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LON4

**Planning Condition 26  
Energy Monitoring,  
Recording and  
Reporting**

## REVISIONS

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## 1.0 INTRODUCTION

This report has been produced to detail the strategy for metering and monitoring of energy consumption at the proposed LON4 development. The report will also detail a mechanism for reporting the data to Hillingdon Council in line with the GLA's "Be Seen" guidance.

### 1.1.1 Site Description

London 4, Hayes is the redevelopment of the site to deliver data centre campus including: two data centre buildings; associated energy and electricity infrastructure, buildings, and plant; security gatehouse, systems and enclosures; works to the highway, car parking and cycle parking; hard and soft landscaping; as well as associated infrastructure, ancillary office use, and associated external works

#### 1.1.1.1 Planning Condition 26

Planning Condition 26 is worded as follows:

*Prior to operation of the development, a scheme for the detailed monitoring, recording and reporting of the CO2 reductions (regulated and unregulated) identified in the 'BW-EP200114-U-REP-700005-4 Rev. 4 Energy Statement (Dated 24th February 2022)' shall be submitted to and approved in writing by the Local Planning Authority. The scheme shall set out how CO2 reductions will be monitored and recorded and details of the report mechanism to the Local Planning Authority. The scheme shall include the triggers and mechanisms for identifying and implementing remedial measures should the approved CO2 reductions not be achieved. The development must be operated in accordance with the approved scheme.*

## 1.2 Detailed Monitoring

A breakdown of the estimated energy consumption for the proposed LON4 is detailed below.

End Use	Predicted Consumption (kWh/m <sup>2</sup> )
Heating	1.53
Cooling	155.55
Auxiliary	78.26
Lighting	26.74
Hot Water	0.49
Unregulated Energy	2188.43
Total Excluding Unregulated Energy	262.57
Total Including Unregulated Energy	2451.00

The carbon dioxide emissions for each stage in the London plan energy hierarchy are detailed below:

	Carbon dioxide emissions (tonnes CO <sub>2</sub> per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the building regulations	5,894	18,761
After energy demand reduction (be lean)	2126	18,781
After heat network connection (be clean)	2126	18,781
After renewable energy (be green)	2111	18,781

The regulated carbon dioxide savings from each stage in the energy hierarchy are shown below:

Regulated carbon dioxide savings		
	(tonnes CO2 per annum)	(%)
Be Lean: Savings from energy demand reduction	3768	64%
Be clean: savings from heat network	0	0.0%
Be Green: savings from renewable energy	15.1	0.3%
Cumulative on-site savings	3783	64%
Annual savings from offset payment	2111	N/A
Tonnes (CO2)		
Cumulative savings for offset payment*	63,328 tonnes	

*\*Calculated as 30 years of the carbon shortfall*

The above data is based on the UK Part L National Calculation Methodology (NCM). To obtain a more accurate baseline the actual energy consumption after one year of occupancy will be used. To allow for partial building occupancy. This will be apportioned to a ratio as follows:

$$\text{Baseline energy consumption} = \text{Year one energy consumption} \times \frac{\text{Total let area at end of year one}}{\text{GIFA}}$$

### 1.3 Monitoring

The design of the development has included an extensive energy metering strategy which is outlined below.

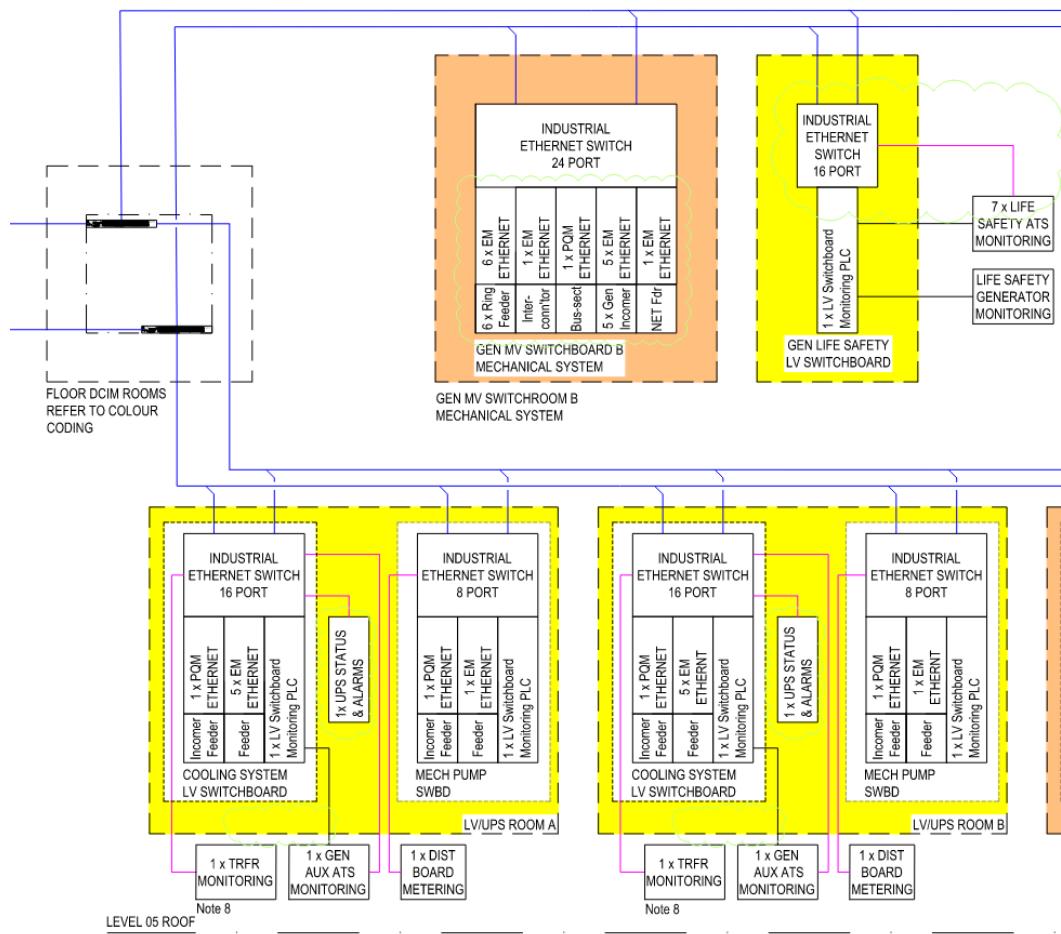
The data centre uses a power management system/System Control and Data Acquisition (PMS/SCADA) which shall utilize programmable logic controllers (PLC) for the management of the electrical circuit breakers as detailed within this specification and project documents. The PMS/SCADA shall also incorporate a supervisory control and data acquisition (SCADA) system to provide and HMI to display, log record and all activities on the BMS. The SCADA control system will monitor and control the complete electrical power system on the Site, including safety interlocking and automatic sequential operations of circuit breakers and provide remote monitoring of the electrical switchgear from a centralised Control Room with remote switching capabilities.

All metering data is gathered by a dedicated EPMS system (Energy and Power Monitoring system).

The EPMS shall be designed to provide the metering and power quality monitoring from the meters installed in the following locations or as shown on the electrical schematics:

- Breakers on the LV switchboards as designated on the electrical schematics.
- All breakers on the MV switchboards.
- Local distribution boards as designated on the electrical schematics and schedules.
- All energy meters, thermal meters and water flow meters on mechanical systems via the BMS.
- All fuel meters via the generator system control and PMS/SCADA system

An example of the different meters on the EPMS system is shown below:



Summing up the electrical energy consumption from each incommers will provide a total energy usage value for each data centre building, and this will be multiplied by the most appropriate electrical carbon factor for each year taken from The UK Government's Greenhouse gas reporting: conversion factors. This will ensure that the carbon emissions are calculated based on an up to date reflection of the UK electrical grid.

## 1.4 Reporting

Energy consumption data will be entered into the GLA's webform annually for the first 5 years of operation. Building one and two will be reported as separate reportable units.

The following data is relevant to the development and will be reported for both buildings:

- Annual electricity use
- Energy Generated by the PV arrays
- Any energy exported to a district heat network in the future

## 1.5 Triggers and Mechanisms for Identifying and Implementing Remedial Measures

The BMS, is a Building Monitoring System, rather than management system and will therefore not control any critical systems directly. Critical systems will be controlled by discrete local control systems, which will interface to the BMS for monitoring only.

The BMS shall enable the following:

- Real time monitoring only of all mechanical systems and equipment.
- Monitoring of independent equipment systems. System will be complete with interactive graphics and trending.
- Adjustment of setpoints from the BMS.
- Control of all critical systems via individual plant and equipment control systems i.e. chillers, pumps, CRAH units will be via discrete control systems.

All critical plant and equipment will have standalone controls, with BMS control provided to non-critical plant via local control panels. All alarms will be distributed by email to owners' systems.

Any loss in communications will result in the equipment to moving to standalone function, which will operate in its last known state. The BMS will cover both the critical and non-critical services, and interface with other site services i.e. fire systems and security. No failure of the BMS system will impact upon the continued operation of the data centre.

Where control of critical systems is required, i.e. chilled water supply pumps, these will be provided with local duplicate control panels complete with hard wired inputs to protect these systems against BMS failure.

The system will be provided with a report generator/writing program to gather, store and manipulate data to produce operator generated reports. Both text and dynamic graphics will be available on a web browser-based display in addition to the static workstations.

All alarm types (analogue, digital or mismatch) will generate an alarm based on the associated alarm priority, the alarm priority being defined within the associated controller equipment schedules.

Alarms in escalating priority will be as below.

Alarm Priority	Alarm Colour	Controller Equipment Schedule Priority
Information	Green	P5 (PI)
Alert	Blue	P4
Warning	Yellow	P3
Acute	Amber	P2
Critical	Red	P1

All alarms raised will be logged on the BMS servers with the date and time and recording user acknowledgement, deletion, or disabling of an alarm, the name of the user, the alarm, the action taken on the alarm and a time / date stamp.

Data Hall space temperature, humidity and pressure sensors will be interlaced between the primary and secondary controllers in a 'salt and pepper' configuration to improve system resilience and to ensure that in the event of a controller being offline either due to maintenance or a hardware fault, then temperature, humidity and pressure condition monitoring within the Data Hall can still be maintained, even though this may be with a reduced number of sensors.

For each critical equipment room, the temperature and humidity sensors will be interlaced between the primary and secondary controllers in a 'salt and pepper' configuration to improve system resilience and to ensure that in the event of a controller being offline either due to maintenance or a hardware fault, then temperature and humidity condition monitoring within each respective electrical or technical room can still be maintained, albeit with a reduced number of sensors.

All sensed values shall be trend logged. All devices shall be logged every [5] minutes or at a suitable logging interval to provide accurate and representative historical reporting of all points and values for each plant or system as appropriate. The logged data shall be archived onto the BMS servers for 10 years.

The BMS will provide monitoring of the data hall chilled water systems, office space HVAC equipment along with monitoring of all miscellaneous system, including but not limited to;

- leak detection
- boosted cold water system
- rainwater harvesting
- sump pumps
- data hall and critical rooms temperature and humidity
- extract systems

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All electrical metering data is gathered by a dedicated EPMS system (Energy and Power Monitoring system).

A head-end PC with a suitable graphics package will be provided at the facility operations centre.

Access to the BMS and EPMS system will be available to the facilities management team. The team will use the generated data and alarm system to identify energy consumption that is greater than expected. This will be used to investigate the cause of the increased consumption and measures to address the cause will be sought.

## OFFICE LOCATIONS

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