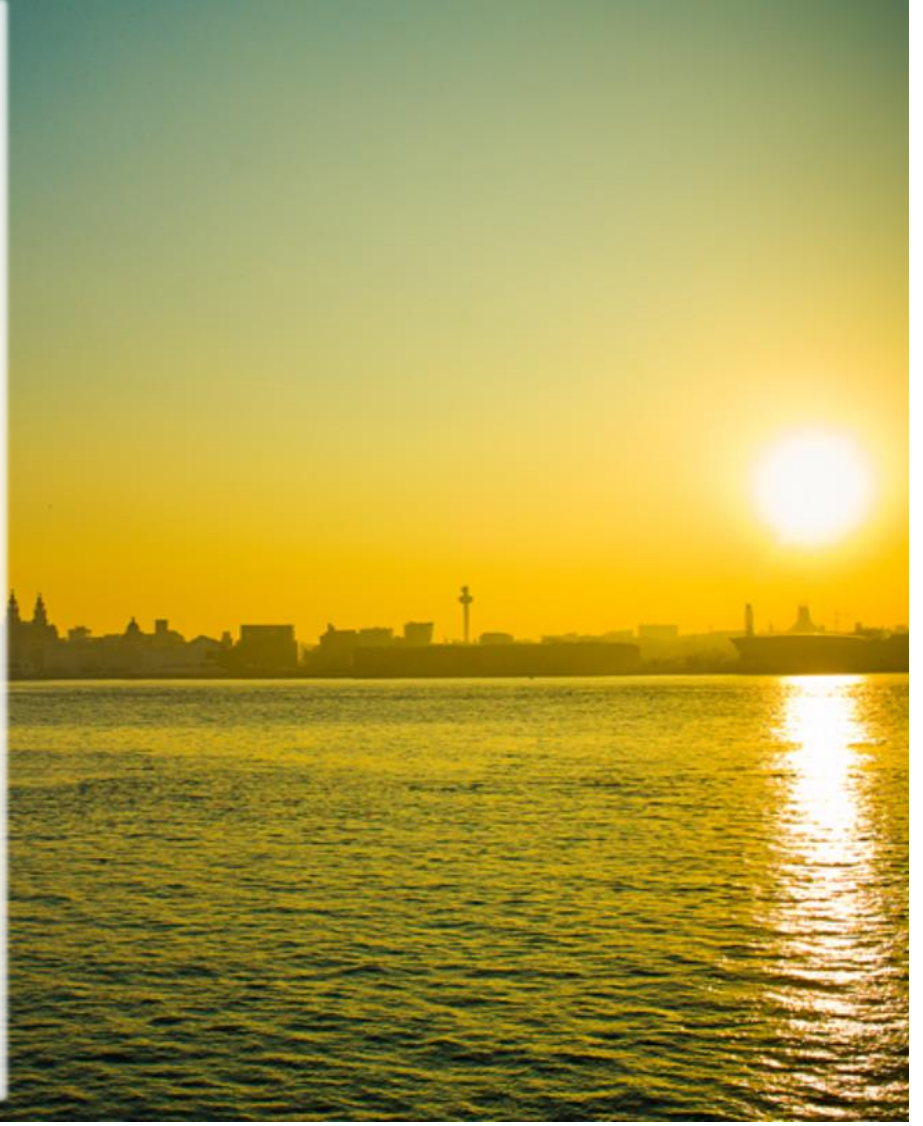


**7ABC Bayham Street, Camden**

**Energy Statement**

**Ensphere Group Ltd on behalf of  
Camden Lifestyle (UK) Ltd**



Ensphere Group Ltd  
10 Greycoat Place, London, SW1P 1SB  
+44 (0) 20 7960 6126  
[www.enspheregroup.com](http://www.enspheregroup.com)



# 7ABC Bayham Street, Camden

## Energy Statement

**Client Name:** Camden Lifestyle (UK) Ltd

**Document Reference:** 17-E090-003

**Project Number:** 17-E090

## Quality Assurance Approval Status

This document has been prepared and checked in accordance with Ensphere Group Ltd's Quality Management System.

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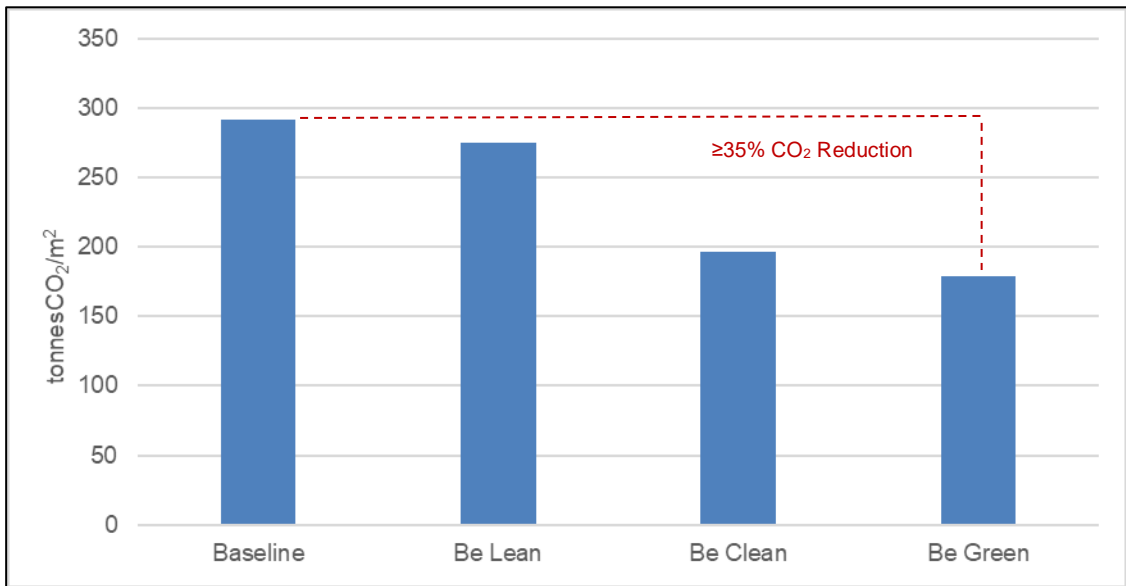
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# 1. Executive Summary

- 1.1 This Energy Statement presents the energy strategy for a proposed scheme at 7ABC Bayham Street, Camden.
- 1.2 Development proposals include the *“Full Planning Application for the demolition of existing buildings (B1a Use Class) and erection of a part 3, part 4, part 5 storey building (with two basement levels), comprising co-working office floorspace (B1a Use Class), hotel accommodation (C1 Use Class) and an ancillary café/bar and fitness facilities; works to the existing access and associated works.”*
- 1.3 Consideration has primarily been given to the planning policy context and other requirements prior to establishing a strategy based upon the energy hierarchy; with a priority given to energy reduction and efficiency. Renewable and low carbon technologies have also been considered in the context of their technical feasibility and financial viability.
- 1.4 The following is therefore proposed:
- High performance building fabric and energy efficient lighting, services and equipment;
  - Passive design measures to reduce energy demand for heating, cooling, ventilation and lighting;
  - Combined Heat and Power (CHP) to provide the majority of hot water;
  - Air Source Heat Pumps to provide space heating.
  - Photovoltaics (PV) at roof level to offset the site’s electricity demand
- 1.5 In line with Policy 5.2 of the London Plan and the Council policy, an on-site carbon saving of  $\geq 35\%$  has been targeted for the entire development relative to Part L 2013 (equivalent to a 40% carbon saving relative to the 2010 version of Part L).

**Figure 1.1 Site-Wide Tonnes CO<sub>2</sub> following Application of the Energy Hierarchy**



1.6 Overall, the proposed energy strategy is considered consistent with the National Planning Policy Framework and the policies of the GLA and local authority and, when implemented, will provide an efficient and low carbon building.

## 2. Introduction

- 2.1 Ensphere Group Ltd was commissioned by Camden Lifestyle (UK) Ltd to produce an Energy Statement for a proposed development at 7ABC Bayham Street, Camden.

### Site & Surroundings

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#### Site

- 2.2 The site is located in central London in the London Borough of Camden, to the southern end and western side of Bayham Street. Bayham Street is a wide one-way route which runs parallel to the east of Camden High Street (A400).
- 2.3 The site has a regular shape and currently comprises three existing buildings 7A, 7B and 7C and the lawful planning use of these buildings is Offices (Class B1a). The site is contained on three sides, with access only being achievable from Bayham Street.

#### Surroundings

- 2.4 The character of the area is mixed but is categorised as commercial by the Conservation Area Appraisal “Sub Area 1 (‘Commercial’)”.
- 2.5 The site is approximately 100m northeast of Mornington Crescent underground station, 400m south of Camden underground station and 900m north of both Euston and King’s Cross/St Pancras National Rail stations. In addition, nine high frequency bus routes operate in the area.

### Proposed Development

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- 2.6 Development proposals include the *“Full Planning Application for the demolition of existing buildings (B1a Use Class) and erection of a part 3, part 4, part 5 storey building (with two basement levels), comprising co-working office floorspace (B1a Use Class), hotel accommodation (C1 Use Class) and an ancillary café/bar and fitness facilities; works to the existing access and associated works.”*

### Report Objective

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- 2.7 The objective of the Energy Statement is to outline how energy efficiency, low carbon and renewable technologies have been considered as part of the energy strategy.

## 3. Assessment Methodology

### Analysis Methodology

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- 3.1 There is a broad consensus that the preferred approach to minimising carbon emissions from buildings is to firstly focus on reducing the demand for energy before reviewing efficient and renewable technology options.
- 3.2 However, priorities and performance targets can vary at a local level and the report therefore commences with a review of the planning policy and other considerations.
- 3.3 A site context appraisal is then undertaken to establish the site specific parameters for climatic conditions and available energy infrastructure. The subsequent sections follow the Energy Hierarchy (discussed below) and review the design proposals in relation to passive design and energy efficiency as well as the potential to incorporate low carbon and renewable technology.

### Energy Hierarchy

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- 3.4 The tiers of the Energy Hierarchy are:

#### Energy Hierarchy

1. Be Lean	Reduce Energy Demand
2. Be Clean	Use Energy More Efficiently
3. Be Green	Use Renewable Energy

- 3.5 The first principle of the Hierarchy is to reduce demand and the need for energy in the first place. Where opportunities to improve the efficiency of the design have been maximised, consideration is then given to the second principle whereby priority is given to the efficient use of energy. This is on the basis that low carbon technologies can be cost-effective and provide significant carbon savings when compared to conventional technologies.
- 3.6 The third principle of the hierarchy promotes the use of renewable technologies. Whilst these technologies can be relatively expensive to install, they do offer the potential to significantly reduce carbon emissions.
- 3.7 The summary section of the report presents an overview of the findings and the strategy.

## 4. Planning Policy Context

4.1 National and local planning policy relevant to sustainable development is considered in detail below:

### National Planning Policy Framework

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4.2 The Department for Communities and Local Government determines national policies on different aspects of planning and the rules that govern the operation of the system.

4.3 The transition to a low carbon economy is promoted in paragraphs 17, 93 through to 97 of the current NPPF, and remains a key objective of the draft revised 2018 NPPF.

### London Planning Policy Framework

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4.4 Key London Plan planning policy is detailed below:

#### The London Plan as Altered (2016)

4.5 The London Plan as Altered March 2015 is the overall strategic plan for London. Chapter five details *London's Response to Climate Change* and include a number of policies that set the overarching principles for reducing carbon emissions in the built environment, as follows:

#### Policy 5.2 – Minimising Carbon Dioxide Emissions

##### Planning Decisions

A) Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

- 1) Be lean: use less energy;
- 2) Be clean: supply energy efficiently;
- 3) Be green: use renewable energy.

B) The Mayor will work with boroughs and developers to ensure that major developments meet the following targets for carbon dioxide emissions reduction in buildings. These targets are expressed as minimum improvements over the Target Emission Rate (TER) outlined in the national Building Regulations leading to zero carbon residential buildings from 2016 and zero carbon non-domestic buildings from 2019.

##### Residential Buildings:

Year	Improvement in 2010 Building Regs
2010-2013	25% (Code Level 4)



2013-2016	40%
2016-2031	Zero Carbon

Non-Residential Buildings:

Year	Improvement in 2010 Building Regs
2010-2013	25%
2013-2016	40%
2016-2019	As per building regulations requirements
2019-2031	Zero Carbon

- C) Major development proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emission reduction outlined above are to be met within the framework of the energy hierarchy.
- D) As a minimum, energy assessments should include the following details:
- a) Calculations of the energy demand and carbon dioxide emissions covered by the Building Regulations and, separately, the energy demand and carbon dioxide emissions from any other part of the development, including plant or equipment, that are not covered by the Building Regulations (see paragraph 5.22) at each stage of the hierarchy;
  - b) Proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services;
  - c) Proposals to reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP);
  - d) Proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies.
- E) The carbon dioxide reduction targets should be met on-site. Where it is clearly demonstrated that the specific targets cannot be fully achieved on-site, any shortfall may be provided off-site or through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.

## **Policy 5.5 – Decentralised Energy Networks**

### **Strategic**

A) The Mayor expects 25 per cent of the heat and power used in London to be generated through the use of localised decentralised energy systems by 2025. In order to achieve this target the Mayor prioritises the development of decentralised heating and cooling networks at the development and area wide levels, including larger scale heat transmission networks.

### **LDF Preparation**

B) Within LDFs boroughs should develop policies and proposals to identify and establish decentralised energy network opportunities. Boroughs may choose to develop this as a supplementary planning document and work jointly with neighbouring boroughs to realise wider decentralised energy network opportunities. As a minimum, boroughs should:

- a) Identify and safeguard existing heating and cooling networks;
- b) Identify opportunities for expanding existing networks and establishing new networks. Boroughs should use the London Heat Map tool and consider any new developments, planned major infrastructure works and energy supply opportunities which may arise;
- c) Develop energy master plans for specific decentralised energy opportunities which identify;
  - Major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing);
  - Major heat supply plant;
  - Possible opportunities to utilise energy from waste;
  - Possible heating and cooling network routes;
  - Implementation options for delivering feasible projects, considering issues of procurement, funding and risk in the role of the public sector.
- d) Require developers to prioritise connection to existing or planned decentralised energy networks where feasible.

## **Policy 5.6 – Decentralised Energy in Development Proposals**

### Planning Decisions

- A) Development proposals should evaluate the feasibility of Combined Heat and Power (CHP) systems, and where a new CHP system is appropriate also examine opportunities to extend the system beyond the site boundary to adjacent sites.
- B) Major development proposals should select energy systems in accordance with the following hierarchy:
  - 1) Connection to existing heating or cooling networks;
  - 2) Site wide CHP network;
  - 3) Communal heating and cooling.
- C) Potential opportunities to meet the first priority in this hierarchy are outlined in the London Heat Map tool. Where future network opportunities are identified, proposals should be designed to connect to these networks.

### Policy 5.7 – Renewable Energy

#### Strategic

- A) The Mayor seeks to increase the proportion of energy generated from renewable sources, and expects that the projections for installed renewable energy capacity outlined in the Climate Change Mitigation and Energy Strategy and in supplementary planning guidance will be achieved in London.

#### Planning Decisions

- B) Within the framework of the energy hierarchy (see Policy 5.2), major development proposals should provide a reduction in expected carbon dioxide through the use of on-site renewable energy generation, where feasible.

#### LDF Preparation

- C) Within LDFs boroughs should, and other agencies may wish to develop more detailed policies and proposals to support the development of renewable energy in London – in particular, to identify broad areas where specific renewable energy technologies, including large scale systems and the large scale deployment of small scale systems, are appropriate. The identification of areas should be consistent with any guidelines and criteria outlined by the Mayor.
- D) All renewable energy systems should be located and designed to minimise any potential adverse impacts on biodiversity, the natural environment and historical assets, and to avoid any adverse impacts on air quality.

## **Policy 5.9 – Overheating and Cooling**

### **Strategic**

- A) The Mayor seeks to reduce the impact of the urban heat island effect in London and encourages the design of places and spaces to avoid overheating and excessive heat generation, and to reduce overheating due to the impacts of climate change and the urban heat island effect on an area wide basis.

### **Planning Decisions**

- B) Major development proposals should reduce potential overheating and reliance on air conditioning systems and demonstrate this is in accordance with the following cooling hierarchy:
- 1) Minimise internal heat generation through energy efficient design;
  - 2) Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls;
  - 3) Manage the heat within the building through exposed internal thermal mass and high ceilings;
  - 4) Passive ventilation;
  - 5) Mechanical ventilation;
  - 6) Active cooling.
- C) Major development proposals should demonstrate how the design, materials, construction and operation of the development would minimise overheating and also meet its cooling needs. New development in London should also be designed to avoid the need for energy intensive air conditioning systems as much as possible. Further details and guidance regarding overheating and cooling are outlined in the London Climate Change Adaptation Strategy.

### **LDF Preparations**

- D) Within LDFs boroughs should develop more detailed policies and proposals to support the avoidance of overheating and to support the cooling hierarchy.

## Local Planning Policy Framework

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### Camden Local Plan (June 2017)

- 4.6 The Local Plan was adopted by Council on 3 July 2017 and has replaced the Core Strategy and Camden Development Policies documents as the basis for planning decisions and future development in the borough. Policies relevant to this report are presented below:

#### **Policy CC1 Climate Change Mitigation**

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

We will:

- a. Promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
- b. Require all major development to demonstrate how London Plan targets for carbon dioxide have been met;
- c. Ensure that the location of the development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
- d. Support and encourage sensitive energy efficiency improvements to existing buildings;
- e. Require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
- f. Expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

- g. Working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
- h. Protecting existing decentralised energy networks (e.g. at Gower Street Bloomsbury, Kings Cross, Gospel Oak, and Somers Town) and safeguarding potential network routes; and
- i. Requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

## 5. Other Policy & Regulatory Considerations

- 5.1 This section comprises an overview of other considerations relevant to the Energy Statement.

### Building Regulations

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#### Update 2013 (Part L Conservation of Fuel & Power)

- 5.2 The Department for Communities and Local Government announced on 30 July 2013 that the update to Part L would include a further 6% carbon reduction for residential from 6 April 2014 and a further 9% reduction for non-residential.

### National Planning Practice Guidance

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#### Climate Change

- 5.3 Advises how planning can identify suitable mitigation and adaptation measures in plan-making and the application process to address the potential for climate change.

#### Renewable and Low Carbon Energy

- 5.4 The guidance is intended to assist local councils in developing policies for renewable energy in local plans, and identifies the planning considerations for a range of renewable sources.

### London Planning Practice Guidance

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#### Sustainable Design and Construction Supplementary Planning Guidance (April 2014)

- 5.5 The Mayor has published supplementary planning guidance on Sustainable Design and Construction. The document provides guidance on the implementation of London Plan policy 5.3 as well as a range of policies, primarily in Chapters 5 and 7 that deal with matters relating to environmental sustainability.

#### Energy Planning Guidance (October 2018)

- 5.6 Policy 5.2 of the London Plan requires each major development proposal to submit a detailed energy assessment. The GLA provides guidance to developers and their advisors on preparing energy assessments to accompany strategic planning applications. With regards to the carbon reduction targets detailed in policy 5.2 of the London Plan, the mayor will apply a 35 per cent target beyond Part L 2013 of the Building Regulations. This is deemed to be broadly equivalent to the 40 per cent target beyond Part L 2010.

### Local Planning Policy Guidance

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#### Camden Planning Guidance – Sustainability (CPG3) (2015)

- 5.7 The guidance provides information on ways to achieve carbon reductions and more sustainable developments. It highlights the Council's requirements and guidelines in support of policies CS13, DP22 and DP23.

- 5.8 Requires developments involving 5 or more dwellings and/or 500sq m (gross internal) floorspace or more to submit an energy statement which demonstrates how carbon dioxide emissions will be reduced in line with the energy hierarchy.
- 5.9 Includes requirements concerning credits under certain BREEAM categories (e.g. 60% energy credits).



## 6. Site Context Appraisal

6.1 Local climatic conditions, natural resources and energy infrastructure are addressed within this section.

### Local Climate

6.2 An assessment of the local climate and natural resources has been compiled from Met Office, Department of Energy and Climate Change and British Geological Survey data. Consideration has been given to the data for Hampstead as the nearest climate station to the site.

**Table 6.1 Averages Table (Climate Period 1981-2010)**

Month	Max temp (°C)	Min temp (°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1mm (days)	Monthly mean wind speed at 10m (knots)
January	7.1	2	8.6	57.5	64.7	12	n/a
February	7.4	1.7	9.5	76.4	46.6	9.7	n/a
March	10.5	3.5	4	107.1	48.9	10.2	n/a
April	13.3	5	1.5	151.6	51.5	9.9	n/a
May	16.8	8	0.1	192.2	58	9.5	n/a
June	19.9	10.9	0	191	54.2	9	n/a
July	22.4	13.2	0	199.9	50.4	8.5	n/a
August	22	13.1	0	193	64.4	8.9	n/a
September	18.8	11	0	140.8	56.9	8.8	n/a
October	14.6	8.1	0.3	109.9	77.7	11	n/a
November	10.3	4.8	2.9	69.4	68.3	11.4	n/a
December	7.4	2.5	7.7	51.6	62.9	11.4	n/a
<b>Annual</b>	<b>14.3</b>	<b>7</b>	<b>34.6</b>	<b>1540.4</b>	<b>704.5</b>	<b>120.1</b>	<b>n/a</b>

### Microclimate

6.3 The term “microclimate” refers to the climatic conditions at a certain area, which may differ from the surroundings. In the context of sustainability in urban developments, the interest lies at the microclimate within the development site and immediate surroundings as this will have an

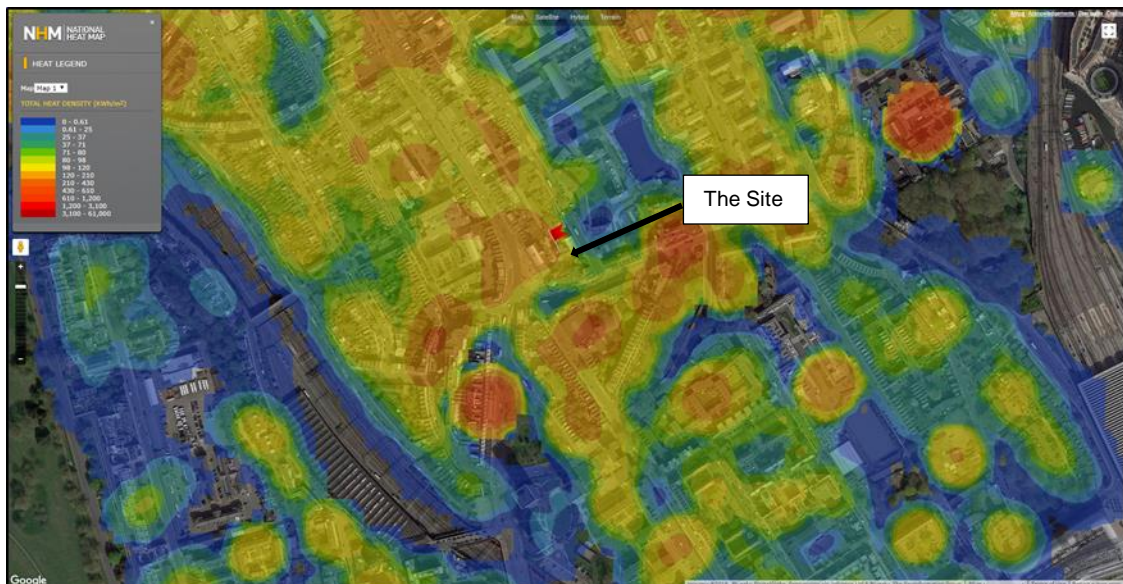
impact on the actual energy performance of the buildings, the potential for renewables exploitation, indoor/outdoor comfort and safety conditions for occupants and the public.

- 6.4 Given the complex interrelationship between building configuration and microclimatic variables (e.g. air temperature, humidity, wind speed/direction, solar radiation), the microclimatic analysis requires advanced modelling techniques and computational simulations which fall out of the scope of the standard approach towards the formulation of an overarching energy strategy.
- 6.5 As a general trend, it can be expected that the air temperatures will be higher than assumed for the standard energy performance calculations (in line with National Calculation Methodology), as a result of the Urban Heat Island (UHI) effect; and solar radiation intensity ( $W/m^2$ ) will present variations depending on elevation orientation. The wind profile will be substantially variant and altered within the dense urban context, with characteristically higher turbulence.

### District Heating Opportunities & Heat Maps

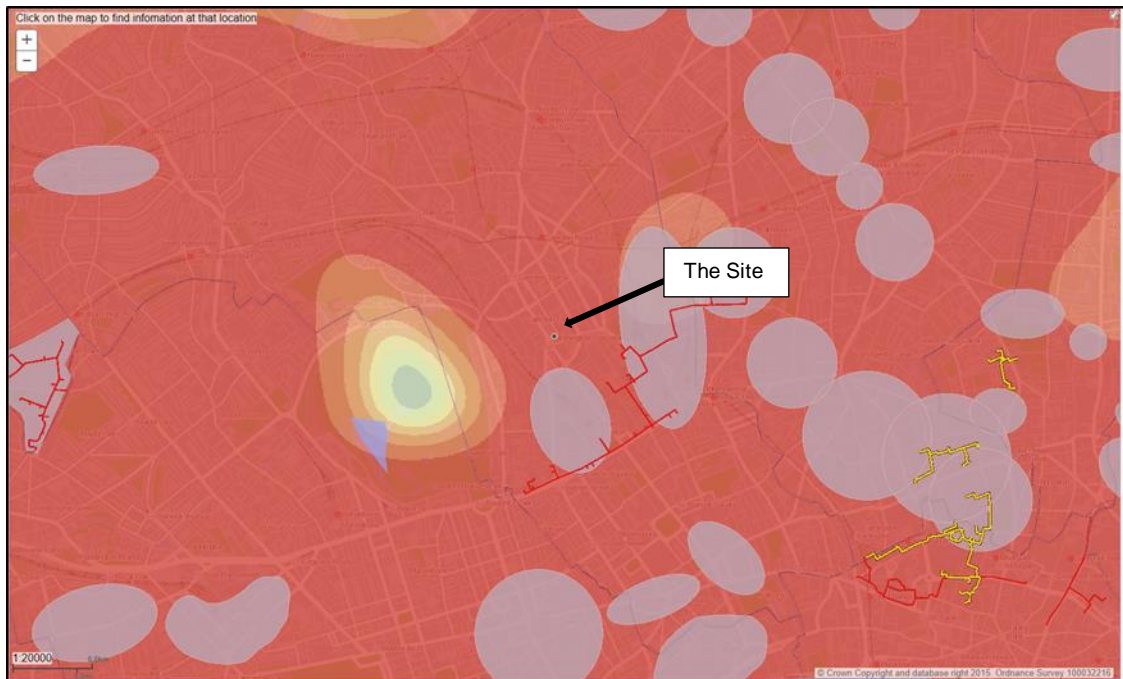
- 6.6 The purpose of the National Heat Map, which was commissioned by the Department of Energy and Climate Change and created by CSE, is to support the planning and deployment of local low-carbon energy projects in England. It aims to achieve this by providing publicly accessible high-resolution web-based maps of heat and demand by area.

**Figure 6.1** Extract from the National Heat Map



- 6.7 The map shows the site as being within an area identified as having a relatively high total heat density.
- 6.8 Similarly, the London Heat Map is a tool provided by the Mayor of London to identify opportunities for decentralised energy projects in London and it builds on the 2005 London Community Heating Development Study.

**Figure 6.2** Extract from the London Heat Map



- 6.9 The above extract from The London Heat Map shows the site located in an area of high heat density. Nevertheless, the site is not identified as being within an opportunity area and no district energy networks are identified within 500m of the site.

## 7. Baseline & Carbon Reduction Target

### Baseline Position

- 7.1 A baseline position must first be established, which is calculated using SBEM and assuming compliance with Part L of the 2013 Building Regulations. The following represents site-wide data for the TER calculation.

Figure 7.1 Baseline Energy Consumption

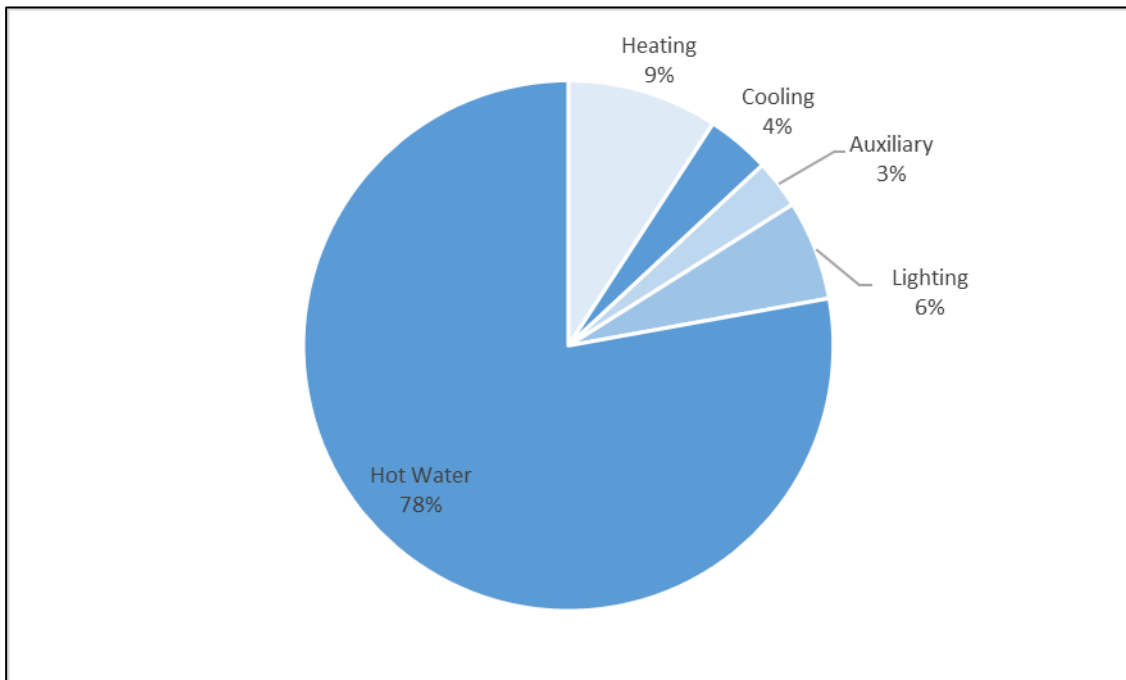


Table 7.1 Carbon Dioxide Emissions - Baseline

Step	Carbon Dioxide Emissions (Tonnes CO <sub>2</sub> per annum)	
	Regulated	Unregulated
Baseline: Part L 2013	291.6	29.2

- 7.2 Non-domestic unregulated emissions have been taken from the unregulated emissions values generated by the SBEM models.

### Carbon Reduction Target

- 7.3 In line with Policy 5.2 of the London Plan and Policy CS13 of the Core Strategy, an on-site carbon reduction target of 35% beyond Part L 2013 applies.


**Table 7.2** Target Savings for Regulated Carbon Dioxide Emissions

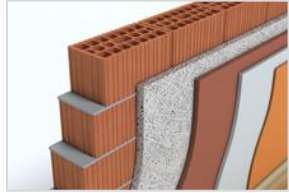

	Regulated Carbon Dioxide Savings	
	(Tonnes CO <sub>2</sub> per annum)	%
Total Target Savings	102.1	35.0%


## 8. Passive Design & Energy Efficiency

8.1 This section considers features of the proposed design (including indicative performance levels) relevant to passive design and energy efficiencies.

Table 8.1 Passive Design & Energy Efficiency Design Features

Aspect	Description	Appraisal
<p><b>Passive Design</b></p> 	<p>Passive design seeks to maximize the use of natural sources of heating, cooling and ventilation to maintain thermal comfort levels within the building.</p>	<p><u>Building Massing &amp; Orientation</u> The building comprises a single block of ground plus upper storeys and is orientated on the northwest-southeast axis of the site.</p> <p><u>Passive Heating / Cooling</u> The limited extent of south-facing surfaces will help reduce the direct solar gain and potential for overheating.</p> <p>It is intended that windows will be set back slightly to provide a degree of shading from the sun. It is intended that the building will have the potential to be naturally ventilated (via openable window / vent), with ventilation rates calculated to ensure sufficient air changes per hour to maintain temperatures within a comfortable range.</p> <p><u>Lighting and Daylighting Design</u> The design of the glazed areas will seek to offer good access to natural daylight to reduce consumption of energy for artificial lighting. Overall, a balance shall be sought between achieving daylighting levels and winter solar gains, whilst minimising summer heat gains and cooling loads.</p>
<p><b>Fabric Efficiency</b></p>	<p>Fabric efficiency concerns the thermal properties associated with the building fabric and construction.</p>	<p><u>Insulation</u> Heat Transfer Coefficients, otherwise referred to as U-Values, are a measure of the rate of heat transfer through a building element over a given area, under standardised conditions (i.e. the rate at which heat is lost or gained through a fabric).</p>

		<p>It is intended that the performance of the building fabric will incorporate relatively low U-Values to reduce the rate at which the buildings lose heat, preserving the heat within the space and reducing the requirement for mechanical heating.</p> <p>The following U-values are provided as a guide for the basic building elements:</p> <p>External Walls                    ~0.2W/m<sup>2</sup>K;</p> <p>Roof                                    ≤0.13W/m<sup>2</sup>K;</p> <p>Ground Floor                    ≤0.15W/m<sup>2</sup>K;</p> <p>Windows                            ≤1.40W/m<sup>2</sup>K (g=0.4).</p> <p><u>Air Tightness</u></p> <p>A high level of air tightness is proposed and a level below 5m<sup>3</sup>/h/m<sup>2</sup> is targeted, meaning that air infiltration between the internal and the external environment will be largely controlled and space heating demand further reduced.</p> <p><u>Thermal Bridging</u></p> <p>Thermal bridging is the penetration of the insulation layer by a highly conductive non-insulating material allowing rapid heat transfer from an interior to exterior environment (and vice versa). In well insulated buildings, as much as 30% of heat loss can occur through thermal bridges.</p> <p>The building fabric shall be constructed so that there are no reasonably avoidable thermal bridges in the insulation layers caused by gaps within the various elements.</p>
<p><b>System Efficiency</b></p> 	<p>System efficiency concerns the energy efficiency of the heating, cooling, lighting and auxiliary systems employed within the building.</p>	<p><u>Back-up Boilers</u></p> <p>Where conventional gas-fired boilers are employed, these will have an efficiency of &gt;90%.</p> <p><u>Extract Fans</u></p> <p>It is anticipated that extract fans will be employed in WC and kitchen areas. The specific fan power (SFP) for these systems will be efficient and below 0.3W//s.</p> <p><u>Metering</u></p>

		<p>The major energy uses shall be monitored via separate energy meters and a Building Energy Management System (BEMS) will be installed, which will allow for optimum operational control and performance of complex building services in the development.</p> <p><u>Lighting Efficacy</u></p> <p>At this stage, detailed lighting design calculations have not yet been undertaken, but lighting design is intended to be highly efficient and in excess of Building Standards requirements. It is intended that lighting efficacy shall be in excess of 75lumens/circuit Watt.</p> <p>Lighting controls (e.g. PIR occupancy sensors) shall be employed throughout the non-residential components and zoned to suit the different space uses; the lighting control strategy shall work in conjunction with daylighting sensors in spaces with substantial glazing, to further reduce the energy consumption for artificial lighting.</p> <p>External lighting shall be highly efficient and employ controls to avoid energy wastage from unnecessary operation during daytime.</p>
<p><b>Overheating Mitigation</b></p> 	<p>The issue of overheating will need detailed and considered assessment at a later stage of design on the basis that, as buildings become progressively better sealed and insulated, the potential for overheating increases.</p>	<p><u>Limiting Summer External Gains</u></p> <p>Solar control glazing shall be installed to the elevations most affected; the precise specification of glazing types for windows and glazed curtain walling is to be based upon further analysis at later stages so that the appropriate balance is found between limiting summer heat gains without compromising daylight harvesting and winter solar gains.</p> <p>Thermal mass (discussed above) and internal occupant-controlled shading elements will be considered at the more detailed design stage along with heat reflective finishes of the external building surfaces.</p> <p>The above shall be considered in conjunction and interrelationship with the ventilation strategy, to ensure thermal comfort for occupants and energy savings.</p> <p><u>Limiting Internal Heat Gains</u></p> <p>Heat losses from the Hot Water and Low Temperature Hot Water (LTHW) distribution network are considered to be a significant source of potential overheating in well insulated buildings. This issue can be a significant factor affecting comfort and will therefore need full consideration during the detailed design of the mechanical systems.</p>





		<p>However, it is expected that attention will be given to:</p> <ul style="list-style-type: none"><li>• The positioning of the distribution network and its potential impact on surrounding spaces;</li><li>• The (mechanical) ventilation of spaces where heating pipework is distributed (e.g. corridors);</li><li>• The implementation of combined passive/active ventilation systems for air exhaust of spaces into corridors and to the outside;</li><li>• Maximising the natural ventilation potential of spaces;</li><li>• The performance of the insulation, with calculations undertaken assessing heat losses from the pipework relative to the heat losses from the spaces.</li></ul>
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## 9. District Energy & Low Carbon Technology Appraisal

9.1 Low carbon technologies are energy generation systems which offer the capability to make more efficient and effective use of primary energy resources, emitting significantly lower levels of carbon dioxide than conventional energy generation methods.

Table 9.1 District Energy & Low Carbon Technology Appraisal

Technology	Description	Appraisal	Proposed
<b>District Energy</b> 	<p>The term “district energy” applies to the energy distribution network, rather than the origins of the energy and the extent of any carbon savings will be largely determined by the energy source and heat losses on the network.</p>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>A sufficient heating demand exists on site which could be satisfied by a District Energy system;</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>Connection costs and energy prices may be high;</li> <li>The carbon factor associated with the fuel source is beyond the control of the developer.</li> <li>There is no DEN in the vicinity of the site.</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>Whilst District Energy is not evident in the vicinity of the site, it is proposed that the site be future proofed to allow future connection.</li> </ul>	<p>Future proofed to allow future connection</p>
<b>Combined Heat &amp; Power</b> 	<p>Combined Heat &amp; Power (CHP) systems generate electrical energy and provide the waste heat from the process to be used on site. They are typically gas-powered but can be run off alternative fuel sources. CHP is a highly efficient means to supply heat</p>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>A sufficient heating demand exists on site which the CHP system could supply;</li> <li>A base load exists for hot water generation for the hotel elements of the proposal;</li> <li>There is potential to apply the CHP to non-regulated energy uses (e.g. the swimming pool heating), which may allow an percentage of the regulated heating to be served.</li> </ul> <p><u>Limitations</u></p>	<p>Yes</p>

in developments, providing significant carbon savings and wider environmental benefits (the power generation is much less resource intensive and carbon emitting compared to grid electricity from the average UK power station).

- The space heating demand presents a variable daily, weekly and seasonal trend; this potentially introduces design complexity and viability implications for the technology;


Appraisal



- CHP is considered a potentially feasible and viable technology for the site and is proposed for the hot water.



## 10. Renewable Technology Appraisal


10.1 Renewable technologies are those which take their energy from sources which are considered to be inexhaustible (e.g. sunlight, wind etc.). Emissions associated with renewables are generally considered to be negligible and the technologies are frequently referred to as “zero carbon”.



Table 10.1 Renewable Technology Appraisal

Technology	Description	Appraisal	Proposed
<b>Biomass Systems</b> 	<p>Biomass systems are heating systems that use agricultural, forest, urban and industrial residues and waste to produce heat and (depending on the system) electricity. At the building scale, biomass boilers using wood pellets or woodchips are the norm. Biomass should be sourced locally to limit “embodied carbon” associated with transport and ideally be derived from waste wood products to limit the take-up of agricultural land for fuel crops.</p>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>• A sufficient heating demand exists, which the biomass system could supply;</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• The site is located in an urban environment and away from a readily available and diverse supply of biomass;</li> <li>• Transport, storage and maintenance requirements, would increase the managerial requirements of operation; and</li> <li>• Carbon emissions associated with cultivation, processing and transport of biomass are not normally considered in the context of planning or Building Regulations meaning that total carbon emissions are likely to be significantly higher than estimated.</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• Whilst technically feasible, the absence of a readily available and diverse local fuel source creates risk associated with security of fuel supply. This has implications for operational viability;</li> <li>• Biomass is therefore not a preferred technology for the scheme.</li> </ul>	No
<b>Heat Pumps</b>	Heat pumps draw thermal energy from the air, water or	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>• A sufficient heating demand exists, which ASHPs could accommodate;</li> </ul>	Yes


<p><u>Air Source Heat Pumps</u></p> 	<p>ground (“source”) and upgrade it to be used as useful heat at another location (“sink”). Heat pumps require electricity to operate (or gas in the case of Gas Absorption Heat Pumps) as mechanical input is required to convert harvested energy to useful heat and complete its transport to the “sink”.</p> <p>Heat pumps are generally considered as renewable (despite an electrical or gas requirement) because the source of the heat is the ambient temperature in the exterior environment, which is ultimately heated via the sun.</p>	<p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• The performance of ASHPs typically varies more than other heat pump options due to greater fluctuations in air temperatures, relative to other heat sources;</li> <li>• Performance reduces when systems are required to achieve higher temperatures. Heat pumps are therefore normally better applied to space heating rather than hot water and specifically to low supply temperature systems (e.g. underfloor heating);</li> <li>• All heat pumps generate noise associated with the movement of refrigerant and (any) fans;</li> <li>• Whilst less expensive than other heat pump systems, relative to other technologies, capital and maintenance costs are high;</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• ASHPs are proposed for space heating on the basis that demand will be variable and intermittent; but also represent a proportionally small amount of the overall energy requirements. A responsive system is therefore advantageous.</li> <li>• Furthermore, it is expected that clients will expect cooling and a reversible AC system would provide the most cost effective and least complex solution.</li> </ul>	
<p><u>Ground Source Heat Pumps</u></p> 	<p>Reversible systems can provide air conditioning comfort cooling; however, when in cooling mode, the system is not considered renewable as it is not taking advantage of a renewable source of energy.</p>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>• A sufficient heating demand exists, which GSHPs could accommodate;</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• Site constraints and shading render a horizontal configuration non-feasible. Capital costs for vertical installations are typically greater than for horizontal systems due to drilling costs;</li> <li>• Thermal properties of the ground will depend upon a number of factors including geology and depth. Desktop information suggests that thermal properties are below average and therefore deeper boreholes would likely be required;</li> </ul>	<p>No</p>

		<ul style="list-style-type: none"> <li>• Performance reduces when systems are required to achieve higher temperatures. Heat pumps are therefore normally better applied to space heating rather than hot water and specifically to low supply temperature systems (e.g. underfloor heating);</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• Installed vertically, a GSHP system would be technically feasible for supplying heat to part of the development;</li> <li>• However, uncertainties exist with regards to the thermal properties of the ground and performance;</li> <li>• GSHPs are not proposed; principally for financial viability reasons and on the basis that it would represent a relatively expensive means of reducing carbon.</li> </ul>	
<p><u>Water Source Heat Pumps</u></p> 		<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>• A sufficient heating demand exists, which WSHPs could accommodate;</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• There is no surface water course in close proximity to the site.</li> <li>• Any use of the river would need to be considerate of the relevant authorities, other users and potential for impact on wildlife.</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• WSHP is not considered an option for the site; primarily for technical feasibility considerations.</li> </ul>	No
<p><b>Micro Hydro Power</b></p> 	<p>Micro hydro power systems harnesses energy from flowing water by using height differences (called "head"); the minimum allowable head is 1.5m and ideally not lower than 10m.</p>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>• A sufficient electricity demand exists, which micro hydro power could address.</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• No suitable water body is found in the vicinity of the site.</li> </ul>	No

		<p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• Micro hydro is therefore not considered an option for the site, for technical feasibility reasons.</li> </ul>	
<p><b>Micro Wind Power</b></p> 	<p>Wind turbines are used to generate electricity; with power production determined by the rotation of the blades and being proportionate to the speed of their rotation. The technology is most efficient for constant, low turbulence wind profiles.</p>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>• A sufficient electricity demand exists, which micro wind power could contribute towards;</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• Due to the urban environment, the wind profile is expected to be highly turbulent, reducing the efficiency of the system;</li> <li>• The average wind speed is low and falls within the lower range for a viability case;</li> <li>• Roof mounted turbines would add height to the buildings with associated aesthetic and planning considerations; and</li> <li>• Moving plant on the roof potentially creates noise and vibration, with associated nuisance and structural considerations.</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• Whilst wind turbines are considered technically feasible in a limited capacity, wind speeds are relatively low and subject to turbulence. The technology is therefore likely to underperform;</li> <li>• On-site &amp; real-time wind speed measurements for at least a year would be required prior to establishing a case for this technology (recommended should the end users wish to investigate further);</li> <li>• Given the uncertainty over performance, the fact that any contribution will likely be quite minor, micro wind turbines are not proposed for the development.</li> </ul>	No
<p><b>Solar Systems</b> <u>Photovoltaics</u></p>	<p>Both solar thermal and photovoltaic (PV) systems</p>	<p><u>Opportunities</u></p>	Yes

	<p>convert energy from the sun into a form which can be applied within the building. Solar thermal generates energy for heating (usually for hot water) and PV generates electricity. Hybrid photovoltaic / solar thermal collectors are also available and co-generate heat and power.</p>	<ul style="list-style-type: none"> <li>• A sufficient electricity demand exists; which PV could partially address;</li> <li>• An extent of roof space exists on the site, which is not subject to significant overshadowing.</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• The area of roof space will limit the potential application of the technology;</li> <li>• The technology tends to have a high capital cost per unit of carbon saved.</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• PV panels are proposed in combination with other technologies in order to offset the requirement for grid electricity.</li> </ul>	
<p><u>PV-T</u></p> 	<p>To maximise the performance from the technology, the solar collectors should be pointed towards the sun; which in the UK is maximised when orientated to the south and at an angle of 30°.</p>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>• A sufficient electricity and heating demand exists; which PV-T could partially address;</li> <li>• An extent of roof space exists on the site, which is flat and not subject to significant overshadowing.</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• Potential carbon savings are jeopardised by auxiliary power needed to move the heat around the development;</li> <li>• Heating energy generation presents high seasonal variance and has therefore limited scope in efficiently supplying the base heating load (hot water);</li> <li>• The system would be conflicting with the preferred technology</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• Whilst technically feasible in a limited capacity, the potential maximum application of the technology is unlikely to provide significant carbon dioxide reductions for the development;</li> </ul>	<p>No</p>



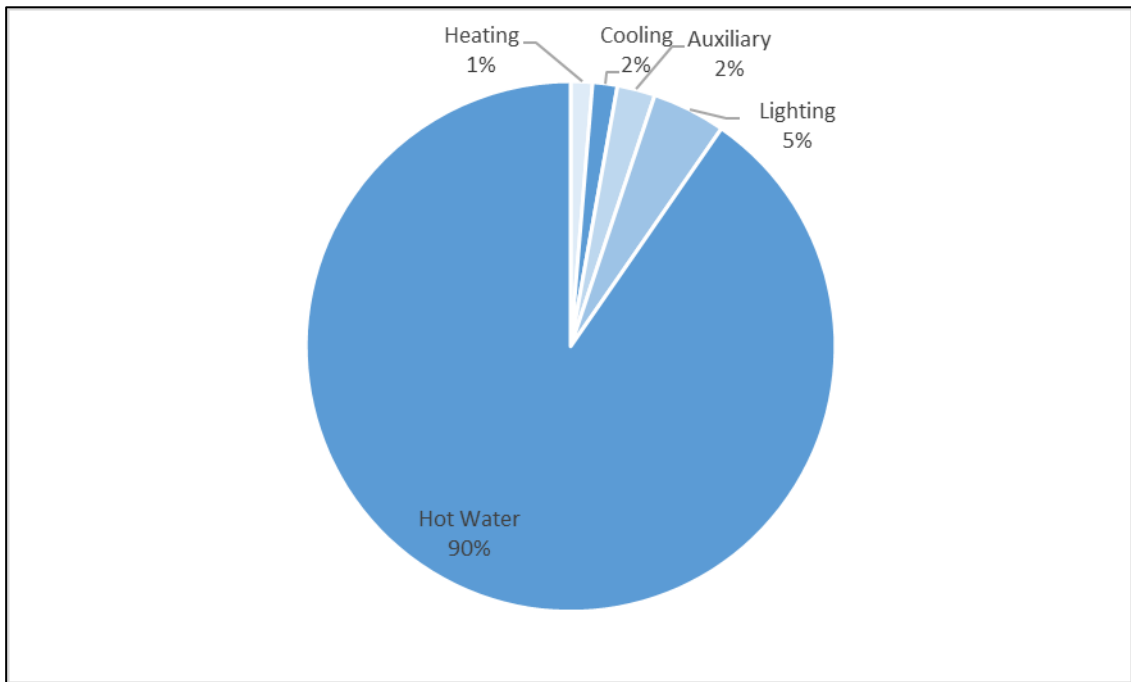
		<ul style="list-style-type: none"> <li>• This technology would conflict with other preferred LZC technologies;</li> <li>• The high capital costs compared to anticipated savings render this option financially unviable;</li> <li>• The limited availability of suitable roof space would mean that PV-T would not be able to satisfy the carbon reduction target in isolation and would need to be combined with other LZC technologies.</li> <li>• PV-T panels are therefore not a preferred option for the energy strategy.</li> </ul>	
<p><u>Solar Thermal</u></p> 		<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>• A sufficient heating demand exists; which Solar Thermal could partially address;</li> <li>• An extent of roof space exists on the site, which is flat and not subject to significant overshadowing.</li> </ul> <p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• The technology tends to have a high capital cost per unit of carbon saved;</li> <li>• Potential carbon savings are jeopardised by auxiliary power needed to move the heat around the development;</li> <li>• Heating energy generation presents high seasonal variance and has therefore limited scope in efficiently supplying the base heating load (hot water);</li> <li>• The system would be conflicting with the preferred technology.</li> </ul> <p><u>Appraisal</u></p> <ul style="list-style-type: none"> <li>• Whilst technically feasible in a limited capacity, the potential maximum application of the technology is unlikely to provide significant carbon dioxide reductions for the development;</li> <li>• This technology would conflict with other preferred LZC technologies;</li> </ul>	<p>No</p>

		<ul style="list-style-type: none"><li>• The high capital costs compared to anticipated savings render this option financially unviable;</li><li>• Solar Thermal panels are therefore not a preferred option for the energy strategy.</li></ul>	
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## 11. Summary

- 11.1 This Energy Statement provides an overview of the energy strategy in consideration of the site context, anticipated energy requirements and local priorities and initiatives.
- 11.2 Development proposals include the “*Full Planning Application for the demolition of existing buildings (B1a Use Class) and erection of a part 3, part 4, part 5 storey building (with two basement levels), comprising co-working office floorspace (B1a Use Class), hotel accommodation (C1 Use Class) and an ancillary café/bar and fitness facilities; works to the existing access and associated works.*”
- 11.3 A review of Camden Council’s planning policies has identified a number of requirements relating to energy. Of these, Local Plan policy CC1 (*Climate Change Mitigation*) is considered most pertinent along with Camden Planning Guidance – *Sustainability* (CPG3). Consideration has also been given to the NPPF and GLA’s London Plan and the targets contained therein.
- 11.4 The approach follows the Energy Hierarchy, with priority given to efficient design on the basis that it is preferable to reduce carbon emissions by reducing energy demand than through the use of low and/or zero carbon technologies.
- 11.5 The building’s fabric shall be constructed to a high performance standard, achieving high levels of thermal insulation and low air permeability. Energy efficient lighting and appropriate controls shall be employed throughout the development.
- 11.6 The CHP central plant shall be used to supply the majority of the base hot water load. The system would be centralised and operate in parallel with an efficient and conventional back-up gas-fired boiler(s). This system is compatible with any future district energy network.
- 11.7 Following the application of energy efficiency measures, space heating has been reduced to represent a relatively small proportion of the overall heating requirements and, due to the nature of the spaces and occupation, will be required to operate intermittently. A reversible ASHP is therefore proposed for space heating on the basis that it will allow for a significant degree of control (i.e. only applying heating when and where needed), will reduce the risk of uncontrolled and wasteful heat losses in the building (e.g. distribution losses) and can be coupled with mechanical cooling relatively simply (anticipated to be an expectation of end-users in a high-end hotel).
- 11.8 It is proposed to install an extent of photovoltaics (PV) at roof level which would assist in further reducing the carbon emissions.

**Figure 11.1 Be Green Energy Consumption**



**Carbon Savings**

11.9 Energy modelling has been undertaken using SBEM and the carbon savings delivered by each of the three steps of the Energy Hierarchy have been estimated (indicative outputs are included in the appendices).

**Table 11.1 Carbon Dioxide Emissions after Each Stage of the Energy Hierarchy**

Step	Carbon Dioxide Emissions (Tonnes CO <sub>2</sub> per annum)	
	Regulated	Unregulated
Baseline: Part L 2013	291.6	29.2
After energy demand reduction	275.0	29.2
After CHP	197.0	29.2
After renewable energy	177.1	29.2

**Table 11.2 Regulated CO<sub>2</sub> Savings from Each Stage of the Energy Hierarchy**

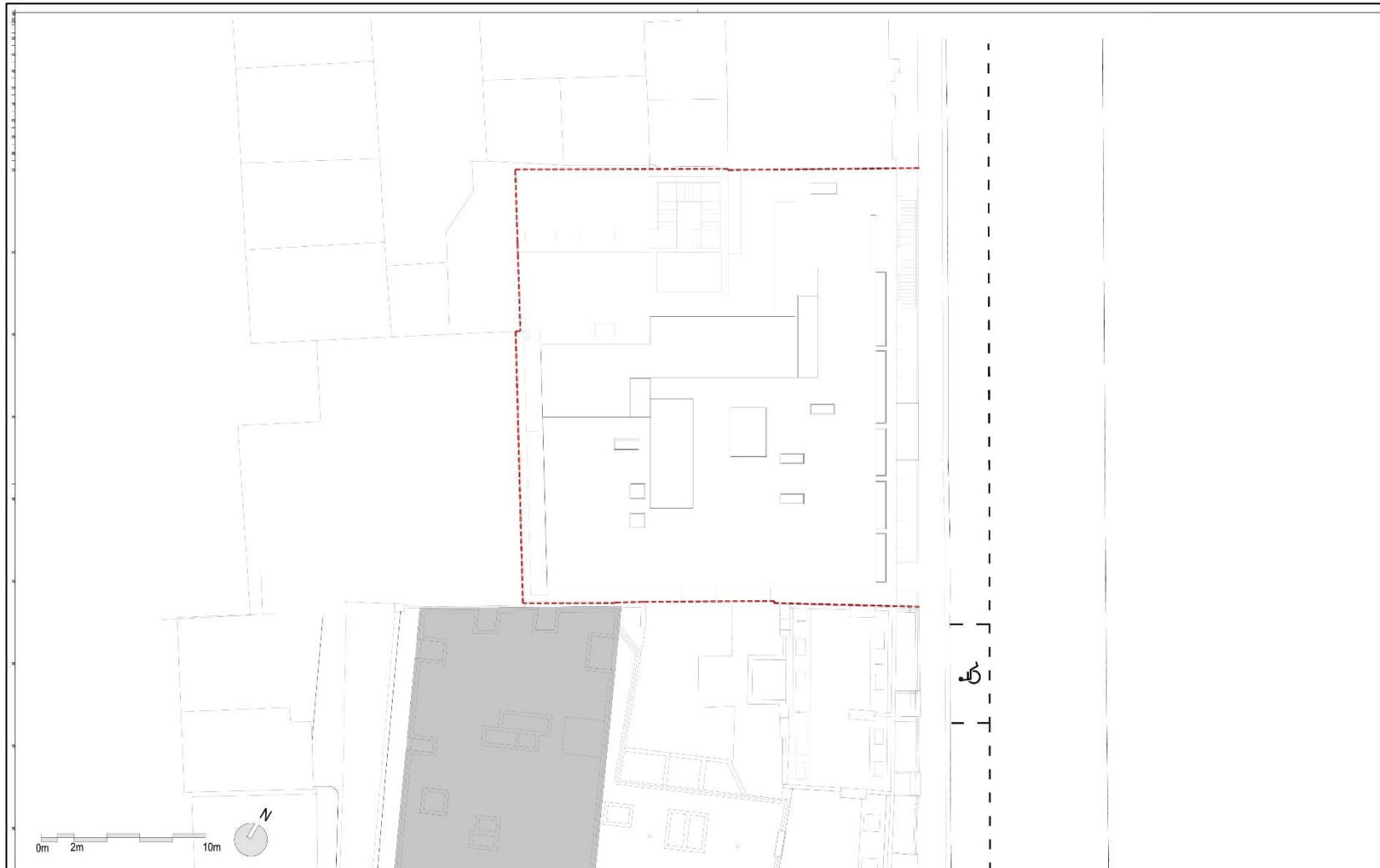
	Regulated Carbon Dioxide Savings	
	(Tonnes CO <sub>2</sub> per annum)	%

Savings from energy demand reduction	16.6	5.7%
Savings from CHP	78.0	26.8%
Savings from renewable energy	19.9	6.8%
Total Cumulative Savings	114.5	39.3%
Total Target Savings	102.1	35.0%
Annual Surplus	12.4	

- 11.10 In line with the London Plan and Council policies, a carbon saving >35% against Part L 2013 baseline has been targeted for the development.
- 11.11 Overall, the proposed energy strategy is considered consistent with the National Planning Policy Framework and policies of the GLA and Council and, when implemented, will provide an efficient and low carbon development.

# Appendices

# A. Site Plan



**NOTES**

- Do not scale off these drawings. Dimensions govern.
- All dimensions are given in metres, rounded to the nearest millimetre.
- All dimensions shall be verified on site before proceeding with the work.
- The contractor shall ensure that all work complies with the relevant Building Regulations and all other applicable requirements.
- During construction the contractor shall be responsible for maintaining the structure in a stable condition.
- These drawings are to be read in conjunction with all other contract documentation and other consultants' recommendations.
- To be used as is.

Rev	Date	Reason for issue	chd
PL-01	11/07/2018	Amended for pre-app comments	MC

**ambigram architects**  
 Studio 204, 60 Groy's Inn Road  
 London WC1X 8AQ  
 www.ambigramarchitects.com  
 info@ambigramarchitects.com  
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**7abc Bayham St**  
 Kings Cross, London, NW1 6ER  
 Project  
**Site Plan Proposed**  
 Title

aa-a-1704	MC	X-XX
Job number	Drawn	Revision
July 2018		
Date	1:100_@A1	
D_PA_P-0401	1:200_@A3	
Drawing no	Scale	



## **B. Energy Modelling Outputs**

# SBEM Main Calculation Output Document

Thu Nov 29 18:19:08 2018

v5.4.b.0

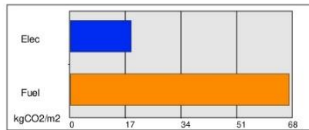
Building name

## Bayham Street \_Be Green

Building type: C1 Hotels

SBEM is an energy calculation tool for the purpose of assessing and demonstrating compliance with Building Regulations (Part L for England and Wales, Section 6 for Scotland, Part F for Northern Ireland, Part L for Republic of Ireland, and Building Bye-laws Jersey Part 11) and to produce Energy Performance Certificates and Building Energy Ratings. Although the data produced by the tool may be of use in the design process, **SBEM is not intended as a building design tool.**

### Building Energy Performance and CO2 emissions

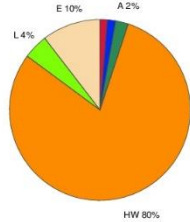


37 kgCO2/m2 displaced by the use of renewable sources.

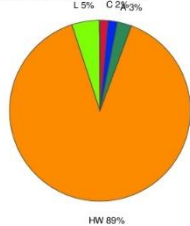
Building area is 3681.59 m2

#### Annual Energy Consumption

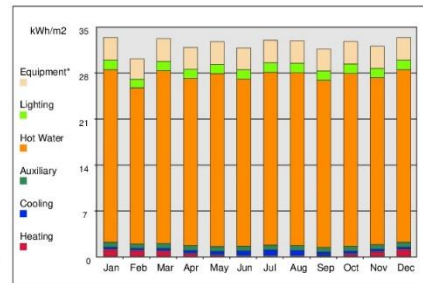
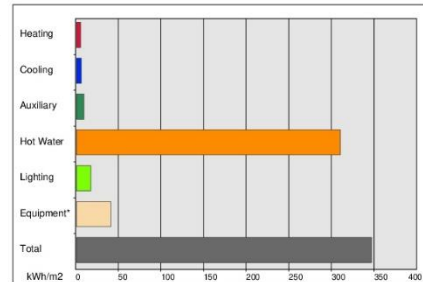
(Pie chart including Equipment end-use)



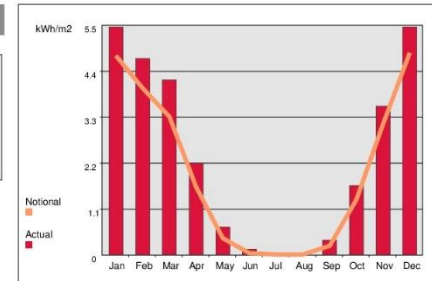
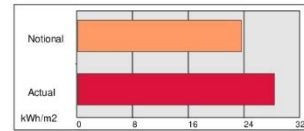
(Pie chart excluding Equipment end-use)



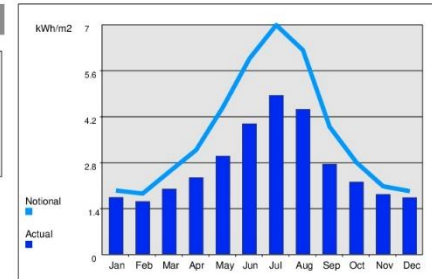
(\*) Although energy consumption by equipment is shown in the graphs for information, this end-use has not been included in the total results of the building or the calculation of the ratings.



#### Annual Heating Demand



#### Annual Cooling Demand



# BRUKL Output Document

HM Government  
Compliance with England Building Regulations Part L 2013

## Project name

**Bayham Street\_Be Green** As designed

Date: Thu Nov 29 18:19:09 2018

## Administrative information

### Building Details

Address: Address 1, Address 2, London, Postcode

### Owner Details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

### Certification tool

Calculation engine: SBEM

Calculation engine version: v5.4.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.10

BRUKL compliance check version: v5.4.b.0

### Certifier details

Name: Pete Jeavons

Telephone number: Phone

Address: Ensphere Group, 10 Greycoat Place, London, SW1P 1SS

## Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum	77.9
Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	77.9
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	48.1
Are emissions from the building less than or equal to the target?	BER <= TER
Are as built details the same as used in the BER calculations?	Separate submission

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

### Building fabric

Element	U <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.21	0.26	FT000000_W0
Floor	0.25	0.2	0.22	FT000000_F
Roof	0.25	0.13	0.13	SP000000_C
Windows***, roof windows, and rooflights	2.2	1.4	1.4	TP000010_W5_O0
Personnel doors	2.2	-	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

U<sub>a</sub>-Limit = Limiting area-weighted average U-values [W/(m<sup>2</sup>K)]

U<sub>a</sub>-Calc = Calculated area-weighted average U-values [W/(m<sup>2</sup>K)]

U<sub>i</sub>-Calc = Calculated maximum individual element U-values [W/(m<sup>2</sup>K)]

\* There might be more than one surface where the maximum U-value occurs.

\*\* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

\*\*\* Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	10	5

## Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

### 1- ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	6.01	3.79	-	-	-
Standard value	2.5*	2.6	N/A	N/A	N/A

### Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system

NO

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

### 1- SYST0002-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

### 1- CCHP Generator

	CHPQA quality index	CHP electrical efficiency
This building	-	0.29
Standard value	Not provided	N/A

## Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
Changing facilities -2F	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	-	N/A
Store -2F		-	-	-	-	-	-	-	-	-	-	N/A
Lift -2F		-	-	-	-	-	-	-	-	-	-	N/A
Lift -1F		-	-	-	-	-	-	-	-	-	-	N/A
Lift -1F		-	-	-	-	-	-	-	-	-	-	N/A
Conference room -1F		-	1.1	-	-	-	-	-	-	-	-	N/A
Corridor -1F		-	-	-	-	-	-	-	-	-	-	N/A
Office -1F		-	1.1	-	-	-	-	-	-	-	-	N/A
Office -1F		-	1.1	-	-	-	-	-	-	-	-	N/A
Store -1F		-	-	-	-	-	-	-	-	-	-	N/A

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Toilets -1F		0.3	-	-	-	-	-	-	-	-	-	N/A
Store -1F		-	-	-	-	-	-	-	-	-	-	N/A
Store -1F		-	-	-	-	-	-	-	-	-	-	N/A
Toilets -1F		0.3	-	-	-	-	-	-	-	-	-	N/A
Circulation area -1F		-	-	-	-	-	-	-	-	-	-	N/A
Store -1F		-	-	-	-	-	-	-	-	-	-	N/A
Tea point -1F		-	1.1	-	-	-	-	-	-	-	-	N/A
Plant/ Store -1F		-	-	-	-	-	-	-	-	-	-	N/A
Bike store -1F		-	-	-	-	-	-	-	-	-	-	N/A
Food preparation area GF		0.4	-	-	-	-	-	-	-	-	-	N/A
Lift GF		-	-	-	-	-	-	-	-	-	-	N/A
Store GF		-	-	-	-	-	-	-	-	-	-	N/A
Store GF		-	-	-	-	-	-	-	-	-	-	N/A
Toilets GF		0.3	-	-	-	-	-	-	-	-	-	N/A
Staff office GF		-	1.1	-	-	-	-	-	-	-	-	N/A
Store GF		-	-	-	-	-	-	-	-	-	-	N/A
Lift GF		-	-	-	-	-	-	-	-	-	-	N/A
Working space GF		-	1.1	-	-	-	-	-	-	-	-	N/A
Lift GF		-	-	-	-	-	-	-	-	-	-	N/A
Staircase GF		-	-	-	-	-	-	-	-	-	-	N/A
Corridor GF		-	-	-	-	-	-	-	-	-	-	N/A
Toilets GF		0.3	-	-	-	-	-	-	-	-	-	N/A
Refuse store GF		-	-	-	-	-	-	-	-	-	-	N/A
Lift 1F		-	-	-	-	-	-	-	-	-	-	N/A
Store 1F		-	-	-	-	-	-	-	-	-	-	N/A
Lift 1F		-	-	-	-	-	-	-	-	-	-	N/A
Store 1F		-	-	-	-	-	-	-	-	-	-	N/A
Store 1F		-	-	-	-	-	-	-	-	-	-	N/A
Store 1F		-	-	-	-	-	-	-	-	-	-	N/A
Guest room 1F		0.3	-	-	-	-	-	-	-	-	-	N/A
Guest room 1F		0.3	-	-	-	-	-	-	-	-	-	N/A
Circulation area 1F		-	-	-	-	-	-	-	-	-	-	N/A
Guest room 1F		0.3	-	-	-	-	-	-	-	-	-	N/A
Cafe seating GF		-	1.1	-	-	-	-	-	-	-	-	N/A
Cafe seating GF		-	1.1	-	-	-	-	-	-	-	-	N/A
Cafe seating GF		-	1.1	-	-	-	-	-	-	-	-	N/A
Plant room 2F		-	-	-	-	-	-	-	-	-	-	N/A
Store 2F		-	-	-	-	-	-	-	-	-	-	N/A
Lift 2F		-	-	-	-	-	-	-	-	-	-	N/A
Store 2F		-	-	-	-	-	-	-	-	-	-	N/A
Circulation area 2F		-	-	-	-	-	-	-	-	-	-	N/A
Guest room 2F		0.3	-	-	-	-	-	-	-	-	-	N/A
Guest room 2F		0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Store 3F		-	-	-	-	-	-	-	-	-	-	N/A
Lift 3F		-	-	-	-	-	-	-	-	-	-	N/A
Store 3F		-	-	-	-	-	-	-	-	-	-	N/A
Guest room 3F		0.3	-	-	-	-	-	-	-	-	-	N/A
Circulation area 3F		-	-	-	-	-	-	-	-	-	-	N/A
Lift 4F		-	-	-	-	-	-	-	-	-	-	N/A
Store 4F		-	-	-	-	-	-	-	-	-	-	N/A
Guest room 4F		0.3	-	-	-	-	-	-	-	-	-	N/A
Circulation area 4F		-	-	-	-	-	-	-	-	-	-	N/A
Fitness room -2F		-	1.1	-	-	-	-	-	-	-	-	N/A
Conference room -2F		-	0.8	-	-	-	-	-	-	-	-	N/A
Staircase -2F		-	0.8	-	-	-	-	-	-	-	-	N/A
Gym reception -2F		-	1.1	-	-	-	-	-	-	-	-	N/A
Changing facilities -2F		-	1.1	-	-	-	-	-	-	-	-	N/A
Changing facilities -2F		-	1.1	-	-	-	-	-	-	-	-	N/A
Circulation area -2F		-	-	-	-	-	-	-	-	-	-	N/A
Plant room -2F		-	0.8	-	-	-	-	-	-	-	-	N/A

Zone name	Standard value	Luminous efficacy [lm/W]			General lighting [W]
		Luminaire	Lamp	Display lamp	
		60	60	22	
Changing facilities -2F		-	80	-	37
Store -2F		80	-	-	7
Lift -2F		-	80	-	39
Lift -1F		-	80	-	17
Lift -1F		-	80	-	39
Conference room -1F		80	-	-	960
Corridor -1F		-	80	-	107
Office -1F		80	-	-	390
Office -1F		80	-	-	384
Store -1F		80	-	-	9
Toilets -1F		-	80	-	115
Store -1F		80	-	-	8
Store -1F		80	-	-	8
Toilets -1F		-	80	-	124
Circulation area -1F		-	80	-	91
Store -1F		80	-	-	8
Tea point -1F		-	80	22	511
Plant/ Store -1F		80	-	-	143
Bike store -1F		80	-	-	34
Food preparation area GF		-	80	-	248
Lift GF		-	80	-	43
Store GF		80	-	-	6

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Luminaire	Lamp	Display lamp		
Standard value	60	60	22		
Store GF	80	-	-	7	
Toilets GF	-	80	-	57	
Staff office GF	80	-	-	167	
Store GF	80	-	-	13	
Lift GF	-	80	-	25	
Working space GF	80	-	-	1149	
Lift GF	-	80	-	18	
Staircase GF	-	80	-	45	
Corridor GF	-	80	-	193	
Toilets GF	-	80	-	149	
Refuse store GF	80	-	-	19	
Lift 1F	-	80	-	19	
Store 1F	80	-	-	6	
Lift 1F	-	80	-	36	
Store 1F	80	-	-	12	
Store 1F	80	-	-	10	
Store 1F	80	-	-	16	
Guest room 1F	-	80	-	164	
Guest room 1F	-	80	-	117	
Circulation area 1F	-	80	-	277	
Guest room 1F	-	80	-	297	
Cafe seating GF	-	80	22	187	
Cafe seating GF	-	80	22	363	
Cafe seating GF	-	80	22	90	
Plant room 2F	80	-	-	39	
Store 2F	80	-	-	6	
Lift 2F	-	80	-	36	
Store 2F	80	-	-	12	
Circulation area 2F	-	80	-	243	
Guest room 2F	-	80	-	230	
Guest room 2F	-	80	-	392	
Store 3F	80	-	-	6	
Lift 3F	-	80	-	36	
Store 3F	80	-	-	8	
Guest room 3F	-	80	-	581	
Circulation area 3F	-	80	-	212	
Lift 4F	-	80	-	36	
Store 4F	80	-	-	5	
Guest room 4F	-	80	-	399	
Circulation area 4F	-	80	-	171	
Fitness room -2F	-	80	-	380	
Conference room -2F	80	-	-	1015	
Staircase -2F	-	80	-	41	

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Luminaire	Lamp	Display lamp		
Standard value	60	60	22		
Gym reception -2F	-	80	22	390	
Changing facilities -2F	-	80	-	56	
Changing facilities -2F	-	80	-	93	
Circulation area -2F	-	80	-	82	
Plant room -2F	80	-	-	174	

**Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains**

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Changing facilities -2F	N/A	N/A
Store -2F	N/A	N/A
Lift -2F	N/A	N/A
Lift -1F	N/A	N/A
Lift -1F	N/A	N/A
Conference room -1F	N/A	N/A
Corridor -1F	N/A	N/A
Office -1F	N/A	N/A
Office -1F	N/A	N/A
Store -1F	N/A	N/A
Toilets -1F	N/A	N/A
Store -1F	N/A	N/A
Store -1F	N/A	N/A
Toilets -1F	N/A	N/A
Circulation area -1F	N/A	N/A
Store -1F	N/A	N/A
Tea point -1F	N/A	N/A
Plant/ Store -1F	N/A	N/A
Bike store -1F	N/A	N/A
Food preparation area GF	N/A	N/A
Lift GF	N/A	N/A
Store GF	N/A	N/A
Store GF	N/A	N/A
Toilets GF	N/A	N/A
Staff office GF	N/A	N/A
Store GF	N/A	N/A
Lift GF	N/A	N/A
Working space GF	N/A	N/A
Lift GF	N/A	N/A
Staircase GF	N/A	N/A
Corridor GF	NO (-77.5%)	NO
Toilets GF	N/A	N/A
Refuse store GF	N/A	N/A
Lift 1F	N/A	N/A
Store 1F	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Lift 1F	N/A	N/A
Store 1F	NO (-54.6%)	NO
Store 1F	N/A	N/A
Store 1F	N/A	N/A
Guest room 1F	NO (-64.8%)	NO
Guest room 1F	NO (-68.1%)	NO
Circulation area 1F	N/A	N/A
Guest room 1F	NO (-82.5%)	NO
Cafe seating GF	NO (-3.5%)	NO
Cafe seating GF	NO (-5.9%)	NO
Cafe seating GF	YES (+202%)	NO
Plant room 2F	N/A	N/A
Store 2F	N/A	N/A
Lift 2F	N/A	N/A
Store 2F	NO (-54.6%)	NO
Circulation area 2F	NO (-58.4%)	NO
Guest room 2F	NO (-74.5%)	NO
Guest room 2F	NO (-61.3%)	NO
Store 3F	N/A	N/A
Lift 3F	N/A	N/A
Store 3F	N/A	N/A
Guest room 3F	NO (-66.2%)	NO
Circulation area 3F	NO (-40.2%)	NO
Lift 4F	N/A	N/A
Store 4F	N/A	N/A
Guest room 4F	NO (-55.8%)	NO
Circulation area 4F	NO (-43.4%)	NO
Fitness room -2F	N/A	N/A
Conference room -2F	N/A	N/A
Staircase -2F	N/A	N/A
Gym reception -2F	N/A	N/A
Changing facilities -2F	N/A	N/A
Changing facilities -2F	N/A	N/A
Circulation area -2F	N/A	N/A
Plant room -2F	N/A	N/A

**Criterion 4: The performance of the building, as built, should be consistent with the calculated BER**

Separate submission

**Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place**

Separate submission

**EPBD (Recast): Consideration of alternative energy systems**

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

## Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m <sup>2</sup> ]	3681.6	3681.6		A1/A2 Retail/Financial and Professional services
External area [m <sup>2</sup> ]	3476.6	3476.6		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	LON	LON		B1 Offices and Workshop businesses
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	5	3		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	1031.9	1804.58	100	B8 Storage or Distribution
Average U-value [W/m <sup>2</sup> K]	0.3	0.52		<b>C1 Hotels</b>
Alpha value* [%]	25.86	17.74		C2 Residential Institutions: Hospitals and Care Homes

\* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

C2 Residential Institutions: Residential schools  
C2 Residential Institutions: Universities and colleges  
C2A Secure Residential Institutions  
Residential spaces  
D1 Non-residential Institutions: Community/Day Centre  
D1 Non-residential Institutions: Libraries, Museums, and Galleries  
D1 Non-residential Institutions: Education  
D1 Non-residential Institutions: Primary Health Care Building  
D1 Non-residential Institutions: Crown and County Courts  
D2 General Assembly and Leisure, Night Clubs, and Theatres  
Others: Passenger terminals  
Others: Emergency services  
Others: Miscellaneous 24hr activities  
Others: Car Parks 24 hrs  
Others: Stand alone utility block

### Energy Consumption by End Use [kWh/m<sup>2</sup>]

	Actual	Notional
Heating	5.04	9.68
Cooling	5.75	12.13
Auxiliary	8.8	9.3
Lighting	17.1	19.02
Hot water	309.57	243.25
Equipment*	40.42	40.42
<b>TOTAL**</b>	<b>274.57</b>	<b>293.38</b>

\* Energy used by equipment does not count towards the total for consumption or calculating emissions.  
\*\* Total is net of any electrical energy displaced by CHP generators, if applicable.

### Energy Production by Technology [kWh/m<sup>2</sup>]

	Actual	Notional
Photovoltaic systems	0.27	0
Wind turbines	0	0
CHP generators	71.69	0
Solar thermal systems	0	0

### Energy & CO<sub>2</sub> Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	217.79	241.94
Primary energy* [kWh/m <sup>2</sup> ]	267.41	446.83
Total emissions [kg/m <sup>2</sup> ]	48.1	77.9

\* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

### HVAC Systems Performance

System Type	Heat dem MJ/m <sup>2</sup>	Cool dem MJ/m <sup>2</sup>	Heat con kWh/m <sup>2</sup>	Cool con kWh/m <sup>2</sup>	Aux con kWh/m <sup>2</sup>	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	101.7	116.1	5	5.7	8.8	5.6	5.61	6.01	7.9
Notional	84.7	157.2	9.7	12.1	9.3	2.43	3.6	----	----

#### Key to terms

Heat dem [MJ/m <sup>2</sup> ]	= Heating energy demand
Cool dem [MJ/m <sup>2</sup> ]	= Cooling energy demand
Heat con [kWh/m <sup>2</sup> ]	= Heating energy consumption
Cool con [kWh/m <sup>2</sup> ]	= Cooling energy consumption
Aux con [kWh/m <sup>2</sup> ]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

### Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

#### Building fabric

Element	U <sub>i-Typ</sub>	U <sub>i-Min</sub>	Surface where the minimum value occurs*
Wall	0.23	0.2	BL000009_W-1
Floor	0.2	0.15	BL000009_F
Roof	0.15	0.13	SP000000_C
Windows, roof windows, and rooflights	1.5	1.4	TP000010_W5_O0
Personnel doors	1.5	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"
U <sub>i-Typ</sub> = Typical individual element U-values [W/(m <sup>2</sup> K)]		U <sub>i-Min</sub> = Minimum individual element U-values [W/(m <sup>2</sup> K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	5	5

## **C. General Notes**



The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Ensphere Group Ltd for inaccuracies in the data supplied by any other party.

The review of planning policy and other requirements does not constitute a detailed review. Its purpose is as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.

No site visits have been carried out, unless otherwise specified.

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Ensphere Group Ltd  
10 Greycoat Place, London, SW1P 1SB  
+44 (0) 20 7960 6126  
[www.enspheregroup.com](http://www.enspheregroup.com)