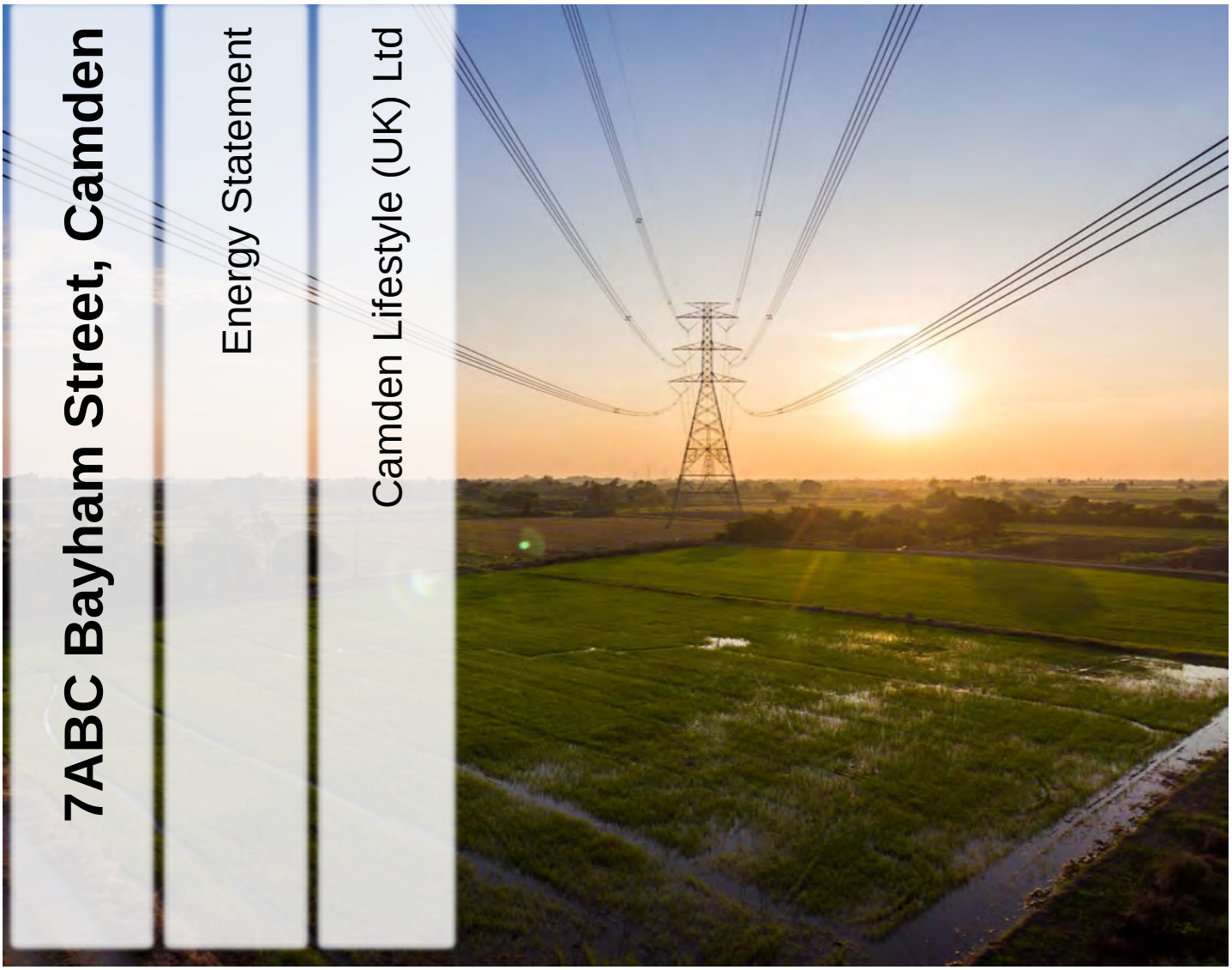
7ABC Bayham Street, Camden

Energy Statement

Camden Lifestyle (UK) Ltd



Ensphere Group Ltd
52 Grosvenor Gardens
London, SW1W 0AU
+44 (0) 20 7846 9040
www.enspheregroup.com

ensphere

7ABC Bayham Street, Camden

Energy Statement

Client Name: Camden Lifestyle (UK) Ltd

Document Reference: 17-E090-032

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.

Issue:	Version:	Prepared by:	Reviewed by:	Date:
Final	V1	Pete Jeavons	Pete Jeavons	November 2020

ensphere

Contents

1. Executive Summary

1.1 This Energy Statement presents the energy strategy for a proposed scheme at 7ABC Bayham Street, Camden.

1.2 Planning consent has been granted for 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."* Variations are being sought as part of a Section 73 Application.

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;
- Air Source Heat Pumps to provide space heating and hot water.
- 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 ≥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).

2. Introduction

2.1 Ensphere Group Ltd was commissioned to produce an Energy Statement for a proposed development at 7ABC Bayham Street, Camden.

Site and Surroundings

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.

Consented Scheme

2.6 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.

Section 73

2.7 A Section 73 Application is now being submitted to accommodate variations.

Report Objective

2.8 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

3.1 The assessment methodology follows the Energy Hierarchy, on the basis that it is preferable to firstly minimise carbon dioxide emissions through reduced energy demand; prior to considering low carbon and renewable energy supply options.

3.2 The tiers of the Energy Hierarchy are:

- Be Lean Demand Reduction
- Be Clean Use Energy More Efficiently
- Be Green Use Renewable Energy

3.3 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.

3.4 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.

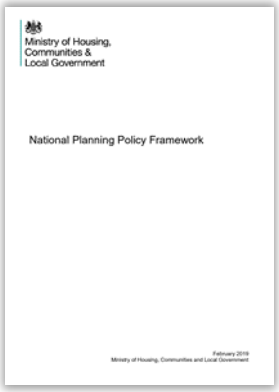
3.5 The following sections of the report review the planning policy requirements prior to establishing a baseline from which the principles of the Energy Hierarchy are applied.

4. Planning Context

4.1 Local planning policy relevant to sustainable development is considered below:

National Context

National Planning Policy Framework (2019)



4.2 The National Planning Policy Framework (NPPF) was updated in February 2019. Paragraph 7 of the revised NPPF states that:

"the purpose of the planning system is to contribute to the achievement of sustainable development"

4.3 Chapter 14 of the NPPF includes consideration of climate change and the use and supply of renewable and low carbon energy. Paragraph 148 states:

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure."

Planning Practice Guidance (2016; updated 2018)

- Climate Change - Advises how planning can identify suitable mitigation and adaption measures in plan-making and the application process to address the potential for climate change.
- Renewable and Low Carbon Energy - 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 Context

The London Plan Consolidated with Alterations Since 2011 (2016)

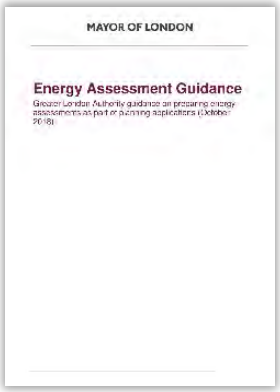
4.4 The London Plan was further updated in March 2016. The Plan is the overall strategic plan for London. Chapter five of the Plan details London's Response to Climate Change. The following policies are considered pertinent to this Statement:

- Policy 5.2 (*Minimising Carbon Dioxide Emissions*) – includes:

- An Energy Hierarchy: Be Lean; Be Clean; Be Green;
- Carbon reduction targets for major developments; including a "zero carbon" target for 2019;
- Sets out the information requirements for energy assessments.

- Policy 5.3 (*Sustainable Design & Construction*) – encourages consideration of sustainability as part of the design and construction;
- Policy 5.5 (*Decentralised Energy Networks*) – requires planning authorities to require developers prioritise connection to existing or planned decentralised energy networks where feasible;
- Policy 5.6 (*Decentralised Energy in Development Proposals*) – encourages development to establish or connect to energy networks;
- Policy 5.7 (*Renewable Energy*) – within the framework of the Energy Hierarchy, major development proposals should provide a reduction in expected carbon dioxide through the use of on-site renewable energy generation, where feasible;
- Policy 5.9 (*Overheating and Cooling*) – major development proposals should reduce potential overheating and reliance on air conditioning systems in accordance with a Cooling Hierarchy;

Energy Assessment Guidance (2018)



4.5 This guidance document explains how to prepare an energy assessment to accompany strategic planning applications referred to the Mayor as set out in London Plan Policy 5.2. It states that the purpose of an energy assessment is to demonstrate that the proposed climate change mitigation measures comply with London Plan energy policies, including the energy hierarchy.

4.6 Although primarily aimed at strategic planning applications, London boroughs are encouraged to apply the same structure for energy assessments related to non-referable applications and adapt it for relevant scales of development.

Emerging London Plan (2019)

4.7 The draft New London Plan is a broad plan to shape the way London develops over the next 20-25 years. Energy issues are discussed in Chapter 3 (Design), Chapter 8 (Green Infrastructure and Natural Environment) and Chapter 9 (Sustainable Infrastructure). The following draft policies are considered important to this report:

- Draft Policy D1 *(London's Form and Characteristics)* – Development should aim for high sustainability standards (with reference to the policies within London Plan Chapter's 8 and 9);
- Draft Policy SI1 *(Improving Air Quality)* – Development should not lead to further deterioration of existing poor air quality;
- Draft Policy SI2 (*Minimising GHG Emissions*) – Encourages major development to be zero-carbon and minimise annual and peak energy demand in accordance to 'Be Lean, Be Clean, Be Green, Be Seen' energy hierarchy.
- Draft Policy SI3 *(Energy Infrastructure)* – Major development proposals in Heat Network Priority Areas should have a communal low-temperatures heating system and the heating source should be selected in accordance to the Heating Hierarchy;
- Draft Policy SI4 *(Managing Heat Risk)* – Encourages development to minimise adverse impacts on the urban heat island and to assess the risk of internal overheating and reduce reliance on air conditioning.

Local Context

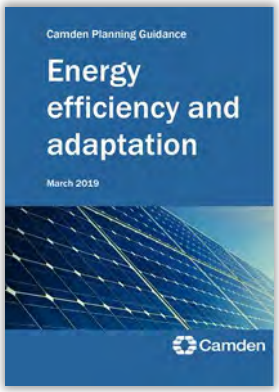
Camden Local Plan (June 2017)

4.8 The Local Plan sets out the planning policies, site allocations and land designations Borough-wide and is the central document in the Borough's Development Plan.

4.9 The following policies are considered relevant to this report:

- Policy CC1 (*Climate Change Mitigation*) – promotes zero carbon development, consideration of the Energy Hierarchy (encouraging connection to District Energy Networks), reduced reliance on transport by car and resource efficiency;
- Policy CC2 (*Adapting to Climate Change*) – requires consideration of overheating risks, encourages the use of the Home Quality Mark and Passivhaus Standards along with BREEAM "excellent" for non-domestic and refurbishment developments >500sqm;

Camden Planning Guidance – Energy Efficiency & Adaptation (March 2019)



4.10 This guidance provides information on key energy and resource issues within the borough and supports Local Plan Policies CC1 Climate change mitigation and CC2 Adapting to climate change.

4.11 Includes requirements concerning credits under certain BREEAM categories (60% energy, 60% water and 40% materials); and reference the 20% renewables target.

5. Baseline Emissions

5.1 This section establishes the baseline position from which carbon savings are to be achieved. For the purposes of this assessment, and in line with GLA and local authority policies and guidance, the baseline position equates to regulated carbon dioxide emissions, assuming compliance with Part L 2013 of the Building Regulations, as calculated using approved compliance software.

5.2 When determining this baseline, it has been assumed that heating would be provided by gas boilers (irrespective of the design proposals) and that any active cooling system would be provided by electrically powered equipment. This is to ensure consistency with the requirements of the GLA guidance.

5.3 Regulated emissions are emissions which are covered by the Building Regulations and include the energy consumed in the operation of the space heating / cooling and hot-water systems, ventilation and internal lighting.

5.4 Unregulated emissions (i.e. those associated with cooking and all electrical appliances and other small power) have been separately calculated.

5.5 All emissions have been assessed using the SAP10 carbon factors. Non-domestic unregulated emissions have been taken from the unregulated emissions values generated by the SBEM models.

Table 5.1 Carbon Dioxide Emissions (SAP10) – Baseline (Non-Domestic)

Step	Carbon Dioxide Emissions (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013	147.7	17.9

6. Demand Reduction (Be Lean)

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

Passive Design

6.2 Passive design seeks to maximise the use of natural sources of heating, cooling and ventilation to maintain thermal comfort levels within the building.

Building Massing & Orientation

6.3 The building comprises a single block of ground plus upper storeys and is orientated on the northwest-southeast axis of the site.

6.4 The limited extent of south-facing surfaces will help reduce the direct solar gain and potential for overheating.

6.5 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 chances per hour to maintain temperatures within a comfortable range.

Daylighting

6.6 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.

Fabric Efficiency

6.7 Fabric efficiency concerns the thermal properties associated with the building fabric and construction.

Insulation

6.8 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).

6.9 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.

Table 6.1 Proposed Building Fabric U-Values (Non-Domestic)

Fabric Element	Part L2A (W/m²K)	Proposed (W/m²K)
External Wall	0.35	0.14-0.15
Roof	0.25	0.12
Ground Floor	0.25	0.12-0.13
Windows	2.2 (including frame)	1.4 (double glazed)

Air Tightness

6.10 A high level of air tightness is proposed and a level below 3m³/h/m² is targeted, meaning that air infiltration between the internal and the external environment will be largely controlled and space heating demand further reduced.

Thermal Bridging

6.11 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.

6.12 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.

System Efficiencies

Heating Systems

6.13 It is proposed to incorporate low carbon and renewable technologies as the basis of the heating strategy (see sections below).

Ventilation / Cooling Systems

6.14 Mechanical Ventilation Heat Recovery (MVHR) will be included to ensure that heat losses are minimised. Mechanical cooling will be included on the basis that this is anticipated to be an expectation of end-users in a high-end hotel.

Extract Fans

6.15 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 target a power consumption rate of 0.3W/l/s.

Controls

6.16 Time and temperature controls by suitable arrangement will be installed within occupied area in order to maximise the efficiency of the heating system.

6.17 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.

Lighting Efficiency

6.18 Lighting design is intended to be highly efficient and in excess of Building Standards requirements. In the domestic components it is intended that lighting efficacy shall be in excess of 80 lumens/circuit Watt (likely predominantly LED).

6.19 External lighting shall be highly efficient and employ controls to avoid energy wastage from unnecessary operation during daytime.

Domestic Appliances

6.20 Within the dwellings, domestic appliances such as fridges, hairdryers etc. may be included. It is proposed that the EU energy label of these appliances shall be A+ or greater.

7. Heating Infrastructure (Be Clean)

District Energy Networks (DEN)

7.1 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.

7.2 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 7.1 Extract from the London Heat Map

7.3 The above extract from The London Heat Map shows the site located in an area of modest heat density. The wider area, as with much of central London, is defined as being a Heat Network Priority Area. However, the Site is not within a zone defined as Heat Mapping Decentralised Energy Potential.

7.4 No existing District Energy Networks (DEN) have been identified in close proximity to the site. The nearest potential network runs along the southern end of Charlton Street, taking heat off Euston Road (orange lines on the above image), circa 700m to the south.

District Energy Appraisal

7.5 In the absence of a DEN in close proximity to the Site, it is not proposed to accommodate DEN as part of the energy strategy.

Combined Heat & Power (CHP)

7.6 Combined Heat & Power (CHP) systems generate electrical energy and provide the waste heat from the process to be used on site. They are typically gas-fired but can be run off alternative fuel sources. CHP has been considered an efficient means of supplying heat in developments, providing significant carbon savings and wider environmental benefits (the power generation has historically been lower carbon emitting compared to grid electricity from the average UK power station). Savings from CHP are; however, reducing on the basis that grid electricity is decarbonising; meaning that carbon reductions associated with not using grid electricity are becoming marginal (or non-existent).

CHP Appraisal

7.7 Whilst the site has a heating demand, it is modest and likely subject to daily / weekly / yearly fluctuation due to occupancy patterns. At this scale, it is generally not economic to install CHP as smaller CHPs tend to have lower electrical efficiencies and therefore higher carbon emissions. CHP also tends to emit higher levels of NO_x than other heating systems; potentially adversely impacting local air quality.

7.8 A centralised CHP plant would create complex managerial arrangements and the administrative burden of managing CHP electricity sales to grid when the power is not required on site; combined with the relatively low unit price for small volumes of exported CHP electricity can create incentives for the CHP to be installed but not operated. CHP is therefore not proposed.

8. Renewable Energy (Be Green)

8.1 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”.

Biomass Systems

8.2 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.

Biomass Appraisal

8.3 Whilst technically feasible, the site is in an urban setting and 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.

8.4 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. Biomass is also likely to cause other air quality impacts (e.g. particulates), which have implications for local air quality.

8.5 Biomass is therefore not a preferred technology for the scheme.

Heat Pumps

8.6 Heat pumps draw thermal energy from the air, water or 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”.

8.7 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.

8.8 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.

Heat Pump Appraisal

8.9 The absence of nearby water body and relatively small footprint of the site rule out the options of Water Source and Ground Source Heat Pumps.

8.10 There is potential to include Air Source Heat Pumps (ASHPs); and it is proposed to use this technology to provide space and hot water heating.

Micro Hydro Power

8.11 Micro hydro power systems harness energy from flowing water by using height differences (called “head”); the minimum allowable head is 1.5m and ideally not lower than 10m.

Micro Hydro Appraisal

8.12 No surface water courses are located in close proximity to the site. Micro hydro is therefore not considered an option.

Micro Wind Power

8.13 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.

Micro Wind Appraisal

8.14 Given the central London location and uncertainty over performance, the fact that any contribution will likely be quite minor, and that the application type (change of use) and heritage considerations would prohibit any external plant, wind turbines are rejected as an option.

Solar Systems

8.15 Both solar thermal and photovoltaic (PV) systems 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.

Solar System Appraisal

8.16 An extent of PV is proposed for the roof area. It is anticipated that these will be allocated to serve the demands for the hotel space.

9. Summary

9.1 This Energy Statement provides an overview of the energy strategy in consideration of the site context, anticipated energy requirements and local priorities and initiatives.

9.2 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 – *Energy Efficiency and Adaptation*. Consideration has also been given to the NPPF and GLA's London Plan and the targets contained therein.

9.3 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.

9.4 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.

9.5 A centralised Air Source Heat Pump (ASHP) shall be used to supply the heating for hot water. The system will also be future proofed with plant room space reserved to enable connection to any future district energy network, subject to this source of energy being available at commercially viable rates and with a lower associated carbon emissions than on-site systems.

9.6 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).

9.7 It is proposed to install an extent of photovoltaics (PV) at roof level which would assist in further reducing the carbon emissions.

Carbon Savings

9.8 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 9.1 CO_2 Emissions after Each Stage of the Energy Hierarchy (SAP10)

Step	Carbon Dioxide Emissions (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline	147.7	17.9
After energy demand reduction	143.4	17.9
After CHP	143.4	17.9
After renewable energy	47.0	17.9

Table 9.2 Regulated CO_2 Savings from Each Stage of the Energy Hierarchy

	Regulated Carbon Dioxide Savings	
	(Tonnes CO_2 per annum)	%
Savings from energy demand reduction	4.3	3%
Savings from CHP	0.0	0%
Savings from renewable energy	96.4	65%
Total Cumulative Savings	**100.7**	**68%**

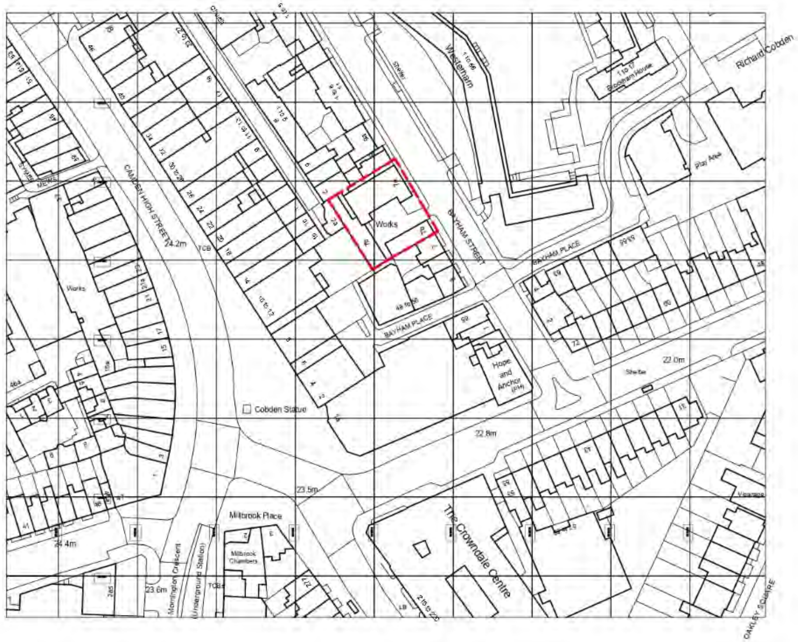
9.9 A copy of the GLA Carbon Emission Reporting Spreadsheet is appended to this report outlining the savings at each stage of the Energy Hierarchy.

9.10 Overall, the proposed energy strategy is considered consistent with the National Planning Policy Framework, London Plan and policies of the Council. When implemented, the scheme will provide an efficient and low carbon development.

Appendices

A. Site Plans

NOTES



Site Boundary

Location Plan
scale 1:1250

dexter moren associates
architecture urban design
interior design creative media
www.dextermoren.com

architecture

57d
jamestown road
london nw1 7db
UK

t. 020 7267 4440

rev	amendments	date	by	chk
F0	issued for Pre-application	14.08.20	SQ	PW

project	drawing title	scale	date	drawn by
Bayham Street London, NW1 0EY	Site Location Plan	1:1250 @ A3 NTS @ A4	14.08.20	PW
client	**drawing status**	**job no**	**drawing no**	**revision**
Camden Lifestyle (UK) ltd	Pre-Application	1783	A 000 001	F0

B. Key Local Planning Policy Requirements

London Planning Policy Framework

Key London Plan planning policy is detailed below:

The London Plan as Altered (2016)

The London Plan is the overall strategic plan for London. Chapter five details London's Response to Climate Change and includes a number of policies that set the overarching principles for reducing carbon emissions in the built environment:

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.

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 5.3 – Sustainable Design & Construction [extract]

Planning Decisions

B) Development proposals should demonstrate that sustainable design standards are integral to the proposals, including its construction and operation, and ensure that they are considered at the beginning of the design process.

C) Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles apply:

a) Minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems);

b) Avoiding internal overheating and contributing to the urban heat island effect;

c) Efficient use of natural resources (including water), including making the most of natural systems both within and around buildings;

d) Minimising pollution (including noise, air and urban run-off);

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 developer 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) Developer 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, finding and risk in the role of the public sector.

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.

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 development 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.

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

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

Camden Local Plan (June 2017)

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.

Policy CC2 Adapting to Climate Change [extract]The Council will require development to be resilient to climate change.

All development should adopt appropriate climate change adaptation measures such as:

[…]

a) Measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

[…]

C. GLA Carbon Emissions Reporting Spreadsheet

Non-domestic

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	189.2	
After energy demand reduction (be lean)	175.8	
After heat network connection (be clean)	175.8	
After renewable energy (be green)	104.6	

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	13.4	7%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	71.2	38%
Total Cumulative Savings	**84.6**	**45%**

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	147.7	17.9
After energy demand reduction (be lean)	143.4	17.9
After heat network connection (be clean)	143.4	17.9
After renewable energy (be green)	47.0	17.9

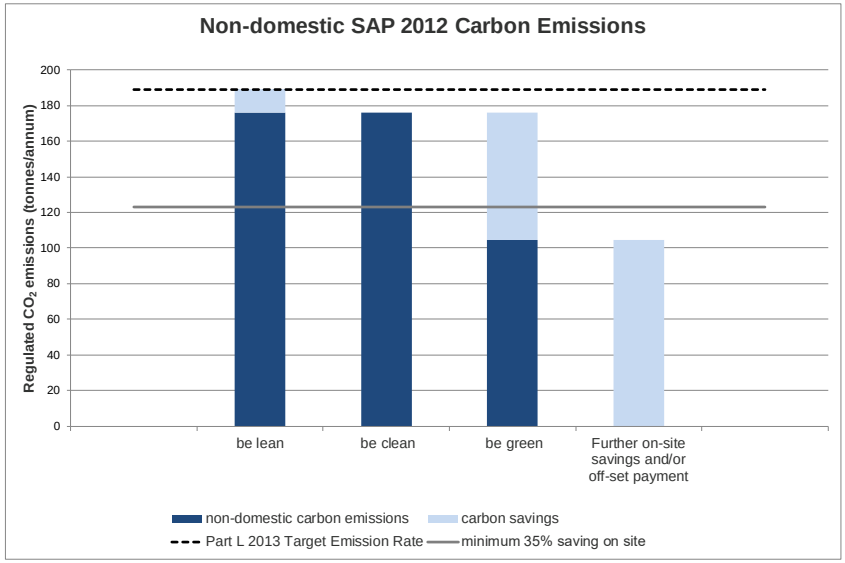
Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

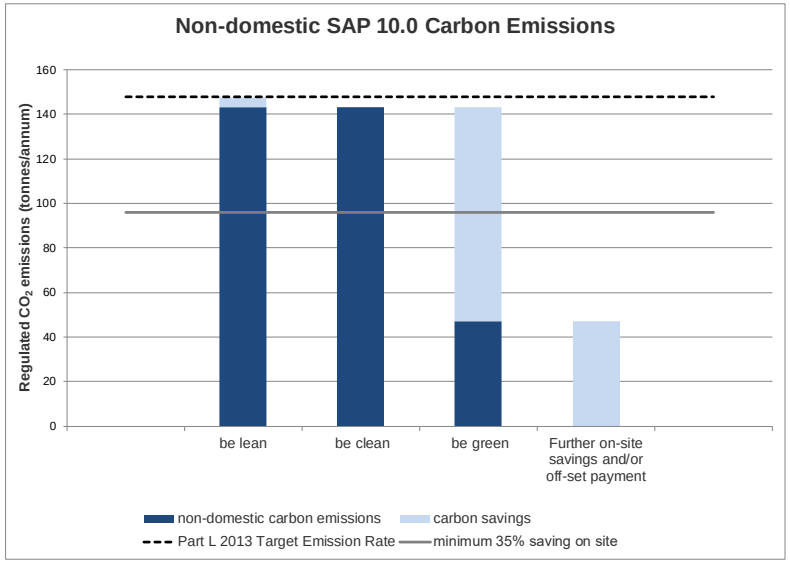
	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	4.3	3%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	96.4	65%
Total Cumulative Savings	**100.7**	**68%**

SITE-WIDE

	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2013 baseline	189.2		
Be lean	175.8	13.4	7%
Be clean	175.8	0.0	0%
Be green	104.6	71.2	38%
Total Savings	-	84.6	45%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**3,138.2**	-

	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2013 baseline	147.7		
Be lean	143.4	4.3	3%
Be clean	143.4	0.0	0%
Be green	47.0	96.4	65%
Total Savings	-	100.7	68%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**1,408.9**	-





D. Indicative Energy Model Outputs (Be Lean)

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Bayam Street Hotel Be Lean

As designed

Date: Fri Aug 07 18:50:35 2020

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.12

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.12

BRUKL compliance check version: v5.6.a.1

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	70.5
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	70.5
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	67.2
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	$U_{i\text{-Limit}}$	$U_{i\text{-Calc}}$	$U_{i\text{-Calc}}$	Surface where the maximum value occurs*
Wall**	0.35	0.14	0.4	BS00000C:Surf[9]
Floor	0.25	0.13	0.36	BS00000C:Surf[6]
Roof	0.25	0.12	0.12	GR000002:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.4	1.4	GR000004:Surf[3]
Personnel doors	2.2	1.65	1.65	GR00000C:Surf[1]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{i\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{i\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]
$U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]

* 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
$m^3/(h.m^2)$ at 50 Pa	10	3

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	<0.9

1- Heating Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	5.82	0	1.3	0.85
Standard value	0.91*	3.2	N/A	1.6^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

2- Heating- (Baseline)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	-	0.2	0	0.85
Standard value	0.91*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82

1- DHW (Baseline)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.96	-
Standard value	0.8	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	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Staff Change	-	-	-	-	-	-	-	0.3	-	-	N/A
Comms	-	-	-	-	-	-	-	0.3	-	-	N/A
Staff Breakout	-	-	-	-	-	-	-	0.3	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
Kitchen	-	-	-	-	-	-	-	0.4	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Acc WC	-	-	-	-	-	-	-	0.4	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
Admin	-	-	-	-	-	-	-	0.3	-	-	N/A
Goods In	-	-	-	-	-	-	-	0.4	-	-	N/A
Restaurant & Bar	-	-	-	-	-	-	-	0.3	-	-	N/A
Reception	-	-	-	-	-	-	-	0.3	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 02	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 02	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 03	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 03	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 06	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 01	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 01	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 06	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 10	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 10	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 11	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 11	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 12	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 12	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 15	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 15	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 16	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 16	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 19	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 19	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 18	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 18	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 17	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 17	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 13	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 13	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 14	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 14	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 20	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 20	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 22	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 22	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 21	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 21	-	-	-	-	-	-	-	0.4	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 09	-	-	-	-	-	-	-	0.4	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
en suite 08	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 08	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 04	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 04	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 05	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 05	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 07	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 07	-	-	-	-	-	-	-	0.3	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 09	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 01	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 01	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 02	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 02	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 05	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 05	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 06	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 06	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 07	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 07	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 08	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 08	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 09	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 09	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 10	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 10	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 12	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 12	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 13	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 13	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 14	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 14	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 15	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 15	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 16	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 16	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 19	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 19	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 18	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 18	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 17	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 17	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 03	-	-	-	-	-	-	-	0.3	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
en suite 03	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 04	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 04	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 11	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 11	-	-	-	-	-	-	-	0.4	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 01	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 01	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 02	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 02	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 03	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 03	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 04	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 04	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 05	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 05	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 07	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 07	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 08	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 08	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite09	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 10	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 10	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 11	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 11	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 12	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 12	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 13	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 13	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 14	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 14	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 15	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 15	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 16	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 16	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 06	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 06	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 17	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 09	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite17	-	-	-	-	-	-	-	0.4	-	-	N/A
circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
circulation	-	-	-	-	-	-	-	0.4	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 03	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 03	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 06	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 01	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 01	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 02	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 02	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 06	-	-	-	-	-	-	-	0.3	-	-	N/A
circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 1	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 1	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 2	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 2	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 3	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 3	-	-	-	-	-	-	-	0.4	-	-	N/A
en suite 4	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 4	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 5	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 5	-	-	-	-	-	-	-	0.3	-	-	N/A
Guestroom 6	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 6	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 7	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 7	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 8	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 8	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 9	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 9	-	-	-	-	-	-	-	0.4	-	-	N/A
Guestroom 10	-	-	-	-	-	-	-	0.3	-	-	N/A
en suite 10	-	-	-	-	-	-	-	0.4	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Staff Change	-	100	-	125
Comms	100	-	-	49
Staff Breakout	-	100	-	62
Circulation	-	100	-	29
Circulation	-	100	-	53
Stairwell	-	100	-	38
Kitchen	-	100	-	465
Acc WC	-	100	-	30

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Circulation	-	100	-	46
Staff Cycle	100	-	-	10
Admin	100	-	-	162
Goods In	100	-	-	15
Restaurant & Bar	-	100	60	839
Reception	-	100	60	200
Circulation	-	100	-	60
en suite 02	-	100	-	12
Guestroom 02	-	100	-	27
en suite 03	-	100	-	9
Guestroom 03	-	100	-	29
Guestroom 06	-	100	-	24
en suite 01	-	100	-	12
Guestroom 01	-	100	-	22
en suite 06	-	100	-	11
Stairwell	-	100	-	28
Guestroom 10	-	100	-	26
en suite 10	-	100	-	11
en suite 11	-	100	-	13
Guestroom 11	-	100	-	28
en suite 12	-	100	-	13
Guestroom 12	-	100	-	33
en suite 15	-	100	-	9
Guestroom 15	-	100	-	26
Guestroom 16	-	100	-	27
en suite 16	-	100	-	10
en suite 19	-	100	-	11
Guestroom 19	-	100	-	29
Guestroom 18	-	100	-	26
en suite 18	-	100	-	10
en suite 17	-	100	-	10
Guestroom 17	-	100	-	26
en suite 13	-	100	-	10
Guestroom 13	-	100	-	26
Guestroom 14	-	100	-	26
en suite 14	-	100	-	10
en suite 20	-	100	-	12
Guestroom 20	-	100	-	31
Guestroom 22	-	100	-	27
en suite 22	-	100	-	10
Guestroom 21	-	100	-	25
en suite 21	-	100	-	10
Circulation	-	100	-	72

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
en suite 09	-	100	-	11
en suite 08	-	100	-	10
Guestroom 08	-	100	-	28
Guestroom 04	-	100	-	25
en suite 04	-	100	-	10
Guestroom 05	-	100	-	26
en suite 05	-	100	-	10
en suite 07	-	100	-	10
Guestroom 07	-	100	-	30
Circulation	-	100	-	104
Guestroom 09	-	100	-	28
Guestroom 01	-	100	-	22
en suite 01	-	100	-	10
Guestroom 02	-	100	-	26
en suite 02	-	100	-	10
Guestroom 05	-	100	-	31
en suite 05	-	100	-	10
en suite 06	-	100	-	12
Guestroom 06	-	100	-	26
en suite 07	-	100	-	10
Guestroom 07	-	100	-	26
Guestroom 08	-	100	-	28
en suite 08	-	100	-	14
Guestroom 09	-	100	-	33
en suite 09	-	100	-	14
en suite 10	-	100	-	10
Guestroom 10	-	100	-	27
en suite 12	-	100	-	10
Guestroom 12	-	100	-	27
Guestroom 13	-	100	-	27
en suite 13	-	100	-	10
en suite 14	-	100	-	10
Guestroom 14	-	100	-	26
Guestroom 15	-	100	-	27
en suite 15	-	100	-	10
en suite 16	-	100	-	11
Guestroom 16	-	100	-	30
Stairwell	-	100	-	28
en suite 19	-	100	-	10
Guestroom 19	-	100	-	29
Guestroom 18	-	100	-	25
en suite 18	-	100	-	10
en suite 17	-	100	-	13

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Guestroom 17	-	100	-	31
Guestroom 03	-	100	-	24
en suite 03	-	100	-	9
en suite 04	-	100	-	10
Guestroom 04	-	100	-	32
Guestroom 11	-	100	-	26
en suite 11	-	100	-	10
Circulation	-	100	-	104
Circulation	-	100	-	46
stairwell	-	100	-	27
Guestroom 01	-	100	-	23
en suite 01	-	100	-	11
Guestroom 02	-	100	-	25
en suite 02	-	100	-	11
Guestroom 03	-	100	-	23
en suite 03	-	100	-	9
Guestroom 04	-	100	-	31
en suite 04	-	100	-	9
en suite 05	-	100	-	10
Guestroom 05	-	100	-	31
Guestroom 07	-	100	-	28
en suite 07	-	100	-	11
en suite 08	-	100	-	16
Guestroom 08	-	100	-	29
en suite09	-	100	-	16
en suite 10	-	100	-	10
Guestroom 10	-	100	-	27
Guestroom 11	-	100	-	27
en suite 11	-	100	-	10
en suite 12	-	100	-	10
Guestroom 12	-	100	-	26
Guestroom 13	-	100	-	26
en suite 13	-	100	-	10
Guestroom 14	-	100	-	26
en suite 14	-	100	-	10
Guestroom 15	-	100	-	26
en suite 15	-	100	-	10
en suite 16	-	100	-	11
Guestroom 16	-	100	-	27
en suite 06	-	100	-	13
Guestroom 06	-	100	-	30
Guestroom 17	-	100	-	34
Guestroom 09	-	100	-	35

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
en suite17	-	100	-	14
circulation	-	100	-	46
circulation	-	100	-	108
circulation	-	100	-	57
Guestroom 03	-	100	-	39
en suite 03	-	100	-	21
en suite 06	-	100	-	26
Guestroom 01	-	100	-	20
Guestroom 01	-	100	-	37
Guestroom 02	-	100	-	44
Guestroom 02	-	100	-	22
stairwell	-	100	-	27
Guestroom 06	-	100	-	65
circulation	-	100	-	96
Circulation	-	100	-	79
en suite 1	-	100	-	23
Guestroom 1	-	100	-	57
en suite 2	-	100	-	14
Guestroom 2	-	100	-	35
Guestroom 3	-	100	-	32
en suite 3	-	100	-	14
en suite 4	-	100	-	14
Guestroom 4	-	100	-	33
Guestroom 5	-	100	-	33
Guestroom 5	-	100	-	14
Guestroom 6	-	100	-	30
en suite 6	-	100	-	22
Guestroom 7	-	100	-	28
en suite 7	-	100	-	18
Guestroom 8	-	100	-	52
en suite 8	-	100	-	13
Guestroom 9	-	100	-	39
en suite 9	-	100	-	14
Guestroom 10	-	100	-	40
en suite 10	-	100	-	15

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?
Staff Change	N/A	N/A
Comms	N/A	N/A
Staff Breakout	N/A	N/A
Circulation	N/A	N/A
Circulation	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Kitchen	N/A	N/A
Acc WC	N/A	N/A
Circulation	N/A	N/A
Admin	N/A	N/A
Goods In	N/A	N/A
Restaurant & Bar	NO (-63%)	NO
Reception	N/A	N/A
Circulation	N/A	N/A
en suite 02	N/A	N/A
Guestroom 02	NO (-68.4%)	NO
en suite 03	N/A	N/A
Guestroom 03	N/A	N/A
Guestroom 06	NO (-58%)	NO
en suite 01	N/A	N/A
Guestroom 01	NO (-60.6%)	NO
en suite 06	N/A	N/A
Guestroom 10	NO (-64.2%)	NO
en suite 10	N/A	N/A
en suite 11	N/A	N/A
Guestroom 11	NO (-65.2%)	NO
en suite 12	N/A	N/A
Guestroom 12	NO (-34.1%)	NO
en suite 15	N/A	N/A
Guestroom 15	NO (-13.4%)	NO
Guestroom 16	NO (-13.8%)	NO
en suite 16	N/A	N/A
en suite 19	NO (-10.2%)	NO
Guestroom 19	NO (-22.3%)	NO
Guestroom 18	NO (-12%)	NO
en suite 18	N/A	N/A
en suite 17	N/A	N/A
Guestroom 17	NO (-10.8%)	NO
en suite 13	N/A	N/A
Guestroom 13	NO (-9.9%)	NO
Guestroom 14	NO (-11.5%)	NO
en suite 14	N/A	N/A
en suite 20	N/A	N/A
Guestroom 20	NO (-66.6%)	NO
Guestroom 22	NO (-74.7%)	NO
en suite 22	N/A	N/A
Guestroom 21	NO (-61.2%)	NO
en suite 21	N/A	N/A
Circulation	N/A	N/A
en suite 09	N/A	N/A
en suite 08	N/A	N/A
Guestroom 08	NO (-76.8%)	NO
Guestroom 04	NO (-61.7%)	NO
en suite 04	N/A	N/A
Guestroom 05	NO (-60.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
en suite 05	N/A	N/A
en suite 07	N/A	N/A
Guestroom 07	NO (-65.2%)	NO
Circulation	N/A	N/A
Guestroom 09	NO (-68.7%)	NO
Guestroom 01	NO (-80.9%)	NO
en suite 01	N/A	N/A
Guestroom 02	NO (-83.7%)	NO
en suite 02	N/A	N/A
Guestroom 05	NO (-86.8%)	NO
en suite 05	N/A	N/A
en suite 06	N/A	N/A
Guestroom 06	NO (-77.3%)	NO
en suite 07	N/A	N/A
Guestroom 07	NO (-63%)	NO
Guestroom 08	NO (-64.7%)	NO
en suite 08	N/A	N/A
Guestroom 09	NO (-47.4%)	NO
en suite 09	N/A	N/A
en suite 10	N/A	N/A
Guestroom 10	NO (-31.4%)	NO
en suite 12	N/A	N/A
Guestroom 12	NO (-32.2%)	NO
Guestroom 13	NO (-32.8%)	NO
en suite 13	N/A	N/A
en suite 14	N/A	N/A
Guestroom 14	NO (-29.7%)	NO
Guestroom 15	NO (-31.5%)	NO
en suite 15	N/A	N/A
en suite 16	N/A	N/A
Guestroom 16	NO (-40.8%)	NO
en suite 19	N/A	N/A
Guestroom 19	NO (-76.4%)	NO
Guestroom 18	NO (-61.7%)	NO
en suite 18	N/A	N/A
en suite 17	N/A	N/A
Guestroom 17	NO (-66.3%)	NO
Guestroom 03	NO (-75.3%)	NO
en suite 03	N/A	N/A
en suite 04	N/A	N/A
Guestroom 04	NO (-67.8%)	NO
Guestroom 11	NO (-30.5%)	NO
en suite 11	N/A	N/A
Circulation	N/A	N/A
Circulation	N/A	N/A
Guestroom 01	NO (-83.4%)	NO
en suite 01	N/A	N/A
Guestroom 02	NO (-84.1%)	NO
en suite 02	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guestroom 03	NO (-75.6%)	NO
en suite 03	N/A	N/A
Guestroom 04	NO (-67.7%)	NO
en suite 04	N/A	N/A
en suite 05	N/A	N/A
Guestroom 05	NO (-87.7%)	NO
Guestroom 07	NO (-66.7%)	NO
en suite 07	N/A	N/A
en suite 08	N/A	N/A
Guestroom 08	NO (-66.4%)	NO
en suite09	N/A	N/A
en suite 10	N/A	N/A
Guestroom 10	NO (-32%)	NO
Guestroom 11	NO (-30.6%)	NO
en suite 11	N/A	N/A
en suite 12	N/A	N/A
Guestroom 12	NO (-30%)	NO
Guestroom 13	NO (-29.3%)	NO
en suite 13	N/A	N/A
Guestroom 14	NO (-29.6%)	NO
en suite 14	N/A	N/A
Guestroom 15	NO (-30.3%)	NO
en suite 15	N/A	N/A
en suite 16	N/A	N/A
Guestroom 16	NO (-33%)	NO
en suite 06	N/A	N/A
Guestroom 06	NO (-82.5%)	NO
Guestroom 17	NO (-80.3%)	NO
Guestroom 09	NO (-50.3%)	NO
en suite17	N/A	N/A
circulation	N/A	N/A
circulation	NO (-52.1%)	NO
circulation	N/A	N/A
Guestroom 03	NO (-29.8%)	NO
en suite 03	N/A	N/A
en suite 06	N/A	N/A
Guestroom 01	NO (-14%)	NO
Guestroom 01	NO (-23.6%)	NO
Guestroom 02	NO (-35.2%)	NO
Guestroom 02	NO (-25.9%)	NO
Guestroom 06	YES (+18.6%)	NO
circulation	N/A	N/A
Circulation	N/A	N/A
en suite 1	N/A	N/A
Guestroom 1	NO (-95.1%)	NO
en suite 2	N/A	N/A
Guestroom 2	NO (-83.2%)	NO
Guestroom 3	N/A	N/A
en suite 3	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
en suite 4	N/A	N/A
Guestroom 4	NO (-77%)	NO
Guestroom 5	NO (-84.8%)	NO
Guestroom 5	N/A	N/A
Guestroom 6	NO (-72.2%)	NO
en suite 6	N/A	N/A
Guestroom 7	NO (-53.3%)	NO
en suite 7	N/A	N/A
Guestroom 8	N/A	N/A
en suite 8	N/A	N/A
Guestroom 9	N/A	N/A
en suite 9	N/A	N/A
Guestroom 10	N/A	N/A
en suite 10	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

	Actual	Notional
Area [m²]	2362	2362
External area [m²]	3278.6	3102.2
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	653.95	900.91
Average U-value [W/m²K]	0.2	0.29
Alpha value* [%]	10.96	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
100	**C1 Hotels**
	C2 Residential Institutions: Hospitals and Care Homes
	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/m²]

	Actual	Notional
Heating	10.03	14.78
Cooling	2.16	3.81
Auxiliary	24.59	25.7
Lighting	9.28	16.66
Hot water	214.7	203.41
Equipment*	23.65	23.65
TOTAL**	**260.76**	**264.36**

* 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/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	68.06	97.85
Primary energy* [kWh/m²]	384.78	404.39
Total emissions [kg/m²]	67.2	70.5

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	68.4	0	21.1	0	2	0.9	0	0.96	0
	Notional	63.7	0	20.5	0	2.8	0.86	0	----	----
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	30.1	38.2	9.7	2.2	25.5	0.86	4.73	0.96	5.82
	Notional	45.4	54	14.6	4	26.6	0.86	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= 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	$U_{i,typ}$	$U_{i,Min}$	Surface where the minimum value occurs*
Wall	0.23	0.04	FR00000F:Surf[5]
Floor	0.2	0.02	FF000001:Surf[5]
Roof	0.15	0.12	GR000002:Surf[0]
Windows, roof windows, and rooflights	1.5	1.4	GR000004:Surf[3]
Personnel doors	1.5	1.65	GR00000C:Surf[1]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

$U_{i,typ}$ = Typical individual element U-values [W/(m²K)] $U_{i,Min}$ = Minimum individual element U-values [W/(m²K)]

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

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Page 17 of 17

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Bayam Street Office Be Lean As designed

Date: Fri Aug 07 18:12:59 2020

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.12

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.12

BRUKL compliance check version: v5.6.a.1

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	34.8
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	34.8
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	28.2
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	$U_{i,Limit}$	$U_{i,Calc}$	$U_{i,Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.12	0.15	GR000003:Surf[2]
Floor	0.25	0.12	0.12	LW000001:Surf[0]
Roof	0.25	0.12	0.12	LW000001:Surf[7]
Windows***, roof windows, and rooflights	2.2	1.4	1.4	LW000001:Surf[11]
Personnel doors	2.2	1.65	1.65	GR000003:Surf[3]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{i,Limit}$ = Limiting area-weighted average U-values [W/(m²K)]

$U_{i,Calc}$ = Calculated area-weighted average U-values [W/(m²K)] $U_{i,Calc}$ = Calculated maximum individual element U-values [W/(m²K)]

* 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. Rather roof ventilators (inc. smoke vents) not swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m³/(h.m²) at 50 Pa	10	3

Page 1 of 6

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	<0.9

1- Heating Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	5.82	0	1.3	0.85
Standard value	0.91*	3.2	N/A	1.6^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

2- Heating- (Baseline)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	-	0.2	0	0.85
Standard value	0.91*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- DHW (Baseline)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.96	-
Standard value	0.8	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	SFP [W/(l/s)]									HR efficiency	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	**Zone**	**Standard**
Work space/ Offices	-	-	-	-	-	-	-	0.3	-	-	N/A
Female WC	-	-	0.4	-	-	-	-	-	-	-	N/A
Stairwell	-	-	0.4	-	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Male WC	-	-	0.4	-	-	-	-	-	-	-	N/A
UA WC	-	-	0.4	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	**Zone**	**Standard**
Office WC Showers	-	-	0.4	-	-	-	-	-	-	-	N/A
Workspace/Office Cafe	-	-	-	-	-	-	-	0.3	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
Work space/ Offices	100	-	-	2430
Female WC	-	100	-	102
Stairwell	-	100	-	37
Circulation	-	100	-	45
Male WC	-	100	-	111
UA WC	-	100	-	33
Office WC Showers	-	100	-	57
Office Cycle	100	-	-	19
Workspace/Office Cafe	100	-	-	351

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?
Work space/ Offices	NO (-81.1%)	NO
Workspace/Office Cafe	NO (-8%)	NO

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

	Actual	Notional
Area [m²]	601.9	601.9
External area [m²]	587.4	786.8
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	123.84	202.42
Average U-value [W/m²K]	0.21	0.26
Alpha value* [%]	10.3	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
100	**B1 Offices and Workshop businesses**
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	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/m²]

	Actual	Notional
Heating	3.6	7.67
Cooling	4.62	5.12
Auxiliary	9.44	9.68
Lighting	12.93	25.53
Hot water	62.06	58.79
Equipment*	34.76	34.76
TOTAL**	**92.65**	**106.79**

* 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/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	90.1	93.68
Primary energy* [kWh/m²]	162.98	201.81
Total emissions [kg/m²]	28.2	34.8

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	34	0	10.5	0	9	0.9	0	0.96	0
	Notional	65.6	0	21.2	0	9	0.86	0	----	----
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	5.7	103.9	1.8	6.1	10	0.86	4.73	0.96	5.82
	Notional	13.3	92.4	4.3	6.8	10.3	0.86	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= 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	$U_{i\,typ}$	$U_{i\,Min}$	Surface where the minimum value occurs*
Wall	0.23	0.11	LW000001:Surf[1]
Floor	0.2	0.12	LW000001:Surf[0]
Roof	0.15	0.12	LW000001:Surf[7]
Windows, roof windows, and rooflights	1.5	1.4	LW000001:Surf[11]
Personnel doors	1.5	1.65	GR000003:Surf[3]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

$U_{i\,typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\,Min}$ = Minimum individual element U-values [W/(m²K)]

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

Air Permeability	Typical value	This building
$m^3/(h.m^2)$ at 50 Pa	5	3

Page 6 of 6

E. Indicative Energy Model Outputs (Be Green)

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Bayam Street Hotel Be Green

As designed

Date: Fri Aug 07 17:39:30 2020

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.12

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.12

BRUKL compliance check version: v5.6.a.1

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	52.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	52.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	38.2
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	$U_{i\text{-Limit}}$	$U_{i\text{-Calc}}$	$U_{i\text{-Calc}}$	Surface where the maximum value occurs*
Wall**	0.35	0.14	0.4	BS00000C:Surf[9]
Floor	0.25	0.13	0.36	BS00000C:Surf[6]
Roof	0.25	0.12	0.12	GR000002:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.4	1.4	GR000004:Surf[3]
Personnel doors	2.2	1.65	1.65	GR00000C:Surf[1]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{i\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{i\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]
$U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]

* 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
$m^3/(h.m^2)$ at 50 Pa	10	3

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	<0.9

1- Heating Cooling - Heat Pump (MVHR)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.8	3.32	0	0	0.8
Standard value	2.5*	3.2	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* 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- DHW - Heat pump

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.56	0.004
Standard value	1	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	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Staff Change	-	-	-	0.3	-	-	-	-	-	-	N/A
Comms	-	-	-	0.3	-	-	-	-	-	-	N/A
Staff Breakout	-	-	-	0.3	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Kitchen	-	-	0.4	-	-	-	-	-	-	-	N/A
Acc.WC	-	-	0.4	-	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Admin	-	-	-	0.3	-	-	-	-	-	-	N/A
Goods In	-	-	0.4	-	-	-	-	-	-	-	N/A
Restaurant & Bar	-	-	-	0.3	-	-	-	-	-	-	N/A
Reception	-	-	-	0.3	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
en suite 02	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 02	-	-	-	0.3	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
en suite 03	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 03	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 06	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 01	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 01	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 06	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 10	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 10	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 11	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 11	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 12	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 12	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 15	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 15	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 16	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 16	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 19	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 19	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 18	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 18	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 17	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 17	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 13	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 13	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 14	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 14	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 20	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 20	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 22	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 22	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 21	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 21	-	-	-	0.4	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
en suite 09	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 08	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 08	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 04	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 04	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 05	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 05	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 07	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 07	-	-	-	0.3	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Guestroom 09	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 01	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 01	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 02	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 02	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 05	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 05	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 06	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 06	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 07	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 07	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 08	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 08	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 09	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 09	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 10	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 10	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 12	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 12	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 13	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 13	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 14	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 14	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 15	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 15	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 16	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 16	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 19	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 19	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 18	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 18	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 17	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 17	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 03	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 03	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 04	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 04	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 11	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 11	-	-	-	0.4	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Guestroom 01	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 01	-	-	-	0.4	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Guestroom 02	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 02	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 03	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 03	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 04	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 04	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 05	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 05	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 07	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 07	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 08	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 08	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite09	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 10	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 10	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 11	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 11	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 12	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 12	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 13	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 13	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 14	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 14	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 15	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 15	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 16	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 16	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 06	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 06	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 17	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 09	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite17	-	-	-	0.4	-	-	-	-	-	-	N/A
circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Guestroom 03	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 03	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 06	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 01	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 01	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 02	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 02	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 06	-	-	-	0.3	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
en suite 1	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 1	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 2	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 2	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 3	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 3	-	-	-	0.4	-	-	-	-	-	-	N/A
en suite 4	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 4	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 5	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 5	-	-	-	0.3	-	-	-	-	-	-	N/A
Guestroom 6	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 6	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 7	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 7	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 8	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 8	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 9	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 9	-	-	-	0.4	-	-	-	-	-	-	N/A
Guestroom 10	-	-	-	0.3	-	-	-	-	-	-	N/A
en suite 10	-	-	-	0.4	-	-	-	-	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Staff Change	-	100	-	125
Comms	100	-	-	49
Staff Breakout	-	100	-	62
Circulation	-	100	-	29
Circulation	-	100	-	53
Stairwell	-	100	-	38
Kitchen	-	100	-	465
Acc WC	-	100	-	30
Circulation	-	100	-	46
Staff Cycle	100	-	-	10
Admin	100	-	-	162
Goods In	100	-	-	15
Restaurant & Bar	-	100	60	839
Reception	-	100	60	200
Circulation	-	100	-	60
en suite 02	-	100	-	12
Guestroom 02	-	100	-	27

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	80	22	
en suite 03	-	100	-	9
Guestroom 03	-	100	-	29
Guestroom 06	-	100	-	24
en suite 01	-	100	-	12
Guestroom 01	-	100	-	22
en suite 06	-	100	-	11
Stairwell	-	100	-	28
Guestroom 10	-	100	-	26
en suite 10	-	100	-	11
en suite 11	-	100	-	13
Guestroom 11	-	100	-	28
en suite 12	-	100	-	13
Guestroom 12	-	100	-	33
en suite 15	-	100	-	9
Guestroom 15	-	100	-	26
Guestroom 16	-	100	-	27
en suite 16	-	100	-	10
en suite 19	-	100	-	11
Guestroom 19	-	100	-	29
Guestroom 18	-	100	-	26
en suite 18	-	100	-	10
en suite 17	-	100	-	10
Guestroom 17	-	100	-	26
en suite 13	-	100	-	10
Guestroom 13	-	100	-	26
Guestroom 14	-	100	-	26
en suite 14	-	100	-	10
en suite 20	-	100	-	12
Guestroom 20	-	100	-	31
Guestroom 22	-	100	-	27
en suite 22	-	100	-	10
Guestroom 21	-	100	-	25
en suite 21	-	100	-	10
Circulation	-	100	-	72
en suite 09	-	100	-	11
en suite 08	-	100	-	10
Guestroom 08	-	100	-	28
Guestroom 04	-	100	-	25
en suite 04	-	100	-	10
Guestroom 05	-	100	-	26
en suite 05	-	100	-	10
en suite 07	-	100	-	10
Guestroom 07	-	100	-	30

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	80	22	
Circulation	-	100	-	104
Guestroom 09	-	100	-	28
Guestroom 01	-	100	-	22
en suite 01	-	100	-	10
Guestroom 02	-	100	-	26
en suite 02	-	100	-	10
Guestroom 05	-	100	-	31
en suite 05	-	100	-	10
en suite 06	-	100	-	12
Guestroom 06	-	100	-	26
en suite 07	-	100	-	10
Guestroom 07	-	100	-	26
Guestroom 08	-	100	-	28
en suite 08	-	100	-	14
Guestroom 09	-	100	-	33
en suite 09	-	100	-	14
en suite 10	-	100	-	10
Guestroom 10	-	100	-	27
en suite 12	-	100	-	10
Guestroom 12	-	100	-	27
Guestroom 13	-	100	-	27
en suite 13	-	100	-	10
en suite 14	-	100	-	10
Guestroom 14	-	100	-	26
Guestroom 15	-	100	-	27
en suite 15	-	100	-	10
en suite 16	-	100	-	11
Guestroom 16	-	100	-	30
Stairwell	-	100	-	28
en suite 19	-	100	-	10
Guestroom 19	-	100	-	29
Guestroom 18	-	100	-	25
en suite 18	-	100	-	10
en suite 17	-	100	-	13
Guestroom 17	-	100	-	31
Guestroom 03	-	100	-	24
en suite 03	-	100	-	9
en suite 04	-	100	-	10
Guestroom 04	-	100	-	32
Guestroom 11	-	100	-	26
en suite 11	-	100	-	10
Circulation	-	100	-	104
Circulation	-	100	-	46

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	80	22	
stairwell	-	100	-	27
Guestroom 01	-	100	-	23
en suite 01	-	100	-	11
Guestroom 02	-	100	-	25
en suite 02	-	100	-	11
Guestroom 03	-	100	-	23
en suite 03	-	100	-	9
Guestroom 04	-	100	-	31
en suite 04	-	100	-	9
en suite 05	-	100	-	10
Guestroom 05	-	100	-	31
Guestroom 07	-	100	-	28
en suite 07	-	100	-	11
en suite 08	-	100	-	16
Guestroom 08	-	100	-	29
en suite09	-	100	-	16
en suite 10	-	100	-	10
Guestroom 10	-	100	-	27
Guestroom 11	-	100	-	27
en suite 11	-	100	-	10
en suite 12	-	100	-	10
Guestroom 12	-	100	-	26
Guestroom 13	-	100	-	26
en suite 13	-	100	-	10
Guestroom 14	-	100	-	26
en suite 14	-	100	-	10
Guestroom 15	-	100	-	26
en suite 15	-	100	-	10
en suite 16	-	100	-	11
Guestroom 16	-	100	-	27
en suite 06	-	100	-	13
Guestroom 06	-	100	-	30
Guestroom 17	-	100	-	34
Guestroom 09	-	100	-	35
en suite17	-	100	-	14
circulation	-	100	-	46
circulation	-	100	-	108
circulation	-	100	-	57
Guestroom 03	-	100	-	39
en suite 03	-	100	-	21
en suite 06	-	100	-	26
Guestroom 01	-	100	-	20
Guestroom 01	-	100	-	37

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	80	22	
Guestroom 02	-	100	-	44
Guestroom 02	-	100	-	22
stairwell	-	100	-	27
Guestroom 06	-	100	-	65
circulation	-	100	-	96
Circulation	-	100	-	79
en suite 1	-	100	-	23
Guestroom 1	-	100	-	57
en suite 2	-	100	-	14
Guestroom 2	-	100	-	35
Guestroom 3	-	100	-	32
en suite 3	-	100	-	14
en suite 4	-	100	-	14
Guestroom 4	-	100	-	33
Guestroom 5	-	100	-	33
Guestroom 5	-	100	-	14
Guestroom 6	-	100	-	30
en suite 6	-	100	-	22
Guestroom 7	-	100	-	28
en suite 7	-	100	-	18
Guestroom 8	-	100	-	52
en suite 8	-	100	-	13
Guestroom 9	-	100	-	39
en suite 9	-	100	-	14
Guestroom 10	-	100	-	40
en suite 10	-	100	-	15

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?
Staff Change	N/A	N/A
Comms	N/A	N/A
Staff Breakout	N/A	N/A
Circulation	N/A	N/A
Circulation	N/A	N/A
Stairwell	N/A	N/A
Kitchen	N/A	N/A
Acc WC	N/A	N/A
Circulation	N/A	N/A
Staff Cycle	N/A	N/A
Admin	N/A	N/A
Goods In	N/A	N/A
Restaurant & Bar	NO (-63%)	NO
Reception	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Circulation	N/A	N/A
en suite 02	N/A	N/A
Guestroom 02	NO (-68.4%)	NO
en suite 03	N/A	N/A
Guestroom 03	N/A	N/A
Guestroom 06	NO (-56%)	NO
en suite 01	N/A	N/A
Guestroom 01	NO (-60.8%)	NO
en suite 06	N/A	N/A
Stairwell	N/A	N/A
Guestroom 10	NO (-64.2%)	NO
en suite 10	N/A	N/A
en suite 11	N/A	N/A
Guestroom 11	NO (-65.2%)	NO
en suite 12	N/A	N/A
Guestroom 12	NO (-34.1%)	NO
en suite 15	N/A	N/A
Guestroom 15	NO (-13.4%)	NO
Guestroom 16	NO (-13.8%)	NO
en suite 16	N/A	N/A
en suite 19	NO (-10.2%)	NO
Guestroom 19	NO (-22.3%)	NO
Guestroom 18	NO (-12%)	NO
en suite 18	N/A	N/A
en suite 17	N/A	N/A
Guestroom 17	NO (-10.8%)	NO
en suite 13	N/A	N/A
Guestroom 13	NO (-9.9%)	NO
Guestroom 14	NO (-11.5%)	NO
en suite 14	N/A	N/A
en suite 20	N/A	N/A
Guestroom 20	NO (-66.8%)	NO
Guestroom 22	NO (-74.7%)	NO
en suite 22	N/A	N/A
Guestroom 21	NO (-61.2%)	NO
en suite 21	N/A	N/A
Circulation	N/A	N/A
en suite 09	N/A	N/A
en suite 08	N/A	N/A
Guestroom 08	NO (-76.9%)	NO
Guestroom 04	NO (-61.7%)	NO
en suite 04	N/A	N/A
Guestroom 05	NO (-60.9%)	NO
en suite 05	N/A	N/A
en suite 07	N/A	N/A
Guestroom 07	NO (-65.2%)	NO
Circulation	N/A	N/A
Guestroom 09	NO (-68.7%)	NO
Guestroom 01	NO (-80.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
en suite 01	N/A	N/A
Guestroom 02	NO (-83.7%)	NO
en suite 02	N/A	N/A
Guestroom 05	NO (-86.8%)	NO
en suite 05	N/A	N/A
en suite 06	N/A	N/A
Guestroom 06	NO (-77.3%)	NO
en suite 07	N/A	N/A
Guestroom 07	NO (-83%)	NO
Guestroom 08	NO (-64.7%)	NO
en suite 08	N/A	N/A
Guestroom 09	NO (-47.4%)	NO
en suite 09	N/A	N/A
en suite 10	N/A	N/A
Guestroom 10	NO (-31.4%)	NO
en suite 12	N/A	N/A
Guestroom 12	NO (-32.2%)	NO
Guestroom 13	NO (-32.8%)	NO
en suite 13	N/A	N/A
en suite 14	N/A	N/A
Guestroom 14	NO (-29.7%)	NO
Guestroom 15	NO (-31.5%)	NO
en suite 15	N/A	N/A
en suite 16	N/A	N/A
Guestroom 16	NO (-40.8%)	NO
Stairwell	N/A	N/A
en suite 19	N/A	N/A
Guestroom 19	NO (-76.4%)	NO
Guestroom 18	NO (-61.7%)	NO
en suite 18	N/A	N/A
en suite 17	N/A	N/A
Guestroom 17	NO (-66.3%)	NO
Guestroom 03	NO (-75.3%)	NO
en suite 03	N/A	N/A
en suite 04	N/A	N/A
Guestroom 04	NO (-67.8%)	NO
Guestroom 11	NO (-30.5%)	NO
en suite 11	N/A	N/A
Circulation	N/A	N/A
Circulation	N/A	N/A
stairwell	N/A	N/A
Guestroom 01	NO (-83.4%)	NO
en suite 01	N/A	N/A
Guestroom 02	NO (-84.1%)	NO
en suite 02	N/A	N/A
Guestroom 03	NO (-75.8%)	NO
en suite 03	N/A	N/A
Guestroom 04	NO (-67.7%)	NO
en suite 04	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
en suite 05	N/A	N/A
Guestroom 05	NO (-87.7%)	NO
Guestroom 07	NO (-66.7%)	NO
en suite 07	N/A	N/A
en suite 08	N/A	N/A
Guestroom 08	NO (-66.4%)	NO
en suite09	N/A	N/A
en suite 10	N/A	N/A
Guestroom 10	NO (-32%)	NO
Guestroom 11	NO (-30.6%)	NO
en suite 11	N/A	N/A
en suite 12	N/A	N/A
Guestroom 12	NO (-30%)	NO
Guestroom 13	NO (-29.3%)	NO
en suite 13	N/A	N/A
Guestroom 14	NO (-29.6%)	NO
en suite 14	N/A	N/A
Guestroom 15	NO (-30.3%)	NO
en suite 15	N/A	N/A
en suite 16	N/A	N/A
Guestroom 16	NO (-33%)	NO
en suite 06	N/A	N/A
Guestroom 06	NO (-82.5%)	NO
Guestroom 17	NO (-80.3%)	NO
Guestroom 09	NO (-50.3%)	NO
en suite17	N/A	N/A
circulation	N/A	N/A
circulation	NO (-52.1%)	NO
circulation	N/A	N/A
Guestroom 03	NO (-29.8%)	NO
en suite 03	N/A	N/A
en suite 06	N/A	N/A
Guestroom 01	NO (-14%)	NO
Guestroom 01	NO (-23.6%)	NO
Guestroom 02	NO (-35.2%)	NO
Guestroom 02	NO (-25.9%)	NO
stairwell	N/A	N/A
Guestroom 06	YES (+18.6%)	NO
circulation	N/A	N/A
Circulation	N/A	N/A
en suite 1	N/A	N/A
Guestroom 1	NO (-95.1%)	NO
en suite 2	N/A	N/A
Guestroom 2	NO (-83.2%)	NO
Guestroom 3	N/A	N/A
en suite 3	N/A	N/A
en suite 4	N/A	N/A
Guestroom 4	NO (-77%)	NO
Guestroom 5	NO (-84.8%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guestroom 5	N/A	N/A
Guestroom 6	NO (-72.2%)	NO
en suite 6	N/A	N/A
Guestroom 7	NO (-83.3%)	NO
en suite 7	N/A	N/A
Guestroom 8	N/A	N/A
en suite 8	N/A	N/A
Guestroom 9	N/A	N/A
en suite 9	N/A	N/A
Guestroom 10	N/A	N/A
en suite 10	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

	Actual	Notional
Area [m²]	2362	2362
External area [m²]	3278.6	3102.2
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	653.95	900.91
Average U-value [W/m²K]	0.2	0.29
Alpha value* [%]	10.96	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
100	**C1 Hotels**
	C2 Residential Institutions: Hospitals and Care Homes
	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/m²]

	Actual	Notional
Heating	3.42	6.8
Cooling	2.22	3.29
Auxiliary	6.74	8.16
Lighting	9.28	16.66
Hot water	54.39	68.55
Equipment*	23.65	23.65
TOTAL**	**76.05**	**103.46**

* 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/m²]

	Actual	Notional
Photovoltaic systems	2.41	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	83.29	107.48
Primary energy* [kWh/m²]	410.96	535.24
Total emissions [kg/m²]	38.2	52.4

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	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	45.9	37.4	3.4	2.2	5.6	3.73	4.68	3.8	6.26
	Notional	62.6	44.8	6.8	3.3	8.2	2.56	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= 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	$U_{i\,typ}$	$U_{i\,Min}$	Surface where the minimum value occurs*
Wall	0.23	0.04	FR00000F:Surf[5]
Floor	0.2	0.02	FF000001:Surf[5]
Roof	0.15	0.12	GR000002:Surf[0]
Windows, roof windows, and rooflights	1.5	1.4	GR000004:Surf[3]
Personnel doors	1.5	1.65	GR00000C:Surf[1]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

$U_{i\,typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\,Min}$ = Minimum individual element U-values [W/(m²K)]

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

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Bayam Street Office Be Green As designed

Date: Fri Aug 07 18:21:17 2020

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.12

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.12

BRUKL compliance check version: v5.6.a.1

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	28.6
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	28.6
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	23.8
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	$U_{i\,Limit}$	$U_{i\,Calc}$	$U_{i\,Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.12	0.15	GR000003:Surf[2]
Floor	0.25	0.12	0.12	LW000001:Surf[0]
Roof	0.25	0.12	0.12	LW000001:Surf[7]
Windows***, roof windows, and rooflights	2.2	1.4	1.4	LW000001:Surf[11]
Personnel doors	2.2	1.65	1.65	GR000003:Surf[3]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{i\,Limit}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{i\,Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
$U_{i\,Calc}$ = Calculated maximum individual element U-values [W/(m²K)]

* 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
m³/(h.m²) at 50 Pa	10	3

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	<0.9

1- Heating Cooling - Heat Pump (MVHR)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.8	3.32	0	0	0.8
Standard value	2.5*	3.2	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* 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- DHW - Heat pump

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.58	0.004
Standard value	1	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	SFP [W/(l/s)]									HR efficiency	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	**Zone**	**Standard**
Work space/ Offices	-	-	-	0.3	-	-	-	-	-	-	N/A
Female WC	-	-	0.4	-	-	-	-	-	-	-	N/A
Stairwell	-	-	0.4	-	-	-	-	-	-	-	N/A
Circulation	-	-	0.4	-	-	-	-	-	-	-	N/A
Male WC	-	-	0.4	-	-	-	-	-	-	-	N/A
UA WC	-	-	0.4	-	-	-	-	-	-	-	N/A
Office WC Showers	-	-	0.4	-	-	-	-	-	-	-	N/A
Workspace/Office Cafe	-	-	-	0.3	-	-	-	-	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
Work space/ Offices	100	-	-	2430
Female WC	-	100	-	102
Stairwell	-	100	-	37

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
Circulation	-	100	-	45
Male WC	-	100	-	111
UA WC	-	100	-	33
Office WC Showers	-	100	-	57
Office Cycle	100	-	-	19
Workspace/Office Cafe	100	-	-	351

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?
Work space/ Offices	NO (-81.1%)	NO
Female WC	N/A	N/A
Stairwell	N/A	N/A
Circulation	N/A	N/A
Male WC	N/A	N/A
UA WC	N/A	N/A
Office WC Showers	N/A	N/A
Workspace/Office Cafe	NO (-8%)	NO

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

	Actual	Notional
Area [m²]	601.9	601.9
External area [m²]	587.4	786.8
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	123.84	202.42
Average U-value [W/m²K]	0.21	0.26
Alpha value* [%]	10.3	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
100	**B1 Offices and Workshop businesses**
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	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/m²]

	Actual	Notional
Heating	0.86	2.59
Cooling	4.76	5.26
Auxiliary	6.75	3.25
Lighting	12.93	25.53
Hot water	20.58	19.82
Equipment*	34.76	34.76
TOTAL**	**45.88**	**56.43**

* 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/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	91.7	95.53
Primary energy* [kWh/m²]	206.68	235.99
Total emissions [kg/m²]	23.8	28.6

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	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	11.9	83	0.9	4.9	2.3	3.73	4.68	3.8	6.26
	Notional	24.7	74.2	2.7	5.4	3.4	2.56	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= 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	$U_{i\,typ.}$	$U_{i\,Min}$	Surface where the minimum value occurs*
Wall	0.23	0.11	LW000001:Surf[1]
Floor	0.2	0.12	LW000001:Surf[0]
Roof	0.15	0.12	LW000001:Surf[7]
Windows, roof windows, and rooflights	1.5	1.4	LW000001:Surf[11]
Personnel doors	1.5	1.65	GR000003:Surf[3]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

$U_{i\,typ.}$ = Typical individual element U-values [W/(m²K)] $U_{i\,Min}$ = Minimum individual element U-values [W/(m²K)]

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

Air Permeability	Typical value	This building
$m^3/(h.m^2)$ at 50 Pa	5	3

F. 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.

This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in guidance may necessitate a re-interpretation of the report in whole or in part after its original submission.

The copyright in the written materials shall remain the property of Ensphere Group Ltd but with a royalty-free perpetual licence to the client deemed to be granted on payment in full to Ensphere Group Ltd by the client of the outstanding amounts.

The report is provided for sole use by the Client and is confidential to them and their professional advisors. No responsibility whatsoever for the contents of the report will be accepted to any person other than the client, unless otherwise agreed.

These terms apply in addition to the Ensphere Group Ltd "Standard Terms of Business" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms of Business the said Standard Terms of Business shall prevail.). In the absence of such a written contract the Standard Terms of Business will apply.

Ensphere Group Ltd
52 Grosvenor Gardens
London, SW1W 0AU
+44 (0) 20 7846 9040
www.enspheregroup.com