PLON01

Prologis Park West, Units DC5 and DC6, Iron Bridge Road North, West Drayton, Uxbridge, UB11 1BT

Energy & Sustainability Statement

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Revision

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This document and its contents are confidential and have been prepared and are intended solely for Prologis UK CCCXXXVIII S.À R.L.'s information and use in relation to the proposed development at Prologis Park West, Units DC5 and DC6, Iron Bridge Road North, West Drayton, Uxbridge, UB11 1BT.

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Executive Summary

This Energy and Sustainability Statement has been prepared in support of a planning application submitted to the London Borough of Hillingdon for the proposed development located at Prologis Park West, Units DC5 and DC6, Iron Bridge Road North, West Drayton, Uxbridge, UB11 1BT.

The scope of the report covers:

- Energy Strategy
- Whole Life Carbon Assessment
- BREEAM

The planning policies as presented by the London Borough of Hillingdon and Greater London Authority require the energy statement to include a calculation of baseline energy demand and CO_2 emissions after the application of energy efficiency measures, decentralised Low/Zero Carbon generation and renewable energy sources.

In accordance with the London Borough of Hillingdon and Greater London Authority (GLA) document **Energy Assessment Guidance (June 2022),** the calculations within this report are based upon the latest Part L 2021 carbon emissions factors, as stated within tables 29, 30 & 31 of the **NCM Modelling Guide 2021 Edition**, and tables created using the latest (at the time of writing) GLA carbon emission reporting spreadsheet, ***Part_L_2021_gla_carbon_emission_reporting_spreadsheet_v2.0_0***.

The energy assessment section of the report addresses requirements in Policies SI 2 to SI 4 inclusive; recognises the integrated nature of London Plan policies; and takes account of relevant design, spatial, air quality, transport and climate change adaptation policies in the Plan. The assessment also considers the GLA guidance (June 2022) for calculating regulated CO_2 emissions.

This report shows that:

Energy

- The existing building is modern and thermally efficient incorporating high levels of insulation and very low air permeability
- There is no viable heat network available for connection at the site, and the use of Combined Heat and Power (CHP) has been assessed as unfeasible.
- The building includes the following low and zero carbon technologies:
    - Air Source Heat pumps / VRF providing low carbon heating to the offices
    - Solar Photovoltaic Panels generating zero carbon electricity
    - Solar Thermal Panels providing domestic hot water
- The data centre process cooling system is highly energy efficient, including high efficiency air cooled chillers with free cooling function
- Initial calculations indicate the data centre will achieve a CNDCP[1] compliant annualised dPUE[2] of ≤1.3[3]
- Carbon reporting has been completed in accordance with the GLA energy hierarchy and the results are shown below

[1] CNDCP = Climate Neutral Data Centre Pact
[2] dPUE = Design Power Usage Effectiveness
[3] Based upon initial high level calculations, subject to further design development, the figure may go up or down.

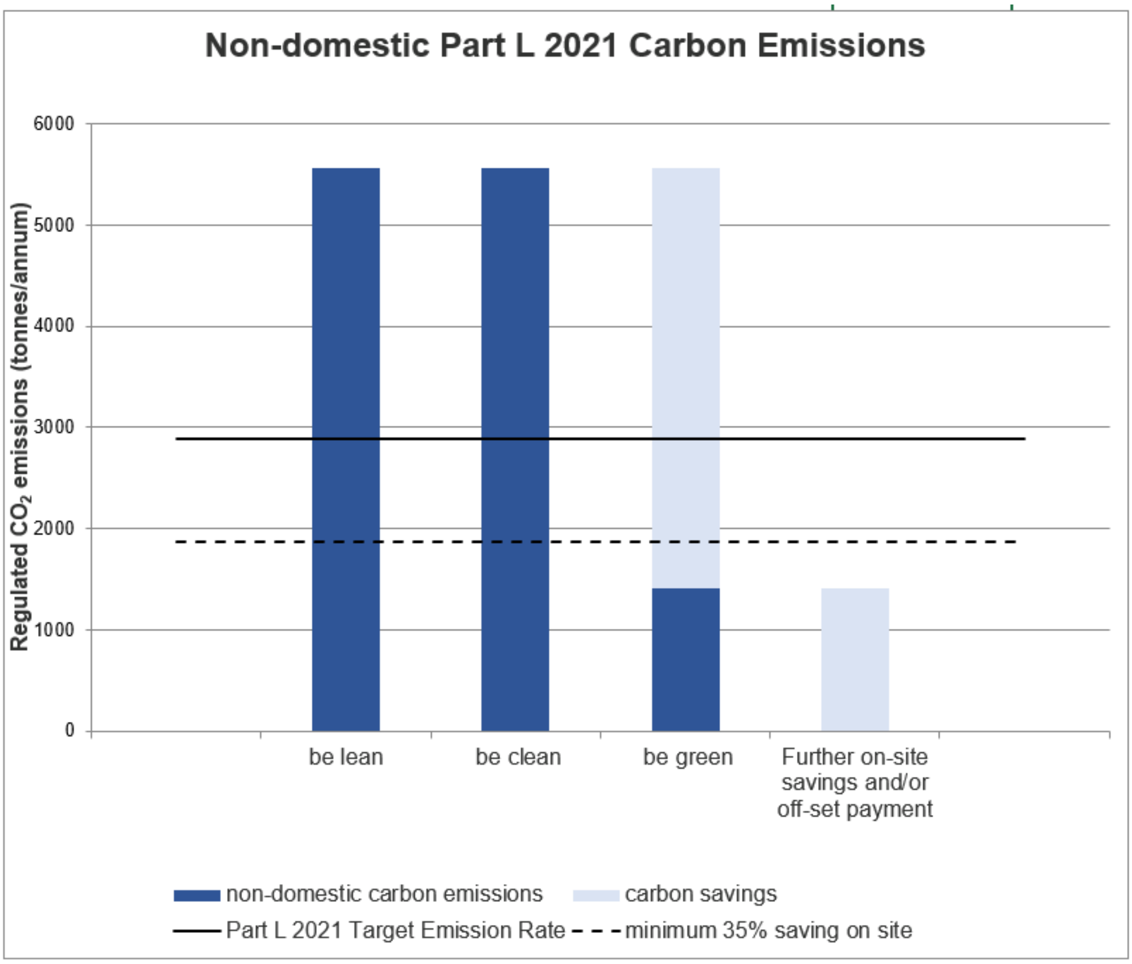

Figure 1- Part L Carbon Emissions

Lean CO_2 emissions' reductions are achieved by the energy efficient design of the building and by implementing passive and active energy saving measures where feasible. The key energy efficiency measures incorporated within the building are as follows:

- Very high level of air tightness
- High efficiency VRF for space heating with no gas on site
- Mechanical ventilation with heat recovery
- High Efficacy LED Luminaires
- Lighting control including presence detection
- 100% electric DHW

Clean CO_2 emissions reductions are not achievable due to the absence of District Heating networks and CHP not being feasible for the proposed development. As such, the Clean building CO_2 emissions are equal to those for the Lean building.

Green CO_2 emissions reductions are achieved by the introduction of high efficiency VRF, solar thermal domestic hot water and solar photovoltaic panels.

Table 1 - Carbon Dioxide Emissions after each stage of the energy hierarchy

Refurbished Buildings	CARBON DIOXIDE EMISSIONS (TONNES CO_2 PER ANNUM)	
	REGULATED	UNREGULATED
Baseline: Part L 2021 of the Building Regulations Compliant Development	2,889.6	80,781.9
After Energy Demand Reduction (Be Lean)	5,567.6	80,781.9
After Heat Network Connection/CHP (Be Clean)	5,567.6	80,781.9
After Renewable energy (Be Green)	1,403.6	80,781.9

Table 2 - Regulated Carbon Dioxide Emissions savings after each stage of the energy hierarchy

Refurbished Buildings	REGULATED CARBON DIOXIDE SAVINGS	
	TONNES CO_2 PER ANNUM	%
Be Lean: Savings from energy demand reduction	-2,680.7	-93%
Be Clean: Savings from heat network / CHP	0.0	0%
Be Green: Saving from renewable energy	4,164.0	144%
Total Cumulative Savings	1,483.3	51%
Annual savings from off-set payment	1,403.6	-
	TONNES CO_2 PER ANNUM	
Cumulative savings for offset payment	42,108	-
Cash-in-lieu contribution	£4,000,253	

The carbon savings and cash in lieu contribution presented are based on preliminary thermal modelling and are indicative only. They remain subject to change as the design develops.

BREEAM

- Full BREEAM certification is not required by either the GLA or the London Borough of Hillingdon.
- The development will comply with London Plan Policy SI 5 by achieving the BREEAM 'Wat 01' Excellent standard, as confirmed through pre-assessment.
- The developer has completed a BREEAM Data Centres 2010 Pre-assessment
- The BREEAM pre-assessment shows the current design is predicted to achieve a BREEAM rating of "Very Good"

Whole Life Carbon Assessment (WLCA)

Red Engineering Design Ltd has been appointed by Prologis UK CCCXXXVIII S.à r.l. to report the Whole Life-Cycle Assessment (WLCA) of Project PLON01 at Prologis Park West, Units DC5 and DC6, Iron Bridge Road North, West Drayton, Uxbridge, UB11 1BT. This WLCA has been prepared in support of the Planning Application in accordance with Hillingdon Local Plan: Part 1 – Strategic Policies, Local Plan: Part 2 – Development Management Policies and the London Plan. The assessment has been carried out using One Click LCA software, following the requirements of RICS and EN 15804 +A2 standards.

Result summary

7,481,632,597
Total kg CO_2e – Non-decarbonised Scenario

	GWP
Product stage (A1-A3)	34,411,996
Transport to construction site (A4)	4,777,856
Installation/Assembly (A5)	7,508,803
Use stage (B1-B5)	43,335,782
Energy/Water use (B6-B7)	7,389,607,506
End of life stage (C1-C4)	2,004,779
Beyond the system boundary (D)	-25,490,762

1,133,432,877
Total kg CO_2e – Decarbonised Scenario

	GWP
Product stage (A1-A3)	34,411,996
Transport to construction site (A4)	4,777,856
Installation/Assembly (A5)	7,508,803
Use stage (B1-B5)	36,350,448
Energy/Water use (B6-B7)	1,048,768,835
End of life stage (C1-C4)	1,629,065
Beyond the system boundary (D)	-21,088,702

No direct comparison with national benchmark figures has been made, as benchmarks are not published for data centres projects and would not reflect their unique operational and material profile. Instead, this WLCA establishes a project-specific baseline for tracking carbon reduction.

A one-year reference service life analysis was undertaken to isolate and highlight the material impacts, which confirmed structural and façade systems as the dominant embodied carbon hotspots.

Commitment and Next Steps

- The WLCA will be refined at key design stages, using project-specific design data and supplier information.
- The project team will investigate further opportunities to reduce embodied carbon, including:
  - Low-carbon concrete mixes (e.g. GGBS, cement substitutes).
  - Recycled content in structural steel.
  - Alternative façade systems.
- Operational carbon will be addressed through energy efficiency measures and the potential integration of renewable energy solutions.

This WLCA provides a transparent and policy-compliant baseline for the Proposed Development. It demonstrates early-stage consideration of both embodied and operational carbon, identifies material hotspots, and establishes a framework for ongoing carbon reduction as the design develops, fully aligning with the requirements of the Hillingdon Local Plan: Part 1 – Strategic Policies, Local Plan: Part 2 – Development Management Policies and the London Plan.

Contents

1.0 Introduction

This report sets out the approach to energy efficiency and sustainability for the proposed development at Prologis Park West, Units DC5 and DC6, Iron Bridge Road North, West Drayton, Uxbridge, UB11 1BT.

1.1 Structure of the report

This report comprises a number of sections that together provide a full description of the evaluation criteria, input data, assumptions and modelling methodology used in order to provide recommendations for the project to reduce energy consumption and associated CO_2 emissions.

This comprises:

- Site Context
- Policy Review
- Energy Assessment
    - Energy Hierarchy
    - LEAN - Demand Reduction Measures
    - Cooling
    - CLEAN - Decentralised Energy
    - GREEN - Review of Low/Zero Carbon Technologies
    - Energy Consumption and CO2 Emissions
    - SEEN -Monitoring & Reporting Carbon Emissions
    - Unregulated Energy performance of the Proposed Building
- Whole Life Carbon Assessment (WLCA)
- BREEAM

2.0 Site Context

2.1 Site Description

The Site forms part of Prologis Park West which comprises a total of six large scale industrial buildings. It is on the eastern section of the estate and measures approximately 6.3 hectare (ha).

The Site currently accommodates two warehouse buildings which were completed in 2023:

- Unit 1 (DC5 - Distribution Centre 5);
- Unit 2 (DC6 - Distribution Centre 6).

Unit 1 and Unit 2 are single-storey warehouse units measuring: 18,063 sq. m (194,428 sq. ft) and 13,290 sq. m (143,052 sq. ft) respectively. Each building has a clear haunch height of 15m and an overall building height of 18m.

The existing buildings are currently vacant but benefit from the flexible use included within the following use classes: Classes B2, B8 and E(g)(iii).

Direct access to the Site is via Iron Bridge Road, which forms the western boundary and runs in a north-south direction from the Stockley Road roundabout to West Drayton.

The Site is bounded to the east by Stockley Road (A408) and beyond that; Stockley Park which accommodates a series of large office buildings rising two to three storeys high. To the north lies Horton Road and beyond that significant mature landscaping including Stockley Country Park and Stockley Park Golf Course. To the south, between the Grand Union Canal and a mainline railway is a cluster of industrial yards that include carparking and storage facilities. Beyond that is the closest area of residential land use. To the west, the Site is bounded by Iron Bridge Road North, the remainder of the Prologis Park West Estate, and further commercial uses.

2.2 Planning History

A planning application for the Redevelopment of the site to provide two industrial units providing industrial floorspace (Use Class B1c/B2/B8) and ancillary offices together with associated parking, access arrangements, landscaping and infrastructure reference: 39207/APP/2020/2188, was granted approval by London Borough of Hillingdon Council, on 24 June 2021.

3.0 Policy review

This section reviews the planning policies, energy and sustainability targets that are relevant to this development.

3.1 National Planning Policy Framework (December 2024)

The purpose of the planning system is to contribute to the achievement of sustainable development, including the provision of homes, commercial development and supporting infrastructure in a sustainable manner. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. At a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection.

Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

- an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- an environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

These objectives should be delivered through the preparation and implementation of plans and the application of the policies in this Framework; they are not criteria against which every decision can or should be judged. Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area.

So that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development.

Plans and decisions should apply a presumption in favour of sustainable development.
For **plan-making** this means that:

- all plans should promote a sustainable pattern of development that seeks to: meet the development needs of their area; align growth and infrastructure; improve the environment; mitigate climate change (including by making effective use of land in urban areas) and adapt to its effects;
- strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas6, unless:

  - the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for restricting the overall scale, type or distribution of development in the plan area; or
  - any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.

For **decision-taking** this means:

- approving development proposals that accord with an up-to-date development plan without delay; or
- where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:
  - the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for refusing the development proposed; or
  - any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole, having particular regard to key policies for directing development to sustainable locations, making effective use of land, securing well-designed places and providing affordable homes, individually or in combination.

3.2 London Borough of Hillingdon Local Plan

Including:

- Local Plan Part 1: Strategic Policies (Adopted November 2012)
- Local Plan Part 2: Development Management Policies (Adopted January 2020)
- Local Plan Part 2: Site Allocations and Designations (Adopted January 2020)

3.2.1 Policy SO11 - Climate Change Adaption & Mitigation

Address the impacts of climate change and minimise emissions of carbon and local air quality pollutants from new development and transport.

3.2.2 Policy DMEI 2 – Reducing Carbon Emissions

a) All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets.
b) All major development proposals must be accompanied by an energy assessment showing how these reductions will be achieved.
c) Proposals that fail to take reasonable steps to achieve the required savings will be resisted. However, where it is clearly demonstrated that the targets for carbon emissions cannot be met onsite, the Council may approve the application and seek an off-site contribution to make up for the shortfall.

3.2.3 Policy DMEI 3 – Decentralised Energy

a) All major developments are required to be designed to be able to connect to a Decentralised Energy Network (DEN).
b) Major developments located within 500 metres of an existing DEN, and minor new-build developments located within 100 metres, will be required to connect to that network, including provision of the means to connect to that network and a reasonable financial contribution to the connection charge, unless a feasibility assessment demonstrates that connection is not reasonably possible.
c) Major developments located within 500 metres of a planned future DEN, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be required to provide a means to connect to that network and developers shall provide a reasonable financial contribution for the future cost of connection and a commitment to connect via a legal agreement or contract, unless a feasibility assessment demonstrates that connection is not reasonably possible.
d) The Council will support the development of DENs and energy centres in principle, subject to meeting the wider policy requirements of this plan and in particular on design and air quality.

3.3 The London Plan (Adopted March 2021)

3.3.1 Policy SI 2 Minimising greenhouse gas emissions

A Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

- be lean: use less energy and manage demand during operation
- be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
- be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
- be seen: monitor, verify and report on energy performance.

B Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C A minimum on-site reduction of at least 35 % beyond Building Regulations is required for major development. Residential development should achieve 10 %, and non-residential development should achieve 15% through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either: 1) through a cash in lieu contribution to the borough's carbon offset fund, or 2) off-site provided that an alternative proposal is identified, and delivery is certain.

D Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

E Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, which are not covered by Building Regulations, i.e. unregulated emissions.

F Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

3.3.2 Policy SI 5 Water Infrastructure

A In order to minimise the use of mains water, water supplies and resources should be protected and conserved in a sustainable manner.

B Development Plans should promote improvements to water supply infrastructure to contribute to security of supply. This should be done in a timely, efficient and sustainable manner taking energy consumption into account.

C Development proposals should:

1) through the use of Planning Conditions minimise the use of mains water in line with the Optional Requirement of the Building Regulations (residential development), achieving mains water consumption of 105 litres or less per head per day (excluding allowance of up to five litres for external water consumption)
2) achieve at least the BREEAM excellent standard for the 'Wat 01' water category 160 or equivalent (commercial development)
3) incorporate measures such as smart metering, water saving and recycling measures, including retrofitting, to help to achieve lower water consumption rates and to maximise future-proofing.

D In terms of water quality, Development Plans should:

1) promote the protection and improvement of the water environment in line with the Thames River Basin Management Plan, and should take account of Catchment Plans
2) support wastewater treatment infrastructure investment to accommodate London's growth and climate change impacts. Such infrastructure should be constructed in a timely and sustainable manner taking account of new, smart technologies, intensification opportunities on existing sites, and energy implications. Boroughs should work with Thames Water in relation to local wastewater infrastructure requirements.

E Development proposals should:

1) seek to improve the water environment and ensure that adequate wastewater infrastructure capacity is provided

2) take action to minimise the potential for misconnections between foul and surface water networks.

F Development Plans and proposals for strategically or locally defined growth locations with particular flood risk constraints or where there is insufficient water infrastructure capacity should be informed by Integrated Water 42 Management Strategies at an early stage.

4.0 Energy Hierarchy

The figure below shows the energy hierarchy, which prioritises actions to minimise environmental impact and maximise energy efficiency in building design.

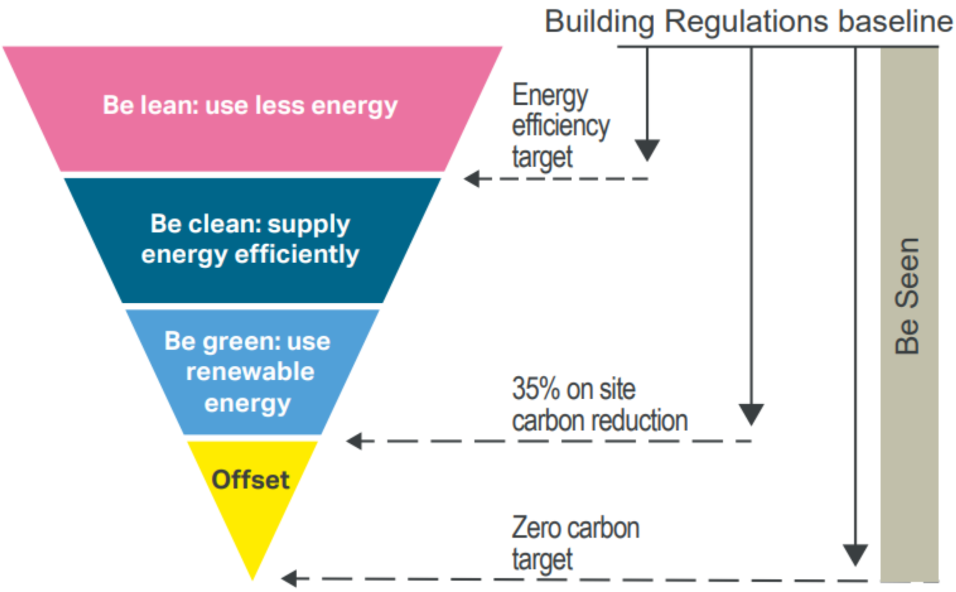

Figure 2 - Energy Hierarchy

- **Lean:** Reduce energy demand by designing buildings to use less energy through improved insulation, energy-efficient lighting, and appliances, and optimising natural light and heat.
- **Clean:** Supply energy efficiently, such as by using heat networks.
- **Green:** Maximise the use of renewable energy sources like solar panels and wind turbines to generate clean energy on-site.
- **Be Seen**: monitor, verify and report on energy performance.

5.0 Building Model Isometric Views

The presented model below captures the building geometry, constructions, usage, climate and equipment through the Integrated Data Model (IDM) within IES-VE. The following isometric views show the proposed buildings.

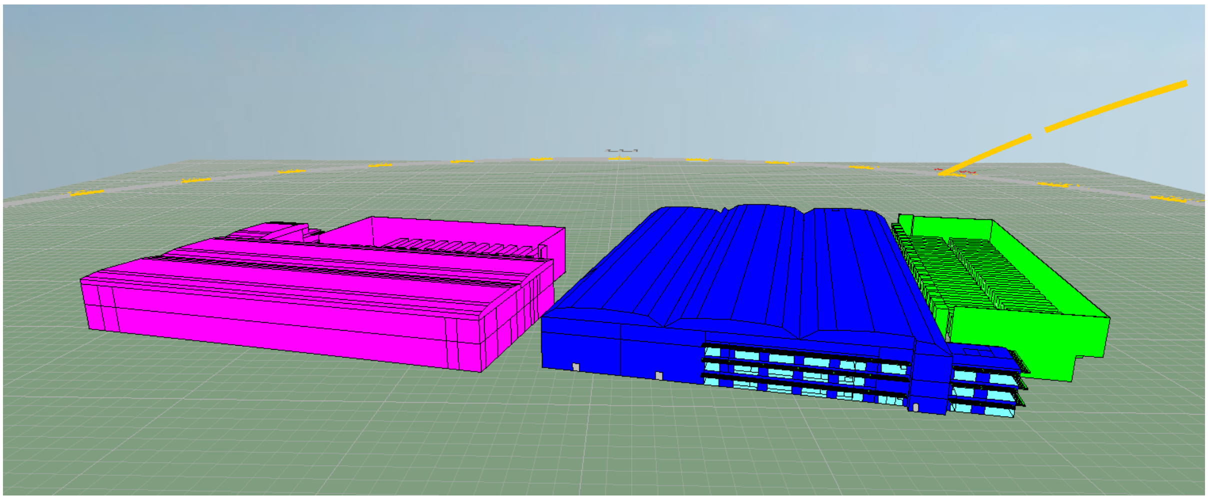

Figure 3 - DC1 West Orientation

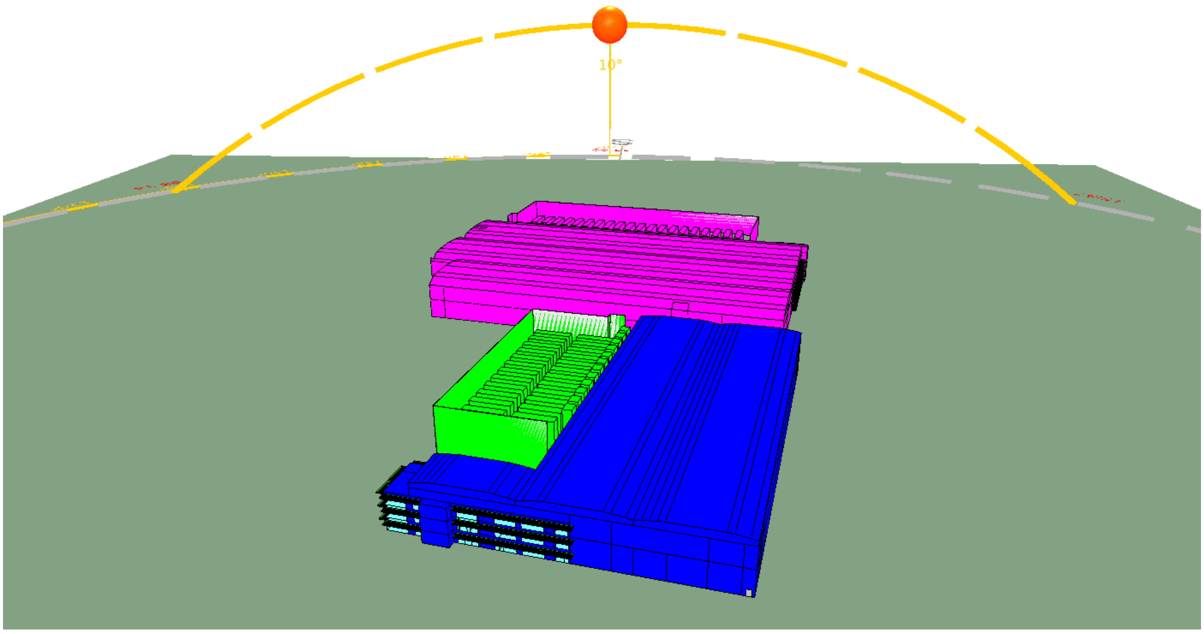

Figure 4 - DC2 North Orientation

6.0 Lean - Demand Reduction Measures

The Lean stage of the energy hierarchy focuses on reducing energy demand and improving energy efficiency through passive design measures, enhanced building fabric, and efficient building services. The aim is to minimise energy use before considering energy supply options. Typical improvements include high-performance insulation, airtight construction, solar shading, efficient lighting and HVAC systems, and intelligent controls. These measures contribute to regulatory compliance and support the overall carbon reduction strategy for the development.

However, the scope for passive design measures in data centres is inherently limited due to their operational nature. Unlike residential or commercial buildings, data centres have a constant and high internal heat gain from IT equipment, which drives a continuous cooling demand regardless of external conditions. As such, strategies like solar gain reduction or natural ventilation offer minimal benefit. While building fabric performance remains important, the dominant energy loads are driven by equipment and cooling systems, meaning that deeper carbon reductions must be achieved through highly efficient mechanical systems and operational controls rather than passive design alone.

6.1 Description of Passive Energy Features

6.1.1 Site Orientation and Site Location

The building is existing and offices are being retained, as such there is no scope for improvement here.

6.1.2 U-values and Thermal Mass.

The existing building already achieves high levels of thermal performance, such that there are no commercially viable fabric upgrades due to diminishing returns.

Also, it should be noted that although for the vast majority of building types in the UK, low U-values are beneficial, there is no energy benefit gained by improving upon the limiting Part L U-values for data halls as heat flux through these elements is overwhelmingly beneficial as, in order to minimise cooling loads, the data halls are maintained at temperatures well above UK average ambient temperatures. As such, heat losses through the fabric reduce the annual cooling energy demand to the data halls.

6.1.3 Glazing & Shading Performance

The building already has high performance glazing and benefits from brise soleil to the offices. The existing warehouse rooflights will be covered to prevent unwanted solar gains to roof voids within the process areas of the building.

6.2 Description of Active Energy Features

This section of the report describes the active energy reduction features which have been considered and will be included in the building design:

6.2.1 HVAC Plant Efficiencies

All new equipment and plant shall exceed the minimum part L efficiency requirements.

6.2.2 Energy Efficient Lighting

High efficacy LED luminaires will be employed throughout the building with performance in excess of Part L limiting values.

6.2.3 Lighting Controls

Lighting will be controlled using passive infra-red (PIR) occupancy sensors to ensure that the lights are switched off when spaces are unoccupied.

6.2.4 Use of low energy fans

Low energy fans will be used with specific fan powers as good as or better than the limiting efficiencies defined in Part L (2021). Duct sizing and routes will be optimised to minimise pressure drops and associated fan energy.

6.2.5 Mechanical ventilation with heat recovery

The office areas will benefit from mechanical ventilation with heat recovery utilising warm exhaust air to pre-heat incoming fresh air to reduce energy consumption.

6.2.6 Variable Speed Drives

Variable speed drives shall be incorporated to ensure fans and pumps operate no faster than required, thereby reducing energy consumption.

6.2.7 Effective Building Energy Management System

A full building management system will be incorporated to ensure plant is controlled and operated efficiently.

Metering of the energy uses within the development separately will help the building users identify areas of increased consumption and highlight potential energy-saving measures for the future, hence reducing the associated annual CO_2 emissions from these systems.

6.2.8 Commissioning

An extensive commissioning programme will be incorporated within the project programme, with time allowed for reconfiguring plant and equipment if needed, to ensure that development's HVAC systems and integrated control systems are configured to operate at peak performance.

7.0 Cooling & Overheating

At this stage, insufficient detail is available to undertake a full dynamic overheating assessment. The development involves the refurbishment and change of use of an existing building, and final layouts, specifications, occupancy profiles and system sizing is not yet finalised.

The office areas will be mechanically ventilated and served by a VRF system capable of providing both heating and cooling. External shading is incorporated into the design to reduce solar gains, and low-energy lighting will be used to minimise internal heat gains.

Although a full overheating assessment in accordance with CIBSE TM52: The Limits of Thermal Comfort has not yet been undertaken, the design team is committed to ensuring compliance with at detailed design stage.

A dynamic thermal model will be developed to assess overheating risk using appropriate weather files (e.g. DSY1), occupancy schedules, and internal gains.

The following mitigation measures are currently proposed:

- External shading to reduce solar gains
- Solar control glazing to be considered
- Mechanical ventilation with heat recovery
- VRF heating and cooling system with zoning and controls
- Low-energy lighting and efficient equipment to reduce internal heat gains.

A full overheating risk assessment will be completed at RIBA Stage 3 to support detailed design and demonstrate compliance with relevant planning and building regulations.

7.1.1 Non-process areas

A number of measures have been applied or exist to reduce the likelihood of overheating and reliance on air conditioning systems, in accordance with the cooling hierarchy presented in policy SI 4 of London Plan:

- *Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure. It is also expected that external shading will form part of major proposals.*
    - The building orientation and location are limited by the site, but the design incorporates solar control glazing and external shading to office areas to reduce unwanted solar gains.

- *Minimise internal heat generation through energy efficient design: For example, heat distribution infrastructure within buildings should be designed to minimise pipe lengths, particularly lateral pipework in corridors of apartment blocks, and adopting pipe configurations which minimise heat losses e.g., twin pipes.*
    - High efficacy LED luminaires with lighting controls will be employed within the building in order to reduce internal gains;

- *Provide passive ventilation: For example, through the use of openable windows, shallow floorplates, dual aspect units or designing in the 'stack effect' where possible.*
    - Openable windows are not be compatible with the security strategy and requirements of the building. In this instance, a mechanical ventilation system is the most suitable solution and the heat recovery will reduce fresh air cooling loads.

- *Provide mechanical ventilation: Mechanical ventilation can be used to utilise 'free cooling' where the outside air temperature/enthalpy is below that in the building during summer months. This will require a by-pass on the heat recovery system for summer mode operation.*
    - Mechanical ventilation will be sized to provide tempered fresh air only as the flow rates are not sufficient to provide any significant cooling for the building volume.

- *Provide active cooling systems: The increased use of air conditioning systems is generally not supported, as these have significant energy requirements and, under conventional operation, expel hot air, thereby adding to the urban heat island effect. However, once passive measures have been prioritised if there is still a need for active cooling systems, such as air conditioning systems, these should be designed in a very efficient way and should aim to reuse the waste heat they produce.*
    - Cooling to the admin areas will be supplied by a highly efficient VRF system, natural ventilation is not feasible due to security requirements.

7.1.2 Process areas

Process areas including both IT equipment and supporting building services plant and infrastructure have heat gains far in excess of standard building types. As such natural ventilation is not an option.

The process cooling system comprises Air Cooled Chillers (ACC) providing chilled water to Computer Room Air Handling Units (CRAHs).

7.2 Cooling Demand

The following table shows the total building cooling demand reduction for the buildings achieved by the measures specified above. As can be seen, the actual cooling demand is substantially lower than the notional building.

Table 3 - Cooling demand following the incorporation of cooling hierarchy

	AREA WEIGHTED AVERAGE NON-DOMESTIC COOLING DEMAND (MJ/m^2)	TOTAL AREA WEIGHTED NON-DOMESTIC COOLING DEMAND (MJ/YEAR)
Actual	5622.1	282,202,445
Notional	5672.8	284,744,291

8.0 Clean - Decentralised Energy

The purpose of this section is to assess the feasibility of decentralised energy sources for the proposed development. In line with the GLA London Plan Energy Assessment Guidance (2022), the Clean stage of the energy hierarchy focuses on identifying opportunities to utilise or connect to decentralised energy systems that can contribute to reducing carbon emissions.

Two decentralised energy options will be considered as part of this assessment:

- Option 1: Connection to an existing or proposed district heating network
- Option 2: On-site Combined Heat and Power (CHP)

Typically, the Clean stage is used to identify potential heat sources to serve the development. However, in the case of data centres, which inherently generate significant quantities of low-grade waste heat, the emphasis shifts towards identifying opportunities for heat export rather than heat import. This approach supports the wider decarbonisation of heat across London by enabling the recovery and redistribution of waste heat to nearby developments or networks, where feasible.

8.1 District Heating

As part of the **Clean** stage of the energy hierarchy, the **London Heat Map** was reviewed to identify existing and proposed heat networks near the development site, in accordance with the **GLA London Plan Energy Assessment Guidance (2022)**. Data centres typically generate substantial quantities of low-grade waste heat; therefore, this assessment focuses on opportunities for **heat export** rather than import.

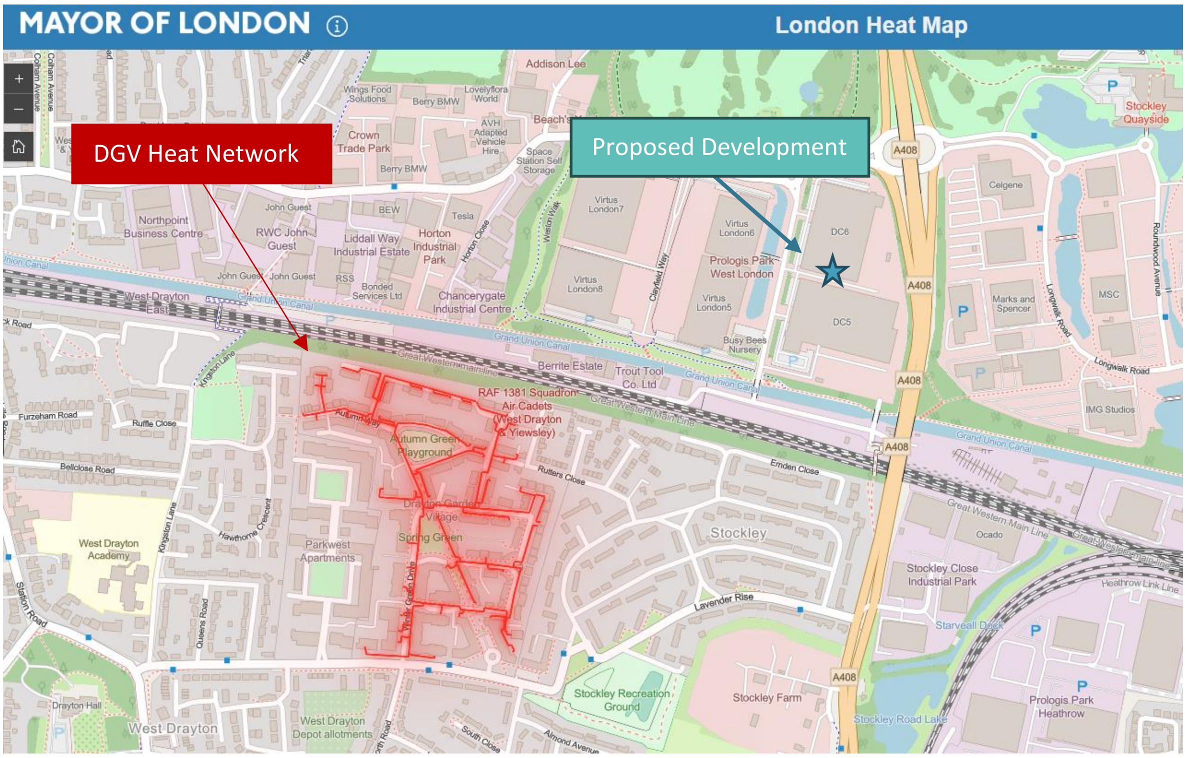

Figure 5 – London Heat Map showing existing & proposed heat networks in surrounding areas

The nearest heat network is the Drayton Garden Village (DGV) system, located over 500 metres from the development and separated by the Grand Union Canal and the Elizabeth Line railway corridor. Any connection would require complex infrastructure works, including canal and rail crossings, introducing significant cost and coordination challenges.

In addition to these spatial constraints, the DGV network operates on a gas-fired Combined Heat and Power (CHP) system with high flow and return temperatures. The data centre's waste heat is low-grade (25–30°C) and would require a heat pump to raise its temperature for integration. This adds complexity, cost, and reduces any carbon saving benefits, making this impractical.

Based on spatial, technical, and strategic considerations, **connection to an existing network is not feasible** and would not represent a cost-effective or low-carbon solution.

Proposed heat networks were also identified using the London Heat map, however, there are none within 1km of the development, as such, **connection to a proposed heat network** is **not feasible**.

8.2 Combined Heat & Power

Combined Heat and Power (CHP) has been considered but ultimately **discounted for this development**. Data centres typically have a low and inconsistent heat demand profile, with cooling being the dominant thermal requirement. As such, the simultaneous demand for heat and power, necessary for CHP to operate efficiently is not present. Furthermore, the carbon intensity of grid electricity has significantly reduced in recent years, making gas-fired CHP systems less favourable from a carbon emissions perspective. In line with the GLA London Plan Energy Assessment Guidance (2022), the use of CHP is discouraged unless it can demonstrate clear carbon savings and alignment with local heat network strategies, which is not achievable in this case.

9.0 Green - Renewable Energy Technologies

The purpose of this section is to review the most appropriate low and zero carbon technologies for the development.

9.1 Biomass

Biomass boilers provide heat with a very low resulting net carbon emission taken over the life cycle of the fuel; CO_2 emitted in the combustion process is nearly balanced by the CO_2 absorbed by photosynthesis during the growth of the biomass vegetation.

Biomass boilers are best suited to sites with steady base heating loads, there is no such heat load at the site and there will be substantial waste process heat available.

In light of the above considerations, biomass boilers are not technically suited to the site and so are not considered a viable option for the proposed development.

9.2 Wind turbines

Wind turbines generate zero-carbon electricity by harnessing the kinetic energy of the wind. When the wind blows, it turns the blades of the turbine, which are designed to capture the maximum amount of energy. These blades are connected to a rotor, which spins a generator to produce electricity. Since the process relies solely on wind, a renewable resource, it does not produce any greenhouse gas emissions during operation. This makes wind energy a clean and sustainable source of power.

Urban environments do not lend themselves well to wind turbines as they reduce average wind speeds and create more turbulent airflow, which reduces annual energy generation whilst decreases the lifespan and increases maintenance requirements for wind turbines.

The development proposals therefore do not include wind power.

9.3 Solar Domestic Hot Water

The application of solar panels is for the heating of domestic hot water. There is an existing solar thermal array which provides domestic hot water to the admin areas. The solar thermal system shall be retained. Previously submitted planning documentation shows the systems provide the following generation, which will be verified during design development.

- DC1 – 6,288 kWh/annum
- DC2 – 6.137 kWh/annum

9.4 PV Solar Panels

Photovoltaic (PV) panels work by converting sunlight directly into electricity through the photovoltaic effect. These panels are made up of solar cells, typically composed of semiconductor materials such as silicon. When sunlight hits the solar cells, it excites electrons, creating an electric current. This direct current (DC) electricity is then converted into alternating current (AC) by an inverter, enabling it to be used within a building or exported to the grid. The entire process is clean and efficient, relying solely on the sun’s energy without producing any greenhouse gases during operation.

Photovoltaic panels have been installed on the shallow pitched roofs of the buildings.

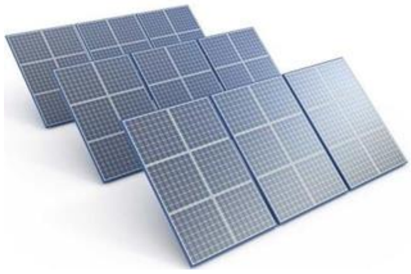

Figure 6 - Photo-voltaic Solar Panels

The **photovoltaic system** will be retained and will provide renewable electricity for the development.

9.5 Heat Pumps

A Ground Source Heat Pump (GSHP) is a central heating and/or cooling system that pumps heat to or from the ground. During the winter season it uses the earth as a heat source, whereas during the summer season it can use the earth as a heat sink. The design increases the efficiency and reduces the operational costs of the heating and cooling systems by taking advantage of the moderate constant temperature in the ground.

Below a certain depth, the ground maintains a constant temperature of 10-12°C winter and summer. A heat pump extracts some of this energy and increases it to a temperature suitable for space heating; this is achieved by circulating water or glycol through either a horizontal matrix of PVC pipework or via a series of boreholes.

For this development, heat demands are low and the waste heat available from the process cooling water would be a much better heat source than ground source could provide.

In light of the above considerations, **ground source heat pumps are not considered to be a viable option** for the proposed development.

9.6 Air Source Heat Pumps

Air Source Heat Pumps (ASHPs), particularly in the form of Variable Refrigerant Flow (VRF) systems, offer a highly efficient and flexible low-carbon solution for heating and cooling in commercial developments. VRF systems operate by transferring heat via refrigerant between indoor and outdoor units, allowing simultaneous heating and cooling across different zones. The ability to recover and redistribute heat internally further enhances performance, making VRF systems a compelling option for meeting both comfort and sustainability goals in this development.

As such VRF will be used to provide heating and cooling to office areas.

10.0 Energy Consumption and CO_2 Emissions of the 'Green' Building

10.1.1 Building Fabric Thermal Performance

Table 4 - 'Green' models' Elements U-Values

EXPOSED ELEMENT	LEAN U-VALUE (W/m^2K)
External Wall	0.35
Floor	0.25
Roof	0.23
Glazing (Double Glazing)	1.5
Personnel Door	1.7
Loading Door	0.5

Table 5 - 'Green' models' Glazing Elements G-Values

GLAZING ELEMENT	BASELINE BUILDING G-VALUE
Windows	0.4

10.1.2 Air Permeability

Table 6 - 'Green' models' Air Permeability

AIR PERMEABILITY	
$m^3/(h.m^2)$ at 50 Pa	DC1 - 1.06 DC2 – 1.14

10.1.3 Lighting

The 'lean' lighting based upon a luminaire efficacy of 125 lumens per circuit watt.

10.1.4 HVAC systems

The Table below presents efficiencies of the HVAC systems used for the 'Green' case thermal model.

Table 7 - 'Green' models' HVAC system specifications

HVAC SYSTEM	EFFICIENCY - DC1	EFFICIENCY - DC2
Admin Areas Variable Refrigerant Flow (VRF) Electrical Panel Heaters	Existing System Heating SCoP 3.79 (ASHP) Cooling SEER 3.84 (ASHP) New System Heating SCoP 4.5 (ASHP) Cooling SEER 5.0 (ASHP) Heating Eff – 1.0	Existing System Heating SCoP 4.3 (ASHP) Cooling SEER 4.4 (ASHP) New System Heating SCoP 4.5 (ASHP) Cooling SEER 5.0 (ASHP) Heating Eff – 1.0
Admin Areas Central Air Handling Unit	Existing AHU SFP = 1.61 W/l/s, Heat recovery 80% New AHU SFP = 2.0 W/l/s, Heat recovery 65%	Existing AHU SFP = 1.61 W/l/s, Heat recovery 80% New AHU SFP = 2.0 W/l/s, Heat recovery 65%
Data Hall Air Cooled Chiller[4] DX/FCU	Cooling SEER 33.7 Cooling SEER 5.0	Cooling SEER 33.7 Cooling SEER 5.0
Data Hall Computer Room Air Handling Unit (CRAH)	SFP = 0.6W/l/s	SFP = 0.6 W/l/s

10.2 IES results for the Carbon Dioxide Emissions of the 'Green' building

Table 8 - Carbon Dioxide emissions after each stage of the energy hierarchy

	CARBON DIOXIDE EMISSIONS (TONNES CO_2 PER ANNUM)	
	REGULATED	UNREGULATED
Baseline: Part L 2021 of the Building Regulations Compliant Development	2,889.6	80,781.9
After Energy Demand Reduction (Be Lean)	3,740.4	80,781.9
After DH / CHP (Be Clean)	3,740.4	80,781.9
After renewables (Be Green)	2,719.9	80,781.9

[4] Plant Seasonal Energy Efficiency Ratio (PSEER) calculated in accordance with Approved Document Part L (2021) paragraph 6.38.

Table 9 - Regulated Carbon Dioxide emission savings after each stage of the energy hierarchy

	REGULATED CARBON DIOXIDE SAVINGS	
	TONNES OF CO_2 PER ANNUM	%
Savings from energy demand reduction (Be Lean)	-850.7	-29%
Savings from CHP (Be Clean)	0.0	0%
Savings from renewable energy (Be Green)	1020.5	35%
Total cumulative savings	169.8	6%

11.0 Be Seen

The 'Be Seen' energy monitoring guidance requires the reporting of energy performance data as a scheme is planned, built out and in use.

11.1 Planning Stage

Responsibility: Planning Applicant

Requirements:

- Upload the necessary contextual and performance data to the 'be seen' portal
- Confirm the target dates for all subsequent 'be seen' stages
- Confirm that metering plans that will enable the in-use energy performance reporting are in place

The MEP design includes sufficient metering to allow measuring and recording of energy consumption in accordance with GLA Be Seen requirements.

11.2 As-built

Responsibility: Developer

Target Date: RIBA Stage 6 (Date TBC)

Requirements:

- Update the contextual data and upload energy performance predictions onto the 'be seen' portal
- Confirm that the metering installation is complete and correctly calibrated

11.3 In Use

Responsibility: Building Owner

Target Date: RIBA Stage 7 (Date TBC)

Requirements:

- Submit energy performance data annually for at least 5 years
- Where actual performance differs from estimated performance, identify the causes and the potential mitigation measures

12.0 Unregulated Energy Performance of the Proposed Building

This section presents details of the energy efficiency of the data centre IT cooling system which is an unregulated process load and therefore excluded from the regulated energy analysis earlier in this report.

12.1 Compliance with Recognised Standards

The data centre will be designed and operated in accordance with relevant international standards and best practice protocols.

12.2 Energy Efficient Design and PUE

The energy efficiency of a data centre can be described in terms of the ratio between the total energy required to support the IT load and the IT load itself. This is known as the PUE or Power Usage Effectiveness.

A PUE study investigates the energy usage of every component within the engineering infrastructure of the proposed data centre. This assessment is undertaken by utilising an in-house application which can model the infrastructure and determine its corresponding steady state air, electrical power flows, heat flow and water flow throughout. Energy and water flows are calculated for every hour of the year, based on local historical weather data, at various data centre load capacities from 0% to 100%. Analysis is undertaken for energy usage for a duration of one year, to give the location impact on energy efficiency and the seasonal variation in performance.

Initial high level calculations suggest a **PUE of ≤1.3** is achievable, which is compliant with the CNDCP[5]. The PUE calculations will be developed as the design progresses.

12.2.1 IT Equipment

The data centre will incorporate energy efficient hardware e.g. servers, storage and networking equipment.

12.2.2 IT Equipment Cooling

The data centre cooling system design will be developed and optimised to provide a high performing cooling solution appropriate to the site and local climatic conditions.

Energy efficient cooling shall be achieved through:

- Mechanical cooling with high efficiency air cooled chillers, integrated with free cooling mode
- High temperature setpoints for data halls
- Dedicated cooling systems for support areas, separate from IT equipment cooling, to allow each system to be optimised for different requirements
- Optimised airflow shall be achieved through hot and cold aisle containment resulting in maximum cooling efficiency

All motors will use variable frequency drives to minimise energy consumption

[5] Climate Neutral Data Centre Pact - https://www.climateneutraldatacentre.net/

13.0 Whole Life Carbon Assessment (WLCA)

A WLCA has been undertaken in support of the Planning Application for the Prologis UK CCCXXXVIII S.à r.l. in accordance with Hillingdon Local Plan: Part 1 – Strategic Policies, Local Plan: Part 2 – Development Management Policies and the London Plan.

The assessment demonstrates that in non-decarbonised scenario:

- Total lifecycle emissions are estimated at 7,480,787 tCO_2e over a 60-year reference period.
- The largest contributor is Operational Energy Use, accounting for almost 99% of annualised emissions, driven by the inherently high IT and cooling demands of data centre operations.
- Embodied carbon impacts from Modules A (product and construction) represent approximately 0.7%, with the most significant contributions arising from structural steel, concrete, and façade systems.
- Preliminary analysis using a one-year reference period has been undertaken to isolate material impacts, helping to identify structural and some mechanical elements as key hotspots for reduction.

The assessment demonstrates that in decarbonised scenario:

- Total lifecycle emissions are estimated at 1,133,433 tCO_2e over a 60-year reference period.
- The largest contributor is Operational Energy Use, accounting for almost 93% of annualised emissions, driven by the inherently high IT and cooling demands of data centre operations.
- Embodied carbon impacts from Modules A (product and construction) represent approximately 4.1%, with the most significant contributions arising from structural steel, concrete, and façade systems.
- Preliminary analysis using a one-year reference period has been undertaken to isolate material impacts, helping to identify structural and some mechanical elements as key hotspots for reduction.

At this early stage, results are based on indicative design parameters and benchmark datasets. Nevertheless, the analysis provides a transparent baseline against which future improvements can be measured.

In line with Hillingdon Local Plan: Part 1 – Strategic Policies, Local Plan: Part 2 – Development Management Policies and the London Plan, the project team commits to:

- Refining the WLCA as the design progresses through key design milestones.
- Investigating opportunities to reduce embodied carbon through material optimisation, specification of low-carbon concrete and steel, PVC pipe.
- Pursuing operational energy efficiency measures and integration of renewable energy solutions to reduce long-term emissions.

This WLCA therefore provides a compliant submission and demonstrates early consideration of lifecycle carbon, and establishes a framework for embedding carbon reduction strategies as the design evolves.

Please see **PLON01-RED-XX-XX-RP-Q-00006** for the full WLCA report.

14.0 BREEAM

BREEAM (Building Research Establishment's Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for buildings. It sets the benchmark for best practice in sustainable design and has become the de facto standard for describing a building's environmental performance.

The objectives of BREEAM are to visibly promote low environmental impact buildings, to establish criteria and standards that go beyond regulatory requirements, and to challenge the market to deliver innovative solutions that meet these enhanced benchmarks. Additionally, BREEAM aims to raise awareness among building owners, occupiers, designers, and operators of the benefits associated with buildings that have a reduced environmental impact.

The existing warehouses were awarded BREEAM Excellent ratings, the majority of the design features which resulted in these high ratings will be retained as part of the development.

It should be noted that neither the London Borough of Hillingdon nor the Greater London Authority (GLA) require developments to undertake full BREEAM certification. However, in accordance with GLA London Plan Policy SI 5 (Water Infrastructure), developments are required to *"achieve at least the BREEAM Excellent standard for the 'Wat 01' water category."* Under BREEAM Data Centres 2010, achieving an "Excellent" rating for Wat 01 requires a minimum of one credit. The proposed building design will meet this requirement, as demonstrated in the pre-assessment provided below.

To maximise the sustainability of the development, the developer has chosen to undertake a BREEAM pre-assessment for the development using BREEAM Data Centres 2010, version 1.2 and assessment tool rev 01.

BREEAM groups its sustainability criteria under the following nine categories:

- Management – Commissioning and construction site management
- Health & Wellbeing – Indoor and external environmental quality
- Energy – Operational energy use and CO_2 emissions
- Transport – Transport-related CO_2 emissions and location-specific factors
- Water – Consumption and water efficiency
- Materials – Environmental impact of building materials
- Waste – Resource efficiency in construction and operation
- Land Use & Ecology – Ecological value and enhancement of the site
- Pollution – Air and water pollution mitigation

The overall rating is determined by the number of 'credits' achieved, each representing specific management, design, or performance aspects of the building as defined by BREEAM. To achieve the target rating, the building must secure all relevant mandatory credits, along with additional credits that contribute to the overall score.

14.1 BREEAM Pre-Assessment

The scores shown in this assessment report are based on comments from a pre-assessment meeting held with the project team.

The table below outlines the credits available, those currently targeted and possible extra credits.
Highlight = mandatory

ISSUE ID	ISSUE TITLE	AVAILABLE CREDITS	TARGETED CREDITS	POSSIBLE ADDITIONAL CREDITS
Man 1	Commissioning	2	2	
Man 2	Considerate Constructors	2	2	
Man 3	Construction Site Impacts	4	4	
Man 4	Building user guide	1	1	
Man 8	Security	1	1	
Man 12	Life Cycle Costing	2	0	2
	Management sub-total	**12**	**10**	**2**
Hea 1	Daylighting	1	0	
Hea 2	View out	1	1	
Hea 3	Glare control	1	1	
Hea 4	High frequency lighting	1	1	
Hea 5	Internal and external lighting levels	1	1	
Hea 6	Lighting zones and controls	1	1	
Hea 7	Potential for natural ventilation	1	0	
Hea 8	Indoor air quality	1	1	
Hea 9	Volatile organic compounds	1	1	
Hea 10	Thermal comfort	1	1	
Hea 11	Thermal zoning	1	0	
Hea 12	Microbial Contamination	1	1	
Hea 13	Acoustic Performance	1	1	
	Health & Wellbeing sub-total	**13**	**10**	
Ene 1	Reduction of CO_2 Emissions	15	11	
Ene 2	Sub-metering of Substantial Energy Uses	2	2	
Ene 4	External Lighting	1	1	
Ene 5	Low zero carbon technologies	3	1	
Ene 8	Lifts	2	2	
Ene 22	Sustainable procurement of IT	2	0	1
	Energy sub-total	**25**	**17**	**1**
Tra 1	Provision of public transport	3	1	
Tra 2	Proximity to amenities	1	0	
Tra 3	Cyclist facilities	2	2	
Tra 4	Pedestrian and cycle safety	1	0	
Tra 5	Travel plan	1	0	1
Tra 6	Maximum car parking capacity	2	0	
	Transport sub-total	**10**	**3**	**1**
Wat 1	Water consumption	3	2	1
Wat 2	Water meter	1	1	
Wat 3	Major leak detection	1	1	
Wat 4	Sanitary supply shut off	1	1	
Wat 5	Water recycling	1	1	
Wat 6	Irrigation systems	1	0	1

ISSUE ID	ISSUE TITLE	AVAILABLE CREDITS	TARGETED CREDITS	POSSIBLE ADDITIONAL CREDITS
	Water sub-total	**8**	**6**	**2**
Mat 1	Materials specification (major building elements)	6	3	1
Mat 2	Hard landscaping and boundary protection	1	1	
Mat 3	Re-use of building façade	1	0	1
Mat 4	Re-use of building structure	1	0	1
Mat 5	Responsible sourcing of materials	3	2	1
Mat 6	Insulation	2	2	
Mat 7	Designing for robustness	1	1	
	Materials sub-total	**15**	**9**	**4**
Wist 1	Construction site waste management	4	3	
Wust 2	Recycled aggregates	1	1	
Wst 3	Recyclable waste storage	1	1	
Wst 4	Compactor / baler	1	0	1
	Waste sub-total	**7**	**5**	**1**
Le 1	Re-use of land	1	1	
Le 2	Contaminated land	1	0	
Le 3	Ecological value of site and protection of ecological features	1	0	
Le 4	Mitigating ecological impact	2	1	
Le 5	Enhancing site ecology	3	1	1
Le 6	Long term impact on biodiversity	2	1	1
	Land use and ecology sub-total	**10**	**4**	**2**
Pol 1	Refrigerant gwp - building services	1	0	
Pol 2	Preventing refrigerant leaks	2	1	
Pol 4	NOx emissions from heating source	2	0	
Pol 5	Flood risk	3	3	
Pol 6	Minimising watercourse pollution	1	1	
Pol 7	Reduction of night time light pollution	1	1	
Pol 8	Noise attenuation	1	1	
	Pollution sub-total	**11**	**7**	
Man 2	Responsible construction practices	1		
Hea 1	Visual comfort	1		
Ene 1	Reduction of energy use and carbon emissions	2		
Ene 5	Low zero carbon technologies	1		
Wat 1	Water consumption	1		
Wat 2	Water meter	1		
Mat 1	Environmental impacts from construction products – building life cycle impacts	1		
Mat 5	Responsible sourcing of materials	1		
Wst 1	Construction waste management	1		
Inn	BREEAM AP	2		
	Innovation sub-total	**10**		
	Target score		**66.91%**	
			Very Good	

ISSUE ID	ISSUE TITLE	AVAILABLE CREDITS	TARGETED CREDITS	POSSIBLE ADDITIONAL CREDITS
	Potential scores			**76.25%**
				Excellent