 0.5kW per minute.
- Hydrogen gas is difficult to store over long periods. Hydrogen can be generated on site from electricity but use of grid electricity to generate hydrogen has high conversion losses and the carbon intensity of grid electricity is such that this is not a low carbon solution. Hydrogen can also be obtained on site using hydrogen reformer technology from natural gas but this presents similar problems for back up generation as other natural gas solutions.
- Liquid petroleum gas (LPG) based generation technology would have a lower air quality and global warming impact. However there is reduced resilience due to the less reliable frequency stability of LPG as compared to diesel generators. Although this could be corrected using an optimisation device the system is nevertheless less desirable as a technology for provision of backup power to mission critical IT systems. Given that the generation equipment is not expected to operate for a significant proportion of time, the environmental benefit over diesel generation technology is not considered significant enough justification.

Overall diesel generators are considered to be BAT for provision of backup power at this site due to the requirement for a cost effective, reliable and proven technique to provide operational resilience. As a proven technology, there are also proven technological and design options available to mitigate the risks of adverse environmental impacts, which have been considered by the Applicant.

The default generator specification as a minimum for new plant to minimise the impacts of emissions to air (NOx) is 2g TA-Luft (or equivalent standard) or an equivalent NOx emission concentration of 2000mg/m<sup>3</sup>. The operator has committed to ensure future generators, which would be subject to a permit variation, meet BAT requirements.

## **Noise Impacts**

### **Noise assessment**

The primary noise source on site are the generators. In April 2017, noise mitigation works were carried out at the site which involved blocking some acoustic weaknesses in the building structure that had been allowing some sound to escape from the generator room.

The Applicant submitted a noise survey with the permit application to assess the effectiveness of a noise mitigation works. The key findings are as follows:

- Noise at the site has reduced by around 5dBA following completion of the noise mitigation works. Noise monitoring data recorded prior to installation supports this assessment.
- The majority of generators at the site do not cause noise above the lowest daytime background level measured as 54 dB<sub>LA90</sub> at the nearest receptor.
- Three of the generators do have the potential to cause noise above background, with the highest measured impact at the nearest receptor being 58 dB<sub>LAeq</sub>.

It should be noted that there are no known noise complaints regarding the site. Whilst we would consider the night-time background level to be the worst-case ambient conditions, the operator has justified the use of the daytime background in their assessment due to the most likely operating scenario (testing) only occurring during the daytime. The results of the assessment show that the level of noise from these three generators is not a level where complaints are likely (+4 dBA above background).

The site maintenance and testing regime is currently arranged to ensure the impacts of noise are minimised. Given the improvements made on site as detailed above, we will now expect the operator, through the review of their EMS, to ensure that the impacts on local air quality are also given consideration when the maintenance and testing schedule is devised in the future.

### **Permit conditions**

At this time we are satisfied that a site specific Noise Management Plan (NMP) is not required beyond the controls detailed in the management system. However, the permit conditions contain a provision for the Environment Agency to request the applicant to produce and implement a NMP should the activities give rise to noise and/or vibration beyond the installation boundary.

## **Soil and Groundwater Impacts**

There are a number of fuel storage tanks at the installation, which store diesel to supply the generators. A potentially significant risk is associated with the on-site bulk storage of fuel and the potential for leaks or spills from re-fuelling, or from damage to the tanks.

The Applicant submitted an appraisal of the fuel storage arrangements and controls at the installation to demonstrate their soil and groundwater protection methodology, including compliance with the Control of Pollution (Oil Storage) (England) Regulations 2001 (OSR), and guidance on Oil Storage Regulations for Businesses, where appropriate.

All tanks are metal and meet British Standard 799-5, meeting the OSR and as such can be considered BAT. In addition, all tanks are double skinned and are able to contain an extra 10% of the capacity of the tank.

Each bulk tank is fitted with overfill protection devices and are filled via a fill point which is enclosed with a drip tray to collect any spills during re-fuelling.

**Permit conditions**

Whilst we are satisfied that there are sufficient measures in place to ensure there is adequate protection of soil and groundwater from these operations, the Applicant has not been able to undertake a site drainage survey, as described in the application submission, prior to permit issue. As such, they are uncertain about the location(s) where surface water run-off (site drainage) enters the combined sewer, if any abatement (such as oil interceptors) is afforded to the discharge, or if the integrity of the drainage system is fit for purpose. On that basis, we have included an improvement condition (IC3) to ensure the operator completes the site drainage survey within 12 months of permit issue.

## Decision checklist

Aspect considered	Decision
<b>Receipt of application</b>	
Confidential information	<p>A claim for commercial or industrial confidentiality has been made.</p> <p>We have accepted the claim for confidentiality. We have excluded financial and operational data. We consider that the inclusion of the relevant information on the public register would prejudice the applicant's interests to an unreasonable degree. The reasons for this are given in the notice of determination for the claim.</p> <p>The decision was taken in accordance with our guidance on confidentiality.</p>
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential.
<b>Consultation</b>	
Consultation	<p>The consultation requirements were identified in accordance with the Environmental Permitting Regulations and our public participation statement.</p> <p>The application was publicised on the GOV.UK website.</p> <p>We consulted the following organisations:</p> <ul style="list-style-type: none"> <li>• Tower Hamlets Council Planning Department</li> <li>• Tower Hamlets Council Environmental Protection Department</li> <li>• Public Health England</li> <li>• Director of Public Health</li> <li>• Health and Safety Executive</li> <li>• Thames Water</li> </ul> <p>The comments and our responses are summarised in the <a href="#">consultation section</a>.</p>
<b>Operator</b>	
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the facility after the grant of the permit. The decision was taken in accordance with our guidance on legal operator for environmental permits.
<b>The facility</b>	
The regulated facility	<p>We considered the extent and nature of the facility at the site in accordance with RGN2 'Understanding the meaning of regulated facility', Appendix 2 of RGN 2 'Defining the scope of the installation', Appendix 1 of RGN 2 'Interpretation of Schedule 1', guidance on waste recovery plans and permits.</p> <p>The extent of the facility is defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit.</p>

Aspect considered	Decision
<b>The site</b>	
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. The plan is included in the permit.
Site condition report	The operator has provided a description of the condition of the site, which we consider is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under the Industrial Emissions Directive.
Biodiversity, heritage, landscape and nature conservation	<p>The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat.</p> <p>We have assessed the application and its potential to affect all known sites of nature conservation, landscape and heritage and/or protected species or habitats identified in the nature conservation screening report as part of the permitting process.</p> <p>We consider that the application will not affect any sites of nature conservation, landscape and heritage, and/or protected species or habitats identified.</p> <p>We have not consulted Natural England on the application but a copy of our HRA Stage 1 form was sent to them for information. The decision was taken in accordance with our guidance.</p>
<b>Environmental risk assessment</b>	
Environmental risk	<p>We have reviewed the operator's assessment of the environmental risk from the facility.</p> <p>The operator's risk assessment is satisfactory.</p> <p>The assessment shows that, applying the conservative criteria in our guidance on environmental risk assessment, all emissions may be categorised as environmentally insignificant with the exception of long term NO<sub>2</sub>. However, our consideration of this is given in more detail in the 'Key Issues' section of this document.</p>
<b>Operating techniques</b>	
General operating techniques	<p>We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility.</p> <p>The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.</p>
Operating techniques for emissions that do not screen out as insignificant	<p>Emissions of long term NO<sub>2</sub> cannot be screened out as insignificant. We have assessed whether the proposed techniques are BAT.</p> <p>This is explained in more detail in the 'Key Issues' section of this document.</p>



Aspect considered	Decision
Operating techniques for emissions that screen out as insignificant	Emissions of other key pollutants have been screened out as insignificant, and so we agree that the applicant's proposed techniques are BAT for the installation.  This is explained in more detail in the 'Key Issues' section of this document.
<b>Permit conditions</b>	
Raw materials	We have specified limits and controls on the use of raw materials and fuels.
Improvement programme	Based on the information on the application, we consider that we need to impose an improvement programme.  These requirements and the reasons we have included them are outlined in the 'Key Issues' Section.
Emission limits	We have decided that emission limits are not required in the permit but instead the operator shall record operating hours for compliance purposes.
Reporting	We have specified reporting in the permit to ensure that the installation is being operated in line with the specified operating techniques and to ensure that we are notified immediately in the instance that the site ever operated in emergency scenario mode.
<b>Operator competence</b>	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.  The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.
Relevant convictions	The Case Management System and National Enforcement Database have been checked to ensure that all relevant convictions have been declared.  No relevant convictions were found. The operator satisfies the criteria in our guidance on operator competence.
Financial competence	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.

Aspect considered	Decision
<b>Growth Duty</b>	
<p>Section 108 Deregulation Act 2015 – Growth duty</p>	<p>We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit.</p> <p>Paragraph 1.3 of the guidance says:</p> <p>“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”</p> <p>We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.</p> <p>We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.</p>

# Consultation

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public and the way in which we have considered these in the determination process.

## Responses from organisations listed in the consultation section

<b>Response received from</b>
Public Health England
<b>Brief summary of issues raised</b>
Recommend that any Environmental Permit issued for this site should contain conditions to ensure that the potential emissions do not impact upon public health.
<b>Summary of actions taken or show how this has been covered</b>
This is has been addressed in the 'Key Issues' section of this document.