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REEF GROUP

PLOT C, TRIBECA

CAMDEN, LONDON

PLOT C ENERGY STATEMENT

REVISION P03

Document History

SUITABILITY	REVISION	DATE	DETAILS	BY	CHKD
S2	P01	8th August 2023	First Issue	MC	NW/BH
S2	P02	24th October 2023	Second Issue – DP9 comments incorporated Plot C2 Retail figures added	MC	NW/BH
S2	P03	21st November 2023	Executive Summary revised. Plot B Energy Statement added as Appendix	MC	BH

CONTENTS

EXECUTIVE SUMMARY

KJ Tait were appointed by Reef Group to develop the energy strategy and produce an Energy Statement for Plot C of the redevelopment of the Ugly Brown Building (UBB) at 6A St Pancras Way, London, NW1 0TB. The site is located between St Pancras Way and Regents Canal.

The guiding mission of the Tribeca development is to make a lasting contribution to the community and environment. Prioritising environmental and social value will run throughout the whole development process, from conceptual design, planning, construction and post completion. The development has a bespoke ESG Strategy in place that has been informed and developed through reference to industry best practice.

Plot C consists of three buildings, Plot C1 & C2 (The Connector), Plot C3 (The Assembly), and Plot C4 (The Platform). Plots C1 and C3 are over 6 and 10 floors respectively and shall be completed to a shell and core standard and will be designed and constructed with the flexibility/adaptability to be fitted out as office or laboratory space with retail/F&B shell units on the ground floor. Plot C4 is a 2-storey standalone retail shell. Plot C2 is an 11-storey residential tower with retail shells at ground floor. The buildings share a common basement across the whole site.

The gross internal area of the proposed development site of Plot C is approximately 44,760 m^2.

The commercial elements of the development are being assessed under BREEAM UK New Construction 2014 and are targeting an Outstanding rating, with a minimum rating of Excellent.

The energy strategy has been developed in accordance with the London Plan 2016 and has been revised from the proposed energy strategy in the originally consented scheme (application ref: 2017/5497/P). The proposed amendments to the Planning consent are considered to be relatively minor and are being covered under a Section 73 variation, therefore the London Plan 2016 is still applicable to the Plot C scheme.

The energy strategy originally proposed for the development was heavily reliant on natural gas and is therefore not suited to current and emerging energy strategies and policies. Electric air source heat pumps are now proposed to provide all space heating and cooling demands of the development and all gas-fired appliances have been omitted from the proposals. This reduces carbon emissions and improves local air quality but requires the roof plant space to be altered from the original proposals in order to accommodate the heat pumps. Further alterations are required to the roof plant areas in order to accommodate the proposed laboratory plant as set out in the Design and Access Statement.

To obtain likely energy demands for the proposed development, IES Virtual Environment 2022 has been used to develop a thermal simulation model of the proposed buildings.

The following Energy Strategy is proposed to reduce the emissions from the proposed development. This follows the structure set out within the London Plan 2016 and the GLA guidance with respect to the Energy Hierarchy.

Be Lean

The following elements have been considered and optimised:

- Thermal insulation bettering Building Regulations Part L (2013) values, with the figures in the LETI Climate Emergency Design Guide targeted where possible.
- Minimising solar gains by the installation of high-performance glazing with sufficient g-values.
- Optimising fabric air permeability improvements over the minimum Building Regulations Part L (2013) standard.
- Utilising mechanical ventilation with heat recovery to all areas with appropriate time and

temperature control. Fan coil units with integral EC motors and low specific fan powers to be utilised.

- Specifying efficient building services systems, including the use of smart metering and controls.
- All lighting will be efficient LED fittings with automatic controls.

Be Clean

The London Heat Mapping tool indicates that there are no known existing or proposed district heat networks in the vicinity of the development that would be viable to connect to.

It is not proposed to have an onsite District Energy Network (DEN) linking plots A, B & C of the Tribeca development. Plot C will have an energy network across the buildings of Plot C only and will also be provided with the facility to make a connection to a future off-site DEN.

Be Green

Through detailed design analysis of the development, it has been shown that air source heat pumps (ASHP) are the best suited renewable technology for all Plots. The key driver behind using an electricity-based technology offers the opportunity to remove reliance on natural gas and to take advantage of the increasing improvement of the carbon intensity of the National Grid.

Roof-mounted photovoltaic (PV) panels are also proposed to available roof space of Plot C2 and C3, with a PV array of approximately 170m^2.

CO_2 Savings Summary

By utilising good design principles led by the Energy Hierarchy and then incorporating low/zero carbon generating technologies, the total savings of regulated CO_2 emissions compared to Part L 2013 compliance, using SAP10 carbon factors provided by the software are as follows:

Building	Total Cumulative CO_2 Savings Below Part L2 2013 (%)
Plot C1	36
Plot C2 (Non-Domestic)	47
Plot C2 (Domestic)	68
Plot C3	43
Plot C4	41

Table 1: Final cumulative savings for each build on Plot C

These carbon savings comply with the London Plan 2016 criteria.

As part of the Drop-in Application for Plot B, a revised Energy Statement was submitted in April 2021 and is included in this document as an Appendix for ease of reference. No changes have been made to the Plot B Energy Statement from the Drop-in Application.

1.0 INTRODUCTION

Planning approval for the redevelopment of the Ugly Brown Building (UBB) on St Pancras Way, London was originally granted by the London Borough of Camden under application reference 2017/5497/P.

Since making the original Planning application and receiving the conditional approval, the development has evolved to comprise Laboratory Enabled Office buildings with Residential and Retail/F&B units. This technical development also included a review of the overall energy strategy and the proposals for Plots B and C, which received full permission as a 'Drop in' application in November 2022 under application reference 2021/2671/P.

This Energy Statement describes the revised energy strategy for Plot C of the proposed development.

Since the development was originally submitted for Planning, there has been significant improvement in the carbon intensity of the National Grid. This has resulted in a move away from the use of natural gas in generating heat for buildings, which is in line with a key element of the London Plan and the Mayor's zero carbon target by 2050. The energy strategy originally proposed for the building was heavily reliant on natural gas and is therefore not ideally suited to current and emerging energy strategies and policies.

This report details the Energy Strategy for Plot C and follows guidance from the GLA with respect to preparing energy assessments for proposed developments within London. The Energy Statement follows the London Plan 2016, which was current at the time of the original application and is therefore still applicable to the proposed amendments to this Plot. The calculation methodology uses the Building Regulations Part L 2013, which is also still applicable to this Plot.

The scheme has been modelled in IES VE 2022 to determine the following parameters:

- The baseline carbon emissions prescribed from Part L Building Regulations known as the Target Emission Rate (TER)
- The site's regulated CO_2 emissions from the 'Be Lean' analysis after passive energy saving measures are added
- The site's regulated CO_2 emissions from the 'Be Clean' analysis after investigating any connections to existing district heating networks or incorporating combined heat & power (CHP) where applicable
- The site's regulated CO_2 emissions from the 'Be Green' analysis which involves the installation of renewable energy where applicable.

This step-by-step approach will ensure that the site is sustainable and that any energy provided by any district heating or renewable installation is not being used for energy that could otherwise have been mitigated earlier in the design process.

1.1 Site Information

The development site is split into three plots:

- Apex, Plot A (Lab Enabled Office and Retail);
- Reflector, Plot B (Lab Enabled Office and Retail); and
- Connector, Plot C1 & Assembly, Plot C3 (Lab Enabled Office and Retail), Connector, Plot C2 (Residential) and Platform, Plot C4 (Retail).

Plot A is being constructed first and is due for completion in 2024. Plots B and C will be constructed together starting on site in 2023 and completing in 2027.

Plot C consists of three buildings, Plot C1&C2 (The Connector), Plot C3 (The Assembly), and Plot C4 (The Platform). Plots C1 and C3 are over 6 and 10 floors respectively and shall be completed to a shell and core standard. The buildings will be designed and constructed with the flexibility and adaptability to be fitted out as office or laboratory space with retail/F&B shell units on the ground floor. Plot C4 is a 2-storey standalone retail shell. Plot C2 is an 11-storey residential tower with retail shells at ground floor. The buildings share a common basement across the whole site.

For energy assessment purposes, the following use mix has been applied:

	Building Type (%)			
	Office	**Retail**	**Residential**	**Restaurants & Cafes**
Plot C1	93	7	-	-
Plot C2	-	12	88	-
Plot C3	93	7	-	-
Plot C4	-	-	-	100

Table 2: Selected building type for each build on Plot C

Figure 1: Plot C - Existing Site

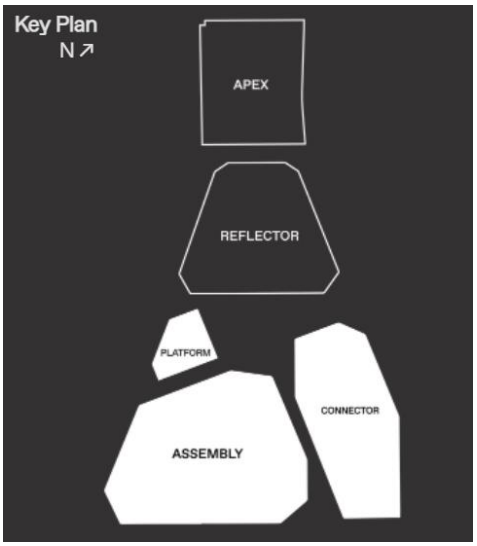

Figure 2: Development Key Plan

1.2 Overview of Development ESG Approach

The guiding mission of the Tribeca development is to make a lasting contribution to the community and environment. The built environment has an enormous role to play in combating climate change. Buildings are responsible for about 40% of the world's carbon emissions, and if we are to meet our net-zero pledges and keep the planet's temperatures from spiralling, new developments have to be as sustainable as possible. That sense of collective responsibility drives the Tribeca development.

Prioritising environmental and social value will run throughout the whole development process, from conceptual design, planning, construction and post completion.

The development has a bespoke ESG Strategy in place that has been informed and developed through reference to industry best practice and is summarised below.

The Tribeca development aims to achieve Net Zero Carbon in operation and will follow the relevant UK Green Building Council (UKGBC) guidance. Energy demand will be reduced to as low as possible via the following measures:

- Reduction in heat losses through the fabric
- Efficient systems installed with overview of control through monthly energy reporting
- Decarbonised heat via use of heat pumps for space conditioning
- Heat recovery on ventilation plant with decarbonised heat for heating coils
- Energy efficient LED lighting with applicable controls for each space type
- PV arrays.

Upfront carbon and whole life cycle carbon emissions will be calculated using RICS whole life cycle carbon guidance and will be reduced through careful design, construction, management and operation. Targets for the expected carbon emissions at practical completion have been developed for each plot and will be monitored throughout design and construction.

Whole building energy use intensity targets have been set and will be monitored throughout design, construction and operation.

Plots C1 and C3 will be assessed under BREEAM UK New Construction 2014, targeting an Outstanding rating with a minimum rating of Excellent.

The tenanted spaces will be 'Net Zero Ready'. Green Leases will be developed to encourage tenants to reduce their energy consumption.

1.3 Policy Review

The following policies and regulations have been identified as being essential to follow with regard to the energy strategy.

1.3.1 Building Regulations

Building Regulations Technical Standards Part L

Part L1A and L2A 2013 incorporating 2016 amendments, Conservation of fuel and power in dwellings and new buildings other than dwellings respectively, sets maximum carbon dioxide emissions for buildings. The L2A regulations apply to the construction of all new buildings and set a reduction in carbon dioxide emissions of 9% compared to 2010 Regulations for non-domestic buildings.

These targets mean that even with good building fabric and low energy building systems, Low or Zero Carbon Technologies will need to be carefully evaluated to establish the most functional and cost-effective design for compliance and maximum reduction of a building's CO_2 footprint.

Regulation 25B, 'nearly zero-energy requirements for new buildings' is currently enforced at a minimum by passing the Target Emissions Rate (TER) under regulation 26. Consideration of high-efficiency alternative systems and BREEAM credits can also be used as evidence of Regulation 25B being met.

It is noted that Part L of the Building Regulations has been updated, however the programme for the Tribeca development is such that the 2013 edition is still applicable.

Consideration of High-Efficiency Alternative Systems in New Buildings

Revised legislation within the Building Regulations was introduced on 9 January 2013 in response to Article 6 of Directive 2010/31/EU on the Energy Performance of Buildings.

For new buildings, the technical, environmental, and economic feasibility of high efficiency alternative systems such as those listed below must be considered:

- Decentralised energy supply systems based on energy from renewable sources
- Cogeneration
- District or block heating or cooling
- Heat pumps

This analysis may be carried out for individual buildings, for groups of similar buildings or for common typologies of buildings in the same area.

Irrespective of whether the building is to be air-conditioned or not, Criterion 3 – Limiting the effects of heat gains in summer must be satisfied within the compliance assessment.

1.3.2 National Planning Policy

The updated National Planning Policy Framework (NPPF) document was published in July 2021. The NPPF states a clear presumption in favour of sustainable development. It supports the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, encouraging the re-use of existing resources, and the use of renewable resources.

Chapter 14 of the NPPF specifies the framework for climate change and energy where local planning authorities should:

- Ensure risks associated with vulnerable areas are mitigated through suitable adaptation measures which may include planning of green infrastructure
- Reduce greenhouse gas emissions through a building's location, orientation and design
- Provide a strategy for the implementation of renewable and low carbon energy and heat that maximises their potential
- Identify opportunities for developments to draw energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

The NPPF allows for Local Planning Authorities to list buildings that are important to the local area to be conserved. This requires that the desirability of sustaining and enhancing the significance of heritage assets is taken into account when planning decisions are made.

1.3.3 The London Plan

The London Plan[1] and the GLA Energy Assessment Guidance[2] are considered to be the benchmark for Local Planning Regulation. Together they provide the regulatory framework against which to undertake energy and sustainability assessments.

The London Plan stipulates that non-domestic buildings should be zero carbon with a mandatory 35% reduction in carbon emissions from Part L2A, 15% of which must be from efficiency measures (Be Lean).

The development's Energy Strategy has been structured in accordance with the GLA energy hierarchy: Be Lean, Be Clean, Be Green and Be Seen. The energy strategy has been developed to comply with the London Plan and the GLA Energy Assessment Guidance on preparing energy assessments as part of planning applications. The key polices of the London

[1] The London Plan (March 2016) (this version is still deemed applicable to this Plot)
[2] Energy Assessment Guidance, GLA guidance on preparing energy assessments as part of planning applications (March 2016)

Plan 2016 are as follows:

Policy 5.2: Minimising Carbon Dioxide Emissions

Major non-domestic developments must achieve an on-site reduction of at least 35% beyond baseline Building Regulations. Where the targets cannot be met on-site, a commitment to ensure the shortfall is met off-site using the provision established by the borough.

Domestic developments shall achieve a zero carbon status for where the residential element of the application achieves at least 35% reduction in regulated carbon emissions on-site over baseline Building Regulations. The remaining regulated carbon dioxide emissions are to be off-set through a cash in lieu contribution to the relevant borough.

Major developments should be net zero-carbon. By making the fullest contribution to minimising carbon dioxide emissions and minimising both annual and peak energy demand 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

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.

Major development proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emissions reduction outlined above are to be met within the framework of the energy hierarchy.

As a minimum, energy assessments should include the following details:

a) Calculation of the energy demand and carbon dioxide emissions covered by 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 at each stage of the energy hierarchy.
b) Proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services
c) 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 savings elsewhere.

Policy 5.5 – Decentralised Energy Networks

The Mayor expects 25% 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. Developers should engage at an early stage with relevant energy companies and bodies to establish the future energy requirements and infrastructure arising from large-scale developments. Energy masterplans should be developed for large scale developments which establishes the most effective energy supply options.

Major development proposals within Heat Network Priority areas should have a communal low-temperature heating system. The heat source for this should be assessed in line with the heating hierarchy as follows:

- Connect to local existing or planned heat network
- Use zero-emission or local secondary heat sources in conjunction with heat pump, if required
- Use low emission CHP (only if there is a case for CHP to enable the delivery of an area wide heat network)
- Use ultra-low NO_x gas boilers.

Where a heat network is planned but not yet in existence, the development should be designed for connection at a later date.

Policy 5.7 – Renewable Energy

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.

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

Within LDFs boroughs should, and other agencies may wish to, develop more detailed policies and proposals to support the development of renewable energy in London – in particular, to identify broad areas where specific renewable energy technologies, including large scale systems and the large scale deployment of small scale systems, are appropriate. The identification of areas should be consistent with any guidelines and criteria outlined by the Mayor.

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

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 area wide basis.

Major development proposals should reduce potential overheating and reliance on air conditioning systems and demonstrate this in accordance within 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. Active cooling systems (ensuring they are the lowest carbon options)

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 ad guidance regarding overheating and cooling are outlined in the London Climate Change Adaptation Strategy.

Policy 7.14: Improving Air Quality

A) The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of this Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.

B) Development proposals should:

a) Minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans.
b) Promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils 'The control of dust and emissions from construction nan demolition'.
c) Be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality.
d) Ensure that where provision needs to be made to reduce emissions from a development, this is usually made on site. Where it can be demonstrated that on-site provision is impractical or inappropriate and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme-by-scheme basis or through joint area-based approaches.
e) Where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified.

C) Boroughs should have policies that:

a) Seek reductions in levels of pollutants referred to in the Governments National Air Quality Strategy having regard to the Mayor's Air Quality Strategy
b) Take account of the findings of their Air Quality Review and Assessments and Action Plans, in particular where Air Quality Management Areas have been designated.

1.3.4 Local Policy

The Camden Local Plan (June 2017) sets out the council's planning policies and replaces the Core strategy and Development Policies planning documents (adopted in 2010). Policies CC1 and CC2 of *Section 8 – Sustainability and Climate Change* of the Camden Local Plan, must be adhered to.

Policy CC1 Climate Change Mitigation

All developments shall be required to minimise the effect of climate change and be encouraged to meet the highest feasible environmental standards that are financially available.

The local council will:

- Promote zero carbon development and require all developments to reduce carbon dioxide emissions through the steps stipulated in the energy hierarchy.
- Require major developments to demonstrate how the London Plan targets have been met.
- Support decentralised energy networks.
- Encourage sensitive energy efficiency improvements to existing buildings
- Expect all developments to optimise resource efficiency

Policy CC2 Adapting to Climate Change

The council requires new developments to adopt appropriate climate change adaptations measures such as:

- Incorporating bio-diverse roofs, green and blue roofs where appropriate
- Demonstrations to show the impact of urban overheating and the application of mitigating the risk of overheating
- Expecting non-domestic developments of 500sqm of floor space or above to achieve Excellent in BREEAM assessments and encouraging zero carbon in new developments from 2019.

Policy CC4 Air Quality

The council will ensure that the impact of development on air quality is mitigated and ensure the exposure to poor air quality is reduced in the borough.

The council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Councils Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the council will not grant planning permission unless measures are adopted to mitigate the impact.

Development that involved significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.

2.0 DEMAND REDUCTION (BE LEAN)

2.1 Introduction

In line with good design principles and London Plan requirements, the development will follow the energy hierarchy so that any low or zero carbon generation is not supplying energy to areas that could have been mitigated early in the design process. The relevant steps in this process are shown below:

Stage 1 - Maximise Passive Design

In the first instance the building design should be efficient, incorporating measures such as good fabric and glazing insulation levels, control of solar heat gain whilst providing good levels of day lighting.

Stage 2 - Minimise Active Design

Having reduced the energy demand, energy requirements will then need to be minimised where possible by installing energy efficient plant and systems to meet the building's energy demands. Suitable control systems should be provided to ensure system energy efficiencies can be realised. Where mechanical intervention cannot be avoided, the design should incorporate the lowest possible level of intervention and energy use.

2.2 Project Approach: Stage 1 - Maximise Passive Design

Passive design measures will be optimised across the development and in conjunction with active measures, such as efficient building services systems, will reduce demand (Be Lean). Building design will be optimised to limit heat loss, reduce cooling loads by limiting solar gain and optimise the use of natural light and ventilation.

The following elements have been considered and optimised:

- Solar gain will be limited through limiting the extent of glazing, specifying high-performance glazing system, external shading, etc.
- High-performance building fabric will be implemented, to significantly exceed the minimum criteria set by Part L.

Improving the thermal insulation standards beyond the minimum Building Regulations (2013) standards has been applied to achieve reduction to the annual CO_2 emissions associated with the building heating systems by limiting the heat loss through the building fabric.

Attention has also been focussed on the building's air tightness. The air permeability rate has been designed to 3.0 $m^3/hr.m^2$ at 50Pa which is a significant improvement over Part L2A Building Regulations of 10.0 $m^3/hr.m^2$.

Glazing has been carefully selected to ensure that solar gains have been limited to reduce the risk of overheating and to reduce the annual cooling loads. Fins on all facades of the floors also assist in creating local shade to the occupied areas and in turn reduce solar gains to the building.

Element	Plot C1	Plot C2	Plot C3	Plot C4
Wall U-value (W/m^2K)	0.20	0.15	0.20	0.20
Basement Slab (W/m^2K)	0.13	0.13	0.13	0.13
Roof (W/m^2K)	0.13	0.13	0.13	0.13
Curtain Wall (W/m^2K)	1.3 (0.28 g)	1.4 (0.34 g)	1.3 (0.28 g)	1.3 (0.28 g)
Air Permeability ($m^3/hr.m^2$ at 50Pa)	3.0	3.0	3.0	3.0

Table 3: Summary of passive measures on all buildings of Plot C

2.3 Project Approach: Stage 2 - Minimise Active Design

The non-residential developments will be served by mechanical ventilation with heat recovery (MVHR) to all commercial areas. The air handling units (AHU) will be fitted with direct drive EC motors with low specific fan powers (SFP) with variable speed drives fitted to all pumps and fans. Control of the HVAC system will include local time and temperature control along with an optimum start program. Fan coil units (FCUs) will be used to deliver heating, cooling and ventilation to the main spaces. Motors within FCUs will incorporate EC motor technology and low SFPs.

The residential apartments will all be served with MVHR units providing continuous background ventilation. The MVHR units shall be low energy, with high efficiency EC fans and motors, and high efficiency heat exchangers.

All lighting will be efficient LED fittings with a minimum efficacy of 100lm/W with occupancy sensor and daylight controls where applicable.

Element	As Designed
Lighting Efficacy (lm/W)	100 (as minimum)
AHU Heat Recovery Efficiency (%)	0.77 – 0.88
AHU SFP (W/l/s) Commercial	1.64 (as maximum)
AHU SFP (W/l/s) Domestic	1.3 (as a maximum)
Terminal Fan Coil Unit SFP (W/l/s)	0.2

Table 4: Summary of Active passive measures

2.4 Project Approach: Energy Demand Following Energy Efficiency Measures

The energy demand across the site, including unregulated electricity and gas following the implementation of energy efficiency measures is the following:

Building use	Energy demand following energy efficiency measures (MWh/year)						
	Space Heating	Hot Water	Lighting	Auxiliary	Cooling	Unregulated electricity	Unregulated gas
Plot C1 Non-Domestic	58	12	64	87	40	91	0
Plot C2 Non-Domestic	7	1	19	10	4	5	0
Plot C2 Domestic	172	184	25	6	0	89	0
Plot C3 Non-Domestic	134	123	210	272	160	233	0
Plot C4 Non-Domestic	7	56	36	19	10	11	0

Table 5: Energy demand post Be Lean stage

3.0 HEATING INFRASTRUCTURE (BE CLEAN)

3.1 Off-Site Energy Network

The Section 106 Agreement (S106) associated with the original Planning decision included requirements for the provision of an off-site energy network study and connection plans. This study is provided separately to this Energy Statement (document reference *C2718-KJT-ZZ-XX-RP-ME-0050-Off Site Energy Network Appraisal-S2-P01*).

Clause 2.59 (a) of the S106 stipulated a requirement to safeguard Plot C for a future connection to an off-site decentralised energy network (DEN). Clause 3 of the S106 sets out the requirements for the DEN off-site feasibility study and connection plan.

From investigations to date, there are no existing heat networks in the vicinity that are viable to connect to. It may become viable to connect to a heat network in future, as set out in the off-site DEN study report.

In accordance with the Planning conditions, provision for a future connection to an off-site DEN has been made within Plot C with a defined location and soft spot for incoming pipework into the basement level B1, a defined pipework route to the plantroom level at B2 and a defined plant room at level B2 for future DEN interface equipment.

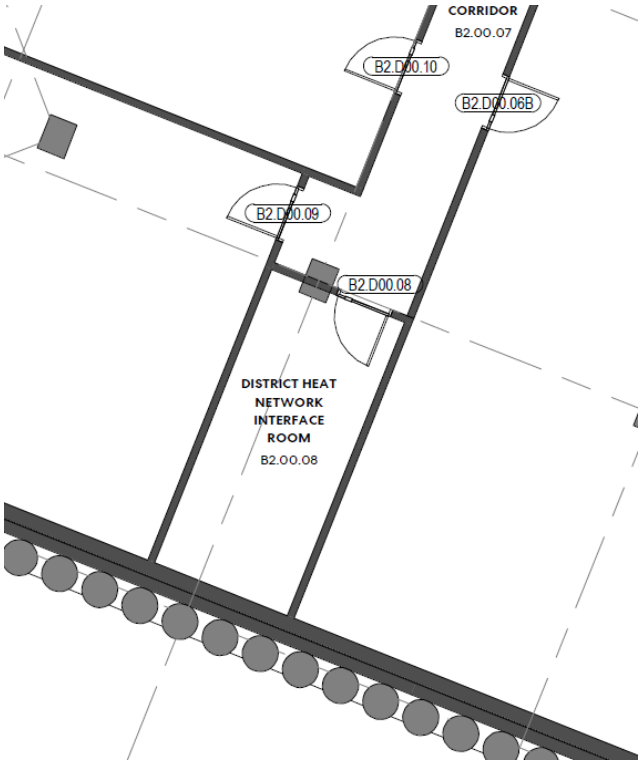

Figure 3: Designated space in basement of Plot C3 for heat network interface

3.2 On-Site Energy Network

The original Planning consent included a requirement to establish an on-site energy network, with a CHP plant providing heating to serve Plots A & B initially, then moving all Plots onto a central CHP plant within Plot C when Plot C was constructed.

A feasibility study has been carried out which appraises the application of an on-site energy network given the change in central plant strategy to ASHP. Refer to document *C2718-KJT-ZZ-XX-RP-ME-0039-On Site Energy Network Appraisal* for further details.

This study demonstrates that it would be deemed to be of no energy or carbon saving benefit to the development to construct an on-site DEN for the Tribeca development. The original energy strategy was CHP-led and may have been more suited to the requirement for an onsite DEN, but this is no longer viable from a sustainability standpoint with the proposed ASHP scheme.

The only reason to install an on-site DEN would be to satisfy the original Planning condition. The additional embodied carbon of an on-site DEN, added complexity of control and operation, plus additional maintenance costs for no energy saving do not provide a viable design proposal. It has therefore been determined that the on-site DEN will not be implemented between Plots A, B & C

All buildings on the Plot C site will have their own local energy network, whereby a total of six roof mounted ASHPs will be located on the roofs of Plot C2 and C3 and will serve the heating and cooling demands of Plots C1 – C4.

3.3 Secondary Heat Generation

Secondary heat can potentially be obtained from various heat sources such as infrastructure and environmental sources within the vicinity. Regents Canal, which runs behind the plot is not suitable for heat rejection/extraction as determined in the original Max Fordham Energy

Strategy for various reasons, including low flow rate, shallow water depth, potential to be drained for maintenance, etc.

Plot C2 will benefit from utilising an ambient loop heat network to minimise system losses and maintaining a consistent temperature. The proposed network will be distributed to each apartment to serve a local water to water packaged heat pump unit. The apartments shall be treated via underfloor heating and cooling. The private apartments shall also include for cooling to the MVHR system.

4.0 RENEWABLE ENERGY (BE GREEN)

The incorporation of low and zero carbon technologies (LZCT) can reduce demand on finite natural energy sources, benefit the environment and reduce running costs.

Potential Sources of Energy

Due to the unique constraints of the development, there is limited scope to incorporate many of the available renewable energy technologies within the scheme. As well as the selected LZC technologies, the following were reviewed and the implications are summarised below:

Technology	Implications
Ground source heat pump	- Complex borehole construction logistics beneath basement - Expensive - Limited carbon benefit over ASHP
River Source Heat Pump	- Canal has low flow rate, discharging heat to canal will cause canal water temperature to rise - Canal is periodically drained for maintenance - Potential of environmental harm to aquatic life
Wind turbines	- Not feasible in this location
Biomass boiler	- Air quality implications - Delivery and storage implications

Table 6: Site feasibility summary of LZCT

Air source heat pumps will be installed on the roofs of Plots C2 and C3 to provide simultaneous heating and cooling, improving the energy efficiency on site with their high seasonal performance.

Plot C2 and C3 shall incorporate roof-mounted PV panel arrays with a combined area of approximately 170m^2 which will counter the on-site energy consumption and help reduce annual carbon emissions. PV panels will be able to optimise their full efficiency with no local or topical shading of surrounding buildings or vegetation.

The savings after applying the Be Green measures are outlined below.

Plot C1	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	11	16%
Savings from heat network / CHP	0	0%
Savings from renewable energy	13	19%
Total Cumulative Savings	**24**	**35%**

Table 7: Plot C1, CO2 savings from each stage of the Energy Hierachy

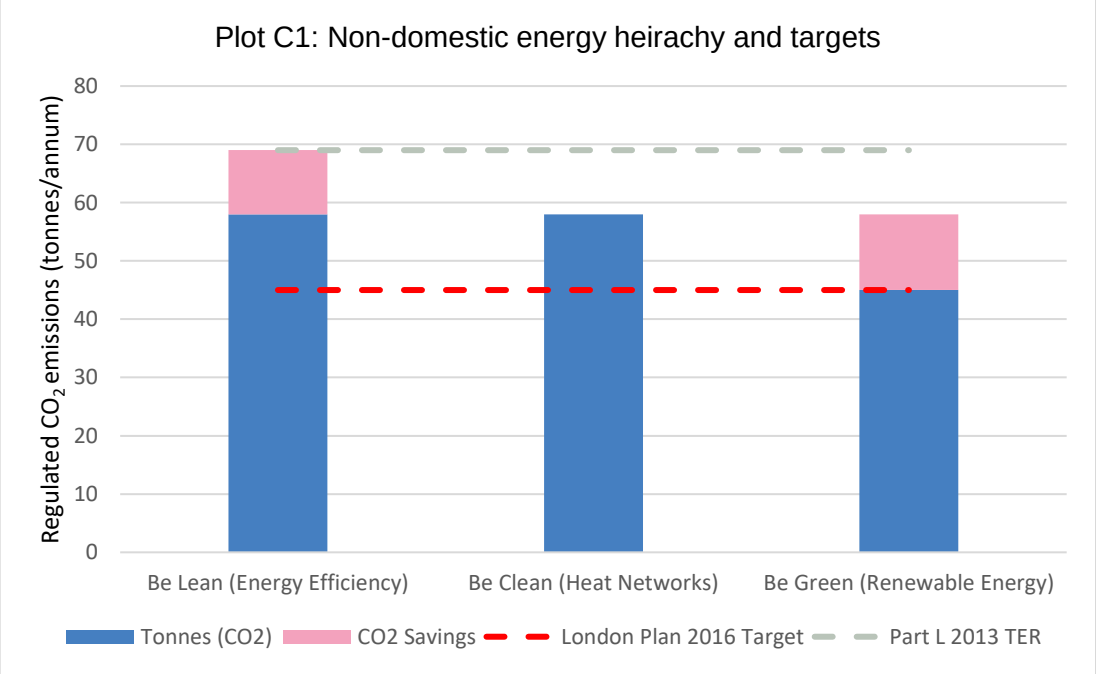

Figure 4: Plot C1, CO2 savings graph from each stage of the Energy Hierarchy

Plot C2 (Domestic)	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	6	11%
Savings from heat network / CHP	0	0%
Savings from renewable energy	31	57%
Total Cumulative Savings	**37**	**68%**

Table 8: Plot C2, CO2 savings from each stage of the Energy Hierarchy

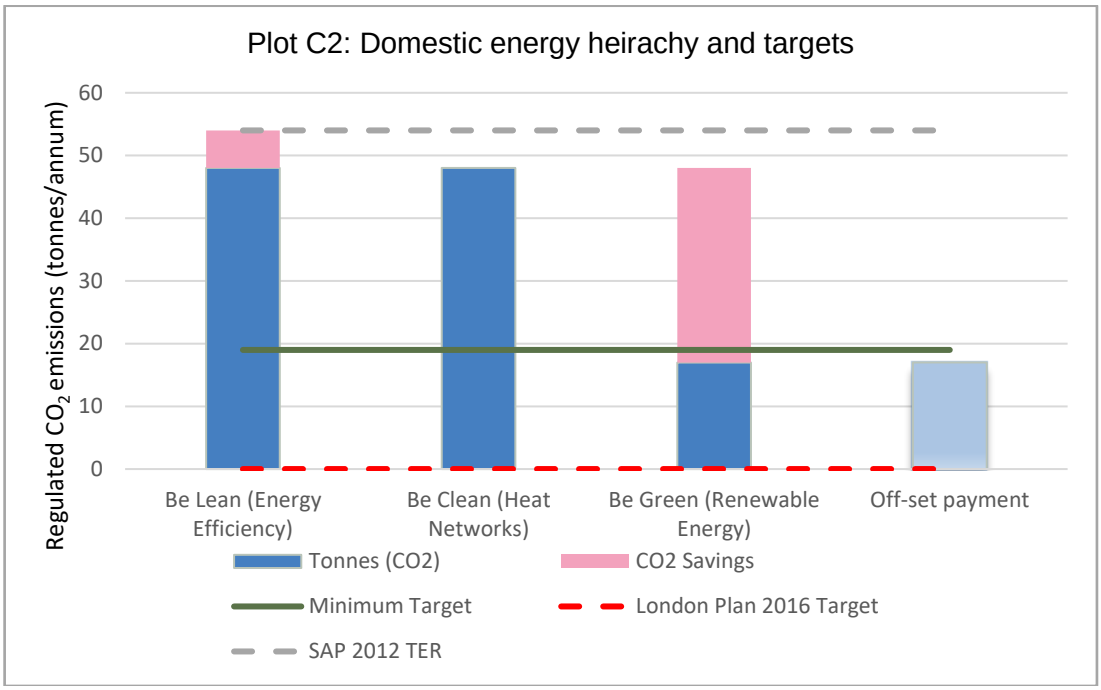

Figure 5: Plot C2 CO2 savings graph from each stage of the Energy Hierarchy

Plot C2 (Non-Domestic)	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	2	18%
Savings from heat network / CHP	0	0%
Savings from renewable energy	3	29%
Total Cumulative Savings	**5**	**47%**

Table 9: Plot C2 Non-domestic CO2 Savings from each stage of the Energy Hierarchy

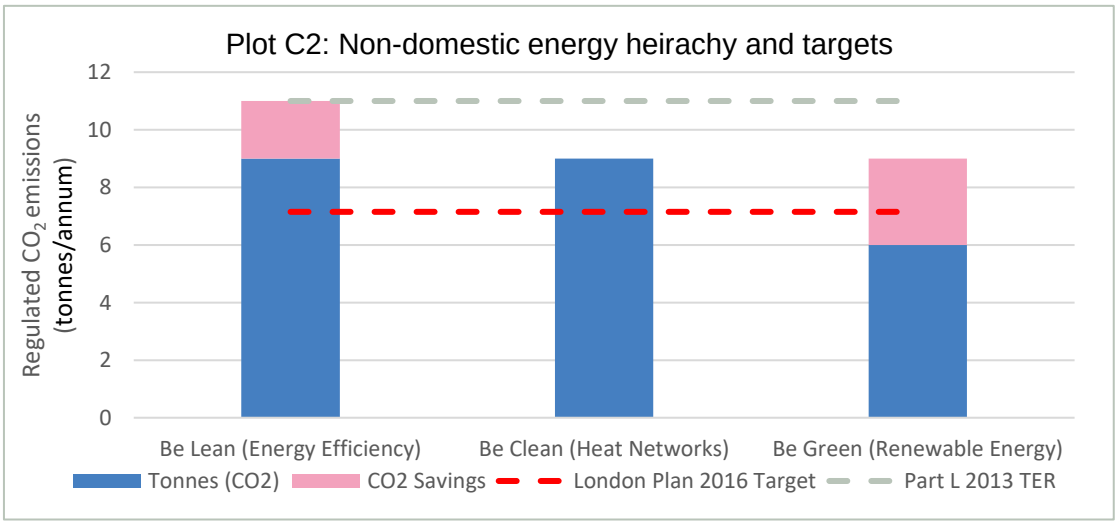

Figure 6: Plot C2 Non-domestic CO2 Savings from each stage of the Energy Hierarchy

Plot C3	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	72	27%
Savings from heat network / CHP	0	0%
Savings from renewable energy	43	16%
Total Cumulative Savings	**115**	**43%**

Table 10: Plot C3, CO2 savings from each stage of the Energy Hierarchy

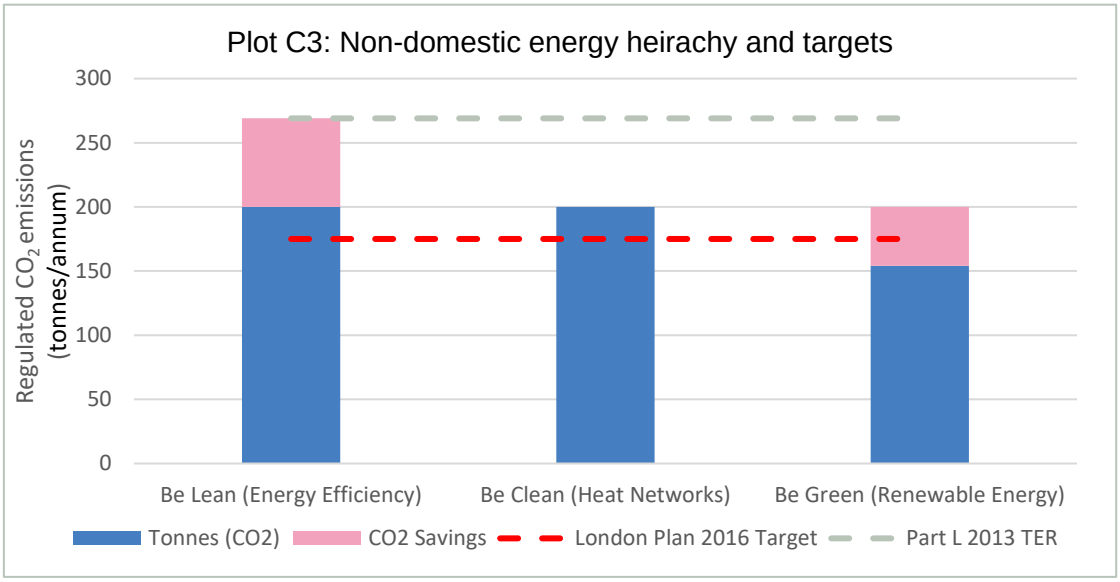

Figure 7: Plot C3, CO2 Savings from each stage of the Energy Hierarchy

Plot C4	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	3	11%
Savings from heat network / CHP	0	0%
Savings from renewable energy	9	30%
Total Cumulative Savings	**12**	**41%**

Table 11: Plot C4, CO2 savings from each stage of the Energy Hierarchy

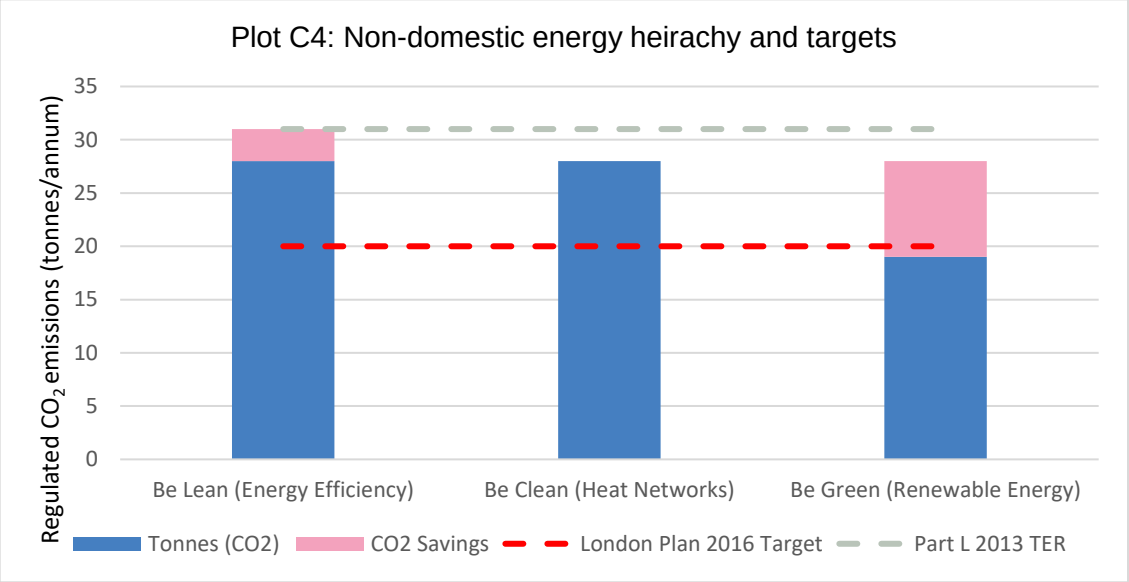

Figure 8: Plot C-4, CO2 Savings graph from each stage of the Energy Hierarchy

	Site wide regulated carbon dioxide emissions and savings		
	Total Regulated Emissions (Tonnes CO_2 per annum)	**CO_2 Savings (Tonnes CO_2 per annum)**	**Percentage Saving (%)**
Part L 2013 Baseline	434		
Be Lean	340	94	22
Be Clean	340	0	0
Be Green	242	98	23
Total savings		**192**	

Table 12: Plot C site-wide CO2 savings from each stage of the Energy Hierarchy

Cooling Demand

The cooling demand for the non-residential and residential buildings was assessed using IES simulation software. In line with London Plan 2016 Policy 5.9 – Overheating and Cooling, the proposed building's cooling demand is lower than the Notional Building.

	Area weighted average non-domestic cooling demand (MJ/m^2)		Total area weighted non-domestic cooling demand (MJ/year)	
	Actual	**Notional**	**Actual**	**Notional**
Plot C1	13.46	17.28	111,002	142,118
Plot C2	18.29	19.15	11,407	11,945
Plot C3	16.85	28.76	447,567	737,433
Plot C4	41.15	67.10	28,782	47,034

Table 13: Cooling demand for each commercial build on Plot C

For overheating analysis of C2 Residential building please refer to KJ Tait report *C2718-KJT-*

ZZ-XX-RP-ME-0024-Plot C2 Residential Thermal Comfort Report.

5.0 CARBON OFFSETTING

By utilising good design principles and the Be Lean, Be Clean, Be Green hierarchy, the development is estimated to save at least 35% of non-domestic regulated CO2 emissions compared to Part L 2013 compliance using SAP10 Carbon Factors as suggested in the GLA Energy Assessment Guidance and is therefore in compliance with the London Plan 2016 requirements.

As part of the London Plan and Local Camden Plan, new residential developments must target a Net Zero Carbon building where any remaining emissions must be offset by means of a monetary payment into the Borough's Carbon Offset Fund.

The previous planning application (Reference 2017/5497/P) was granted by the London Borough of Camden by utilising CHP to comply with the London Plan. The new proposals incorporating ASHP and PV has reduced the amount of carbon required to be offset for the residential element of Plot C. The carbon offset contribution based on the higher figure in the previous application was paid prior to the commencement of Plot A superstructure works and is not proposed to change.

APPENDIX 1 – BRUKL OUTPUT DOCUMENT (BE LEAN)

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Camden Plot C1 - Be Lean P07 As designed

Date: Thu Jul 20 10:42:34 2023

Administrative information

Building Details

Address: St Pancras Way, LONDON, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.21

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.21

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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	16.2
Target CO_2 emission rate (TER), kgCO_2/m^2.annum	16.2
Building CO_2 emission rate (BER), kgCO_2/m^2.annum	13.6
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.2	PL0000CF:Surf[7]
Floor	0.25	0.13	0.13	PL000129:Surf[0]
Roof	0.25	0.13	0.13	PL000194:Surf[2]
Windows***, roof windows, and rooflights	2.2	1.29	1.29	PL0000CF:Surf[0]
Personnel doors	2.2	-	-	No personnel doors in building
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

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m^{2}K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m^{2}K)]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m^{2}K)]

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m^3/(h.m^2) at 50 Pa	10	3

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
PLOT C1 GROUND FLOOR: Retail C1C	C1.90.12	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 GROUND FLOOR: Retail C1B	C1.90.11	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 GROUND FLOOR: Reception	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 FIRST FLOOR: Open Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 2ND FLOOR: Open Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 5TH FLOOR: 5th Floor Open-Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 6TH FLOOR: 6th Floor Open-Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 3RD FLOOR: Open Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 4TH FLOOR: 4th Floor Open-Plan Office	-	-	-	-	-	-	-	0.2	-	-	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	
PLOT C1 GROUND FLOOR: Reception Lobby C1.00.04	-	122	-	112
PLOT C1 GROUND FLOOR: Retail C1A	-	100	15	2554
PLOT C1- BASEMENT: Circulation B1.00.13	-	152	-	13
PLOT C1- BASEMENT: Bike Store B1.00.59	154	-	-	13
PLOT C1- BASEMENT: TX Room B1.00.09	154	-	-	132
PLOT C1- BASEMENT: Escape Corridor B1.00.03	-	152	-	91
PLOT C1- BASEMENT: Store B1.00.15	100	-	-	19
PLOT C1- BASEMENT: Lift Lobby B1.00.14	-	118	-	104
PLOT C1- BASEMENT: Goods Lift Lobby B1.00.50C	-	118	-	47
PLOT C1- BASEMENT: Gym	-	100	-	436
PLOT C1- BASEMENT: Circulation B1.00.47	-	152	-	24
PLOT C1- BASEMENT: North Staircase B1.00.11	-	100	-	83
PLOT C1- BASEMENT	-	152	-	56
PLOT C1- BASEMENT: North Staircase B1.00.11	-	100	-	131
PLOT C1- BASEMENT: Comms Intake B1.00.28	154	-	-	102
PLOT C1- BASEMENT: C1 LTHW & CHW Plant room B1.00.22	154	-	-	170
PLOT C1- BASEMENT: CW Water Tanks B1.00.23	154	-	-	171
PLOT C1- BASEMENT: Commercial Sprinkler Room B1.00.16	154	-	-	182
PLOT C1- BASEMENT: Resi Sprinkler Pump Room B1.00.24	154	-	-	114
PLOT C1- BASEMENT: Circualtion B1.00.50J	-	152	-	72
PLOT C1- BASEMENT: Generator Fuel Tank Room B1.00.27	154	-	-	165
PLOT C1- BASEMENT: LV Switchroom B1.00.29C	154	-	-	165
PLOT C1- BASEMENT: Ventialtion Plantroom B1.00.29	154	-	-	287
PLOT C1- BASEMENT: Lift Lobby B1.00.50E	-	118	-	117
PLOT C1- BASEMENT: Store B1.00.50G	100	-	-	52
PLOT C1- BASEMENT: Lift Lobby B1.00.50E	-	118	-	98
PLOT C1- BASEMENT: Gym	-	100	-	266
PLOT C1- BASEMENT: Retail BOH B1.00.04	100	-	-	72
PLOT C1- BASEMENT: Escape Corridor B1.00.03	-	152	-	187
PLOT C1- BASEMENT: Gym	-	100	-	1229

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C1- BASEMENT: Circulation B1.00.47	-	152	-	53
PLOT C1- BASEMENT: Bike Store B1.00.59	154	-	-	184
PLOT C1- BASEMENT: Circulation B1.00.47	-	152	-	26
PLOT C1- BASEMENT: Circulation B1.00.13	-	152	-	75
PLOT C1- BASEMENT: Bike Store B1.00.59	154	-	-	42
PLOT C1 GROUND FLOOR: Lift Lobby C1.00.01	-	118	-	76
PLOT C1 GROUND FLOOR: Escape Corridor C1.00.05		152	-	69
PLOT C1 GROUND FLOOR: Goods Lift Lobby C1.00.43		118	-	31
PLOT C1 GROUND FLOOR: Staircase C1.00.04	-	100	-	63
PLOT C1 GROUND FLOOR: AWC C1.00.06	-	102	-	37
PLOT C1 GROUND FLOOR: Gym Entrance C1.00.01B		152	-	91
PLOT C1 GROUND FLOOR: Retail C1C C1.00.12	-	100	15	519
PLOT C1 GROUND FLOOR: Retail C1B C1.00.11	-	100	15	1343
PLOT C1- BASEMENT: Refuse Store B1.00.50F	154	-	-	31
PLOT C1- BASEMENT: Circulation B1.00.31	-	152	-	137
PLOT C1- BASEMENT: Commercial Sprinkler Tank B1.00.02		-	-	113
PLOT C1- BASEMENT: Commercial Sprinkler Tank B1.00.01		-	-	99
PLOT C1- BASEMENT: TX Room B1.00.09	154	-	-	85
PLOT C1- BASEMENT: Refuse Store B1.00.02	154	-	-	37
PLOT C1- BASEMENT: Retail BOH B1.00.04	100	-	-	53
PLOT C1- BASEMENT: Circulation B1.00.47	-	152	-	117
PLOT C1 GROUND FLOOR: Cycle Stair C1.00.09	-	152	-	69
PLOT C1 GROUND FLOOR: Escape Corridor C1.00.07		152	-	75
PLOT C1 GROUND FLOOR: Reception	-	122	15	9
PLOT C1 GROUND FLOOR: South Staircase C1.00.02		100	-	51
PLOT C1 FIRST FLOOR: Open Plan Office	122	-	-	3379
PLOT C1 FIRST FLOOR: Escape Corridor C1.01.06	-	152	-	29
PLOT C1 FIRST FLOOR: Toilet Lobby C1.01.08	-	118	-	38
PLOT C1 FIRST FLOOR: WC C1.01.08C	-	102	-	76
PLOT C1 FIRST FLOOR: AWC C1.01.08C	-	102	-	38
PLOT C1 FIRST FLOOR: North Staircase C1.01.03	-	100	-	59
PLOT C1 FIRST FLOOR: Lobby C1.01.05	-	118	-	18
PLOT C1 FIRST FLOOR: Goods Lift Lobby C1.01.07	-	118	-	26
PLOT C1 FIRST FLOOR: Lift Lobby C1.01.01	-	118	-	66
PLOT C1 FIRST FLOOR: Fire Fighting Lobby C1.01.04		118	-	29
PLOT C1 FIRST FLOOR: South Staircase C1.01.02	-	100	-	51
PLOT C1 FIRST FLOOR: WC C1.01.08	-	102	-	42
PLOT C1 FIRST FLOOR: Cleaners C1.01.08B	100	-	-	7
PLOT C1 2ND FLOOR: Open Plan Office	122	-	-	3379
PLOT C1 2ND FLOOR: Escape Corridor C1.02.06	-	152	-	29
PLOT C1 2ND FLOOR: Toilet Lobby C1.02.08	-	118	-	38
PLOT C1 2ND FLOOR: WC C1.02.08C	-	102	-	76
PLOT C1 2ND FLOOR: AWC C1.02.08C	-	102	-	38

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C1 2ND FLOOR: North Staircase C1.02.03	-	100	-	59
PLOT C1 2ND FLOOR: Lobby C1.02.05	-	152	-	14
PLOT C1 2ND FLOOR: Goods Lift Lobby C1.02.07	-	118	-	26
PLOT C1 2ND FLOOR: Lift Lobby C1.02.01	-	118	-	66
PLOT C1 2ND FLOOR: Fire Fighting Lobby C1.02.04	-	118	-	29
PLOT C1 2ND FLOOR: South Staircase C1.02.02	-	100	-	51
PLOT C1 2ND FLOOR: WC C1.02.08	-	102	-	42
PLOT C1 2ND FLOOR: Cleaners C1.02.08B	100	-	-	7
PLOT C1 5TH FLOOR: Escape Corridor C1.05.06	-	152	-	29
PLOT C1 5TH FLOOR: Toilet Lobby C1.05.08	-	118	-	38
PLOT C1 5TH FLOOR: WC C1.05.08C	-	102	-	76
PLOT C1 5TH FLOOR: AWC C1.05.08C	-	102	-	38
PLOT C1 5TH FLOOR: North Staircase C1.05.03	-	100	-	59
PLOT C1 5TH FLOOR: Lobby C1.05.05	-	118	-	18
PLOT C1 5TH FLOOR: Goods Lift Lobby C1.05.07	-	118	-	26
PLOT C1 5TH FLOOR: Lift Lobby C1.05.01	-	118	-	66
PLOT C1 5TH FLOOR: Fire Fighting Lobby C1.05.04	-	118	-	29
PLOT C1 5TH FLOOR: South Staircase C1.05.02	-	100	-	51
PLOT C1 5TH FLOOR: WC C1.05.08	-	102	-	42
PLOT C1 5TH FLOOR: Cleaners C1.05.08B	100	-	-	7
PLOT C1 5TH FLOOR: 5th Floor Open Plan Office	122	-	-	2272
PLOT C1 6TH FLOOR: Escape Corridor C1.06.06	-	152	-	34
PLOT C1 6TH FLOOR: Toilet Lobby C1.06.08	-	118	-	45
PLOT C1 6TH FLOOR: WC C1.06.08C	-	102	-	88
PLOT C1 6TH FLOOR: AWC C1.06.08C	-	102	-	40
PLOT C1 6TH FLOOR: North Staircase C1.06.03	-	100	-	65
PLOT C1 6TH FLOOR: Lobby C1.06.05	-	118	-	22
PLOT C1 6TH FLOOR: Goods Lift Lobby C1.06.07	-	118	-	31
PLOT C1 6TH FLOOR: Lift Lobby C1.06.01	-	118	-	74
PLOT C1 6TH FLOOR: Fire Fighting Lobby C1.06.04	-	118	-	34
PLOT C1 6TH FLOOR: South Staircase C1.06.02	-	100	-	58
PLOT C1 6TH FLOOR: WC C1.06.08	-	102	-	52
PLOT C1 6TH FLOOR: Cleaners C1.06.08B	100	-	-	7
PLOT C1 6TH FLOOR: 6th Floor Open Plan Office	122	-	-	2331
PLOT C1 3RD FLOOR: Cleaners C1.03.08B	100	-	-	7
PLOT C1 3RD FLOOR: WC C1.03.08	-	102	-	42
PLOT C1 3RD FLOOR: South Staircase C1.03.02	-	100	-	51
PLOT C1 3RD FLOOR: Fire Fighting Lobby C1.03.04	-	118	-	29
PLOT C1 3RD FLOOR: Lift Lobby C1.03.01	-	152	-	52
PLOT C1 3RD FLOOR: Goods Lift Lobby C1.03.07	-	118	-	26
PLOT C1 3RD FLOOR: Lobby C1.03.05	-	118	-	18
PLOT C1 3RD FLOOR: North Staircase C1.03.03	-	100	-	59
PLOT C1 3RD FLOOR: AWC C1.03.08C	-	102	-	38

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C1 3RD FLOOR: WC C1.03.08C	-	102	-	76
PLOT C1 3RD FLOOR: Toilet Lobby C1.03.08	-	118	-	38
PLOT C1 3RD FLOOR: Escape Corridor C1.03.06	-	152	-	29
PLOT C1 3RD FLOOR: Open Plan Office	122	-	-	3379
PLOT C1 4TH FLOOR: Cleaners C1.04.08B	100	-	-	7
PLOT C1 3RD FLOOR: WC C1.03.08	-	102	-	42
PLOT C1 4TH FLOOR: South Staircase C1.04.02	-	100	-	51
PLOT C1 4TH FLOOR: Fire Fighting Lobby C1.04.04	-	118	-	29
PLOT C1 4TH FLOOR: Lift Lobby C1.04.01	-	118	-	66
PLOT C1 4TH FLOOR: Goods Lift Lobby C1.04.07	-	118	-	26
PLOT C1 4TH FLOOR: Lobby C1.04.05	-	118	-	18
PLOT C1 4TH FLOOR: North Staircase C1.04.03	-	100	-	59
PLOT C1 4TH FLOOR: AWC C1.04.08C	-	102	-	38
PLOT C1 3RD FLOOR: WC C1.03.08C	-	102	-	76
PLOT C1 4TH FLOOR: Toilet Lobby C1.04.08	-	118	-	38
PLOT C1 4TH FLOOR: Escape Corridor C1.04.06	-	152	-	29
PLOT C1 4TH FLOOR: 4th Floor Open Plan Office	122	-	-	3379

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?
PLOT C1 GROUND FLOOR: Reception Lobby C1.00.09	NO (-38%)	NO
PLOT C1 GROUND FLOOR: Retail C1A	NO (-37.3%)	NO
PLOT C1- BASEMENT: Gym	N/A	N/A
PLOT C1- BASEMENT: Gym	N/A	N/A
PLOT C1- BASEMENT: Gym	N/A	N/A
PLOT C1 GROUND FLOOR: Retail C1C C1.00.12	NO (-49.2%)	NO
PLOT C1 GROUND FLOOR: Retail C1B C1.00.11	NO (-51.2%)	NO
PLOT C1 GROUND FLOOR: Reception	N/A	N/A
PLOT C1 FIRST FLOOR: Open Plan Office	NO (-26.6%)	NO
PLOT C1 2ND FLOOR: Open Plan Office	NO (-26.6%)	NO
PLOT C1 5TH FLOOR: 5th Floor Open Plan Office	YES (+27.7%)	NO
PLOT C1 6TH FLOOR: 6th Floor Open Plan Office	YES (+28.1%)	NO
PLOT C1 3RD FLOOR: Open Plan Office	NO (-26.6%)	NO
PLOT C1 4TH FLOOR: 4th Floor Open Plan Office	NO (-26.6%)	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?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	8224.4	8224.4
External area [m²]	8511.9	8511.9
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	3136.86	3239.08
Average U-value [W/m²K]	0.37	0.38
Alpha value* [%]	10.15	10

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

Building Use

% Area	Building Type
7	**A1/A2 Retail/Financial and Professional services**
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
93	**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	7.11	3.6
Cooling	4.88	4.8
Auxiliary	10.63	9.01
Lighting	7.78	15.97
Hot water	1.49	1.52
Equipment*	41.28	41.28
TOTAL**	31.89	34.9

* 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]	77.65	76.68
Primary energy* [kWh/m²]	80.2	95.4
Total emissions [kg/m²]	13.6	16.2

* 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] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	43.4	105.9	13.4	9.5	14.4	0.9	3.1	0.97	3.88
	Notional	18.9	127.4	6.1	9.3	13.3	0.86	3.79	----	----
[ST] Central heating using air distribution, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	17.7	0	4.7	0	12.3	1.05	0	0.97	0
	Notional	7.6	0	2.4	0	6.3	0.86	0	----	----
[ST] Central heating using air distribution, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	8.8	0	2.3	0	33.8	1.06	0	0.97	0
	Notional	14.8	0	4.8	0	22.6	0.86	0	----	----
[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	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.15	PL0000CF:Surf[2]
Floor	0.2	0.13	PL000129:Surf[0]
Roof	0.15	0.13	PL000194:Surf[2]
Windows, roof windows, and rooflights	1.5	1.29	PL0000CF:Surf[0]
Personnel doors	1.5	-	No personnel doors in building
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

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

Camden Plot C2 - Retail - Be Lean Part L 2013 - P10

As built

Date: Tue Sep 12 15:16:36 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.22

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.22

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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/m².annum	31.3
Target CO_2 emission rate (TER), kgCO_2/m².annum	31.3
Building CO_2 emission rate (BER), kgCO_2/m².annum	26.4
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	$U_{e\text{-}Limit}$	$U_{e\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.15	PL00001A:Surf[6]
Floor	0.25	0.13	0.13	PL00000C:Surf[0]
Roof	0.25	0.13	0.13	PL00001A:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.4	1.4	PL00001A:Surf[1]
Personnel doors	2.2	2.2	2.2	PL00001A:Surf[7]
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

$U_{e\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{e\text{-}Calc}$ = 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
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	>0.95

1- C2718 - Be Lean - ASHP (Heat) + Fail Coil (Cool) + MVHR (Vent)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.97	3	0	1.64	0.88
Standard value	0.91*	2.55	N/A	1.1^	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.

"No HWS in project, or hot water is provided by HVAC system"

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
Entrenace Lobby - Private - C2.00.01	0.3	-	-	-	0.3	-	-	0.3	-	-	N/A
Retail CB2 - C2.00.12	0.3	-	-	-	0.3	-	-	0.3	-	-	N/A
Retail C2A - C2.00.11	0.3	-	-	-	0.3	-	-	0.3	-	-	N/A
Lobby - C2.00.07	0.3	-	-	-	0.3	-	-	0.3	-	-	N/A
Entrance Lobby - Afforable - C2.00.08	0.3	-	-	-	0.3	-	-	0.3	-	-	N/A
Entrance Lobby - Afforable - C2.00.08	0.3	-	-	-	0.3	-	-	0.3	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
Unisex Accessible WC - C2.00.02	-	102	-	33
Post Room - C2.00.03	100	-	-	29
Entrenace Lobby - Private - C2.00.01	-	118	-	154
Retail CB2 - C2.00.12	-	100	15	1185
Staircase 2 - C2.00.06	-	100	-	33
Retail C2A - C2.00.11	-	100	15	2053

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Staircase 1 - C2.00.05	-	100	-	19
Escape Corridor - C2.00.04	-	100	-	69
Lobby - C2.00.07	-	118	-	12
Cycle Stair Entrance and Cycle Lift Lobby - C2.00.09	-	100	-	37
Cycle Stair - C2.00.10	-	100	-	30
Entrance Lobby - Afforable - C2.00.08	-	118	-	50
Entrance Lobby - Afforable - C2.00.08	-	118	-	28

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?
Entrenace Lobby - Private - C2.00.01	NO (-51.1%)	NO
Retail CB2 - C2.00.12	NO (-40.2%)	NO
Retail C2A - C2.00.11	NO (-31.7%)	NO
Lobby - C2.00.07	N/A	N/A
Entrance Lobby - Afforable - C2.00.08	N/A	N/A
Entrance Lobby - Afforable - C2.00.08	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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	623.7	623.7
External area [m²]	1060.6	1060.6
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	348.59	418.18
Average U-value [W/m²K]	0.33	0.39
Alpha value* [%]	12.04	10

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

Building Use

% Area	Building Type
100	**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
	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	9.56	17.84
Cooling	5.44	5.49
Auxiliary	14.75	13.36
Lighting	27.38	34.99
Hot water	1.12	1.08
Equipment*	17.84	17.84
TOTAL**	58.25	72.75

* 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]	108.26	130.27
Primary energy* [kWh/m²]	155.41	184.21
Total emissions [kg/m²]	26.4	31.3

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.15	PL00001A:Surf[6]
Floor	0.2	0.13	PL00000C:Surf[0]
Roof	0.15	0.13	PL00001A:Surf[0]
Windows, roof windows, and rooflights	1.5	1.4	PL00001A:Surf[1]
Personnel doors	1.5	2.2	PL00001A:Surf[7]
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

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

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] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	37	93.8	11.5	6.6	17.8	0.89	3.96	0.97	5
	Notional	66.9	90.5	21.5	6.6	16.1	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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Camden Plot C-3 - Be Lean Part L 2013 - P03

As designed

Date: Sun Jul 23 11:12:15 2023

Administrative information

Building Details

Address: St Pancras Way, LONDON, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.21

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.21

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	19.9
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	19.9
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	14.9
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.2	PL00000D:Surf[36]
Floor	0.25	0.13	0.13	PL00003F:Surf[202]
Roof	0.25	0.13	0.13	PL000071:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.32	1.32	PL00000D:Surf[0]
Personnel doors	2.2	-	-	No personnel doors in building
Vehicle access & similar large doors	1.5	1.3	1.3	PL000174:Surf[3]
High usage entrance doors	3.5	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* 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	>0.95

1- AHU 08A (WC East) (Be Lean)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	0.2	1.07	0.88
Standard value	0.91	N/A	N/A	1.5^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

^ 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- AHU04 (Office East) - FCU (Be Lean)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	3.1	0	1.64	0.75
Standard value	0.91*	2.55	N/A	1.6^	0.65
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.

3- AHU 08B (WC West) (Be Lean)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	0.2	1.24	0.87
Standard value	0.91	N/A	N/A	1.5^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

^ 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.

4- AHU05 (Office West) - FCU (Be Lean)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	3.1	0	1.64	0.75
Standard value	0.91*	2.55	N/A	1.6^	0.65
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.

5- Nat Vent (Be Lean)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	0.2	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
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.

6- AHU 11 (Basement general) (Be Lean)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	0.2	1.65	0.75
Standard value	0.91	N/A	N/A	1.5^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
^ 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.					

7- AHU 09 (Basement Toilets & Showers) (Be Lean)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	0.2	1.67	0.77
Standard value	0.91	N/A	N/A	1.5^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
^ 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.					

"No HWS in project, or hot water is provided by HVAC system"

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**
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 1ST FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C: First Floor Open Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	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
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: Open Plan Office		-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 10TH FLOOR: Open Plan Office		-	-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45					-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45					-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45					-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45					-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45					-	-	-	0.2	-	-	N/A
PLOT C Ground Floor: Retail 3A C3.00.23		-	-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E General Use			-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E General Use			-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E General Use			-	-	-	-	-	0.2	-	-	N/A
PLOT C Upper Ground Floor: Retail C3B		-	-	-	-	-	-	0.2	-	-	N/A
PLOT C Upper Ground Floor: Dock Office C3.00.11A				-	-	-	-	0.2	-	-	N/A
PLOT C Upper Ground Floor: Dock Office C3.00.11A				-	-	-	-	0.2	-	-	N/A
PLOT C 00: RETAIL C3	-	-	-	-	-	-	-	0.2	-	-	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	
PLOT C 2ND FLOOR: WC LOBBY C3.02.11	-	152	-	30
PLOT C 2ND FLOOR: CLEANERS C3.02.11D	102	-	-	7
PLOT C 2ND FLOOR: AWC C3.02.11B	-	102	-	39
PLOT C 2ND FLOOR: UNISEX WC C3.02.11B	-	102	-	89
PLOT C 2ND FLOOR: WEST STAIRS	-	100	-	51
PLOT C 2ND FLOOR: TOILET LOBBY C3.02.10	-	152	-	30
PLOT C 2ND FLOOR: AWC C3.02.10A	-	102	-	40
PLOT C 2ND FLOOR: UNISEX C3.02.10	-	102	-	89
PLOT C 2ND FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 2ND FLOOR: FIRE FIGHTING LOBBY C3.02.04		152	-	27
PLOT C 2ND FLOOR: LOBBY C3.02.06	-	152	-	18
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	122	-	-	2267
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	122	-	-	8475
PLOT C 1ST FLOOR: WC LOBBY C3.01.11	-	152	-	30
PLOT C 1ST FLOOR: CLEANERS C3.01.11D	152	-	-	5
PLOT C 1ST FLOOR: AWC C3.01.11B	-	102	-	39
PLOT C 1ST FLOOR: UNISEX WC C3.01.11B	-	102	-	89

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 1ST FLOOR: WEST STAIRS C3.01.05	-	100	-	51
PLOT C 1ST FLOOR: TOILET LOBBY C3.01.10	-	152	-	30
PLOT C 1ST FLOOR: AWC C3.01.10B	-	102	-	40
PLOT C 1ST FLOOR: UNISEX C3.01.10B	-	102	-	89
PLOT C 1ST FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 1ST FLOOR: LIFT LOBBY C3.01.01	-	152	-	79
PLOT C 1ST FLOOR: LOBBY C3.01.09	-	152	-	47
PLOT C 1ST FLOOR: FIRE FIGHTING LOBBY C3.01.04		152	-	27
PLOT C 1ST FLOOR: LOBBY C3.01.06	-	152	-	18
PLOT C 1ST FLOOR: OPEN PLAN OFFICE	122	-	-	2267
PLOT C: First Floor Open Plan Office	122	-	-	8271
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	152	-	30
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	152	-	10
PLOT C 3RD FLOOR: AWC C3.03.11B	-	102	-	39
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	102	-	89
PLOT C 3RD FLOOR: WEST STAIRS C3.03.05	-	100	-	51
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	152	-	30
PLOT C 3RD FLOOR: AWC C3.03.10B	-	102	-	40
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	102	-	89
PLOT C 3RD FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 3RD FLOOR: LIFT LOBBY C3.03.01	-	152	-	79
PLOT C 3RD FLOOR: FIRE FIGHTING LOBBY C3.03.04		152	-	27
PLOT C 3RD FLOOR: LOBBY C3.03.06	-	152	-	18
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	122	-	-	2267
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	122	-	-	8475
PLOT C 5TH FLOOR: WC LOBBY C3.05.11	-	152	-	30
PLOT C 5TH FLOOR: CLEANERS C3.05.11D	152	-	-	5
PLOT C 5TH FLOOR: AWC C3.05.11B	-	102	-	39
PLOT C 5TH FLOOR: UNISEX WC C3.05.11B	-	102	-	89
PLOT C 5TH FLOOR: WEST STAIRS C3.05.05	-	100	-	51
PLOT C 5TH FLOOR: TOILET LOBBY C3.05.10	-	152	-	30
PLOT C 5th FLOOR: AWC C3.05.10B	-	102	-	40
PLOT C 5TH FLOOR: UNISEX C3.05.10B	-	102	-	89
PLOT C 5TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 5TH FLOOR: LIFT LOBBY C3.05.01	-	152	-	79
PLOT C 5TH FLOOR: FIRE FIGHTING LOBBY C3.05.04		152	-	27
PLOT C 5TH FLOOR: LOBBY C3.05.06	-	152	-	18
PLOT C 2ND FLOOR: LOBBY C3.02.09	-	152	-	18
PLOT C 2ND FLOOR: FF LOBBY C3.02.02	-	152	-	34
PLOT C 2ND FLOOR: LIFT LOBBY C3.02.01	-	152	-	79
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	152	-	18
PLOT C 3RD FLOOR: FF LOBBY C3.03.09	-	152	-	34
PLOT C 5TH FLOOR: LOBBY C3.05.09	-	152	-	18

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 5TH FLOOR: FF LOBBY C3.05.09	-	152	-	34
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	122	-	-	2212
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	122	-	-	7937
PLOT C 4TH FLOOR: WC LOBBY C3.04.11	-	152	-	30
PLOT C 4TH FLOOR: CLEANERS C3.04.11D	152	-	-	5
PLOT C 4TH FLOOR: AWC C3.04.11B	-	102	-	39
PLOT C 4TH FLOOR: UNISEX WC C3.04.11B	-	102	-	89
PLOT C 4TH FLOOR: WEST STAIRS C3.04.05	-	100	-	51
PLOT C 4TH FLOOR: TOILET LOBBY C3.04.10	-	152	-	30
PLOT C 4TH FLOOR: AWC C3.04.10B	-	102	-	40
PLOT C 4TH FLOOR: UNISEX C3.04.10B	-	102	-	89
PLOT C 4TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 4TH FLOOR: LIFT LOBBY C3.04.01	-	152	-	79
PLOT C 4TH FLOOR: FIRE FIGHTING LOBBY C3.04-04		152	-	27
PLOT C 4TH FLOOR: LOBBY C3.04.06	-	152	-	18
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	122	-	-	2267
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	122	-	-	8475
PLOT C 4TH FLOOR: LOBBY C3.04.09	-	152	-	18
PLOT C 4TH FLOOR: FF LOBBY C3.04.09	-	152	-	34
PLOT C 6TH FLOOR: WC LOBBY C3.06.11	-	152	-	30
PLOT C 6TH FLOOR: CLEANERS C3.06.11D	152	-	-	5
PLOT C 6THFLOOR: AWC C3.06.11B	-	102	-	39
PLOT C 6TH FLOOR: UNISEX WC C3.06.11B	-	102	-	89
PLOT C 6TH FLOOR: WEST STAIRS C3.06.05	-	100	-	51
PLOT C 6TH FLOOR: TOILET LOBBY C3.06.10	-	152	-	30
PLOT C 6th FLOOR: AWC C3.06.10B	-	102	-	40
PLOT C 6TH FLOOR: UNISEX C3.06.10B	-	102	-	89
PLOT C 6TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 6TH FLOOR: LIFT LOBBY C3.06.01	-	152	-	79
PLOT C 6TH FLOOR: FIRE FIGHTING LOBBY C3.06-04		152	-	27
PLOT C 6TH FLOOR: LOBBY C3.06.06	-	152	-	18
PLOT C 6TH FLOOR: LOBBY C3.06.09	-	152	-	18
PLOT C 6TH FLOOR: FF LOBBY C3.06.09	-	152	-	34
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	122	-	-	2212
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	122	-	-	7937
PLOT C 7TH FLOOR: WC LOBBY C3.07.11	-	152	-	30
PLOT C 7TH FLOOR: CLEANERS C3.07.11D	152	-	-	5
PLOT C 7TH FLOOR: AWC C3.07.11B	-	102	-	39
PLOT C 7TH FLOOR: UNISEX WC C3.07.11B	-	102	-	89
PLOT C 7TH FLOOR: WEST STAIRS C3.07.05	-	100	-	51
PLOT C 7TH FLOOR: TOILET LOBBY C3.07.10	-	152	-	30
PLOT C 7th FLOOR: AWC C3.07.10B	-	102	-	40
PLOT C 5TH FLOOR: UNISEX C3.05.10B	-	102	-	89

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 7TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 7TH FLOOR: LIFT LOBBY C3.07.01	-	152	-	79
PLOT C 7TH FLOOR: FIRE FIGHTING LOBBY C3.07-04		152	-	27
PLOT C 7TH FLOOR: LOBBY C3.07.06	-	152	-	18
PLOT C 7TH FLOOR: LOBBY C3.07.09	-	152	-	18
PLOT C 7TH FLOOR: FF LOBBY C3.07.09	-	152	-	34
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	122	-	-	2212
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	122	-	-	7937
PLOT C 8TH FLOOR: WEST STAIRS C3.08.05	-	100	-	51
PLOT C 8TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	99
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	88
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	105
PLOT C 8TH FLOOR: LIFT LOBBY C3.08.01	-	152	-	30
PLOT C 8TH FLOOR: FF LOBBY C3.08.04	-	152	-	47
PLOT C 8TH FLOOR: NORTH STAIRS	-	100	-	53
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	8
PLOT C 8TH FLOOR: NORTH STAIRS	-	100	-	23
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	52
PLOT C 8TH FLOOR: LIFT LOBBY C3.08.01	-	152	-	77
PLOT C 8TH FLOOR: UNISEX C3.08.10D	-	102	-	43
PLOT C 8TH FLOOR: CLEANERS C3.08.08C	152	-	-	7
PLOT C 8TH FLOOR: UNISEX C3.08.10D	-	102	-	41
PLOT C 8TH FLOOR: UNISEX C3.08.10D	-	102	-	41
PLOT C 8TH FLOOR: UNISEX C3.08.10D	-	102	-	41
PLOT C 8TH FLOOR: ESCAPE CORRIDOR C3.08.10		152	-	25
PLOT C 8TH FLOOR: LOBBY C3.08.07	-	152	-	17
PLOT C 8TH FLOOR: FF LOBBY C3.08.02	-	152	-	27
PLOT C 8TH FLOOR: AWC C3.08.08A	-	102	-	37
PLOT C 8TH FLOOR: WC LOBBY C3.08.08	-	152	-	35
PLOT C 9TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	8
PLOT C 9TH FLOOR: UNISEX C3.09.08C	-	102	-	43
PLOT C 8TH FLOOR: Cleaners C3.09.08B	152	-	-	7
PLOT C 9TH FLOOR: UNISEX C3.09.08C	-	102	-	41
PLOT C 9TH FLOOR: UNISEX C3.09.08C	-	102	-	41
PLOT C 9TH FLOOR: UNISEX C3.09.08C	-	102	-	41
PLOT C 9TH FLOOR: Escape corridor C3.09.09	-	152	-	25
PLOT C 9TH FLOOR: LOBBY C3.09.05	-	152	-	17
PLOT C 9TH FLOOR: FF LOBBY C3.09.02	-	152	-	27
PLOT C 8TH FLOOR: AWC C3.09.08D	-	102	-	37
PLOT C 9TH FLOOR: WC Lobby C3.09.08	-	152	-	35
PLOT C 9TH FLOOR North Stair	-	100	-	53

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 9TH FLOOR North Stair	-	100	-	25
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	58
PLOT C 9TH FLOOR: Lift Lobby C3.09.01	-	152	-	101
PLOT C 8TH FLOOR: Open Plan Office	122	-	-	5015
PLOT C 10TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	8
PLOT C10tH FLOOR: UNISEX C3.10.08C	-	102	-	43
PLOT C 10TH FLOOR: Cleaners C3.10.08B	152	-	-	7
PLOT C 10TH FLOOR: UNISEX C3.10.08C	-	102	-	41
PLOT C 10TH FLOOR: UNISEX C3.10.08C	-	102	-	41
PLOT C 10TH FLOOR: UNISEX C3.10.08C	-	102	-	41
PLOT C 10TH FLOOR: Escape corridor C3.10.09	-	152	-	23
PLOT C 10TH FLOOR: LOBBY C3.10.05	-	152	-	17
PLOT C 10TH FLOOR: FF LOBBY C3.10.02	-	152	-	27
PLOT C 10TH FLOOR: AWC C3.10.08D	-	102	-	37
PLOT C 10TH FLOOR: WC Lobby C3.10.08	-	152	-	33
PLOT C 10TH FLOOR North Stair	-	100	-	53
PLOT C 10TH FLOOR North Stair	-	100	-	25
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	58
PLOT C 10tH FLOOR: Lift Lobby C3.10.01	-	152	-	101
PLOT C 10TH FLOOR: Open Plan Office	122	-	-	5015
PLOT C BASEMENT -01: Changing Room DHW Storage B1.00.51	152	-	-	326
PLOT C BASEMENT -01: Fire Control Centre B1.00.54	122	-	-	165
PLOT C BASEMENT -01: HV Switch Room B1.00.41C	152	-	-	125
PLOT C BASEMENT -01: Tank Room B1.00.35	152	-	-	132
PLOT C BASEMENT -01: WC Circ B1.00.48	-	152	-	53
PLOT C BASEMENT -01: Cleaners Cpbd B1.00.48G	152	-	-	3
PLOT C BASEMENT -01: WC B1.00.48	-	102	-	94
PLOT C BASEMENT -01: WC B1.00.48	-	102	-	113
PLOT C BASEMENT -01: AWC B1.00.48A	-	102	-	39
PLOT C BASEMENT -01: Lift Lobby B1.00.40	-	152	-	136
PLOT C BASEMENT -01: Fire Fighting Lobby B1.00.39		152	-	43
PLOT C BASEMENT -01: East Stairs B1.00.38	-	100	-	112
PLOT C BASEMENT -01: IN Bulding Tech B1.00.29D	122	-	-	189
PLOT C BASEMENT -01: Unisex Staff Circ B1.00.41	-	152	-	41
PLOT C BASEMENT -01: Male Showers Lobby B1.00.53A		152	-	22
PLOT C BASEMENT -01: Male Changing circ B1.00.53B		152	-	184
PLOT C BASEMENT -01: Male WC B1.00.53E	-	102	-	27
PLOT C BASEMENT -01: Male AWC B1.0053.F	-	102	-	40
PLOT C BASEMENT -01: Male WC B1.00.53G	-	102	-	55
PLOT C BASEMENT -01: Male Showers Circulation B1.00.53D		152	-	89
PLOT C BASEMENT -01: Male Showers B1.00.53D	-	101	-	58
PLOT C BASEMENT -01: Male Shower Area B1.00.53D		101	-	54

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C BASEMENT -01: Unisex Shower B1.00.54	-	101	-	8
PLOT C BASEMENT -01:Unisex AWC B1.00.54	-	102	-	86
PLOT C BASEMENT -01: Male Shower Area B1.00.53D		101	-	37
PLOT C BASEMENT -01: Male Showers B1.00.53D	-	101	-	47
PLOT C BASEMENT -01: Female Showers Lobby B1.00.52A		152	-	23
PLOT C BASEMENT -01: Female Changing Room B1.00.52B		152	-	173
PLOT C BASEMENT -01: Female Showers Circualtion B1.00.52		152	-	92
PLOT C BASEMENT -01: Female Shower Area B1.00.52D		101	-	51
PLOT C BASEMENT -01: Female Showers B1.00.52D	-	101	-	55
PLOT C BASEMENT -01: Female WC B1.00.52E	-	102	-	27
PLOT C BASEMENT -01: Female AWC B1.00.52F	-	102	-	37
PLOT C BASEMENT -01: Female Showers B1.00.52C	-	101	-	45
PLOT C BASEMENT -01: Female Shower Area B1.00.52D		101	-	42
PLOT C BASEMENT -01: Female WC B1.00.52F	-	102	-	29
PLOT C BASEMENT -01: Female WC B1.00.52G	-	102	-	27
PLOT C BASEMENT -01: Circulation B1.00.47	-	152	-	401
PLOT C BASEMENT -01: Unisex Staff Change Shower B1.00.41		101	-	8
PLOT C BASEMENT -01: Unisex Staff Change Shower Area B1.00.41		101	-	7
PLOT C BASEMENT -01: Unisex Staff WC B1.00.41	-	102	-	85
PLOT C BASEMENT -01: Unisex Staff Change Shower B1.00.41		101	-	8
PLOT C BASEMENT -01: Unisex Staff Change Shower Area B1.00.41		101	-	7
PLOT C BASEMENT -01: West Stair B1.00.43	-	100	-	93
PLOT C BASEMENT -01: Fire Fighting Lobby B1.00.42		152	-	69
PLOT C BASEMENT -02: LV Switchroom B2.00.03	152	-	-	224
PLOT C BASEMENT -02: Heat Pumps & Energy Storage B2.00.06	-	-	-	970
PLOT C BASEMENT -02: Water Tank & Booster B2.00.09		-	-	262
PLOT C BASEMENT -02: West Stair B2.00.01	-	152	-	36
PLOT C BASEMENT -02: Firefighting Lobby B2.00.02	-	152	-	21
PLOT C BASEMENT -02: LTHW & CHW Plantroom CM B2.00.10	-	-	-	341
PLOT C BASEMENT -02: Fire Escape Corridor B2.00.05		152	-	56
PLOT C BASEMENT -02: Escape Corridor B2.00.07	-	152	-	45
PLOT C BASEMENT -02: District Hea Network B2.00.06	2	-	-	66
PLOT C BASEMENT -01: Circulation B1.00.41A	-	152	-	27
PLOT C BASEMENT -01: Circulation B1.00.41A	-	152	-	123
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45		-	-	466
PLOT C BASEMENT -01: Escape Corridor B1.00.44	-	152	-	86
PLOT C BASEMENT -01: Escape Corridor B1.00.44	-	152	-	59
PLOT C BASEMENT -01: Escape Corridor B1.00.44	-	152	-	39
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45		-	-	606
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45		-	-	399
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45		-	-	3428
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45		-	-	354
PLOT C Lower Ground Floor	-	152	-	1

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 00: UKPN SUbstation C3.00.21	152	-	-	106
PLOTC 00: UKPN HV Intake room C3.00.20	152	-	-	97
PLOT C 00: Lobby C3.00.20A	-	152	-	22
PLOT C Ground Floor: West Stair C3.00.05	-	100	-	61
PLOT C Ground Floor: Fire Fighting Lobby C3.00.04	-	152	-	54
PLOT C Ground Floor: Escape Corridor C3.00.08	-	152	-	109
PLOT C Ground Floor: Retail BOH C3.00.25	152	-	-	39
PLOT C Ground Floor: Unisex WC C3.00.28	-	102	-	73
PLOT C Ground Floor: AWC C3.00.29	-	102	-	42
PLOT C Ground Floor: Retail 3A C3.00.23	-	100	15	2475
PLOT C Ground Floor: Retail BOH C3.00.24	152	-	-	15
PLOT C Ground Floor: Lobby C3.00.32	-	152	-	28
PLOT C Ground Floor: Firefighting Lobby C3.00.02	-	152	-	71
PLOT C Ground Floor: east Stair C3.00.03	-	100	-	61
PLOT C Ground Floor: Back of House C3.00.14	152	-	-	39
PLOT C Ground Floor Lift Lobby C3.00.01	-	152	-	104
PLOT C Ground Floor: Reception Lobby C3.00.30	-	152	15	605
PLOT C Ground Floor: Loading Bay C3.00.09	-	100	-	585
PLOT C BASEMENT -01: Class E General Use	122	-	-	101
PLOT C BASEMENT -01: Class E General Use	122	-	-	607
PLOT C BASEMENT -01: Class E General Use	122	-	-	2066
PLOT C BASEMENT -01: Security Office B1.0036	122	-	-	162
PLOT C BASEMENT -01: Security Office B1.0036	122	-	-	349
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	14
PLOT C BASEMENT -01: Client management Suite B1.00.54K	-	-	-	11
PLOT C BASEMENT -01: Client management Suite B1.00.54K	-	-	-	479
PLOT C BASEMENT -01: Tank Room B1.00.34	152	-	-	83
PLOT C BASEMENT -01: Tank Room B1.00.34	152	-	-	63
PLOT C BASEMENT -01: Circulatiom B1.00.41	-	152	-	24
PLOT C BASEMENT -01: Circulatiom B1.00.41	-	152	-	91
PLOT C BASEMENT -01: Refuse Store B1.00.33	152	-	-	9
PLOT C BASEMENT -01: Refuse Store B1.00.33	152	-	-	66
PLOT C BASEMENT -01: AWC B1.00.29E	-	102	-	25
PLOT C BASEMENT -01: AWC B1.00.29E	-	102	-	14
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	33
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	184
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	41
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	101
PLOT C Upper Ground Floor: Post RoomC3.00.11B	122	-	-	16
PLOT C Upper Ground Floor: Retail C3B	-	122	15	1136
PLOT C Ground Floor: Accessible Parking C3.00.10	-	100	-	121
PLOT C Upper Ground Floor: Escape Corridor C3.00.12		152	-	82
PLOT C Upper Ground Floor: LN2 Store C3.00.27	152	-	-	19

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C Upper Ground Floor: Lobby C3.00.26	-	152	-	30
PLOT C Upper Ground Floor: Dock Office C3.00.11A	122	-	-	46
PLOT C Upper Ground Floor: Dock Office C3.00.11A	122	-	-	85
PLOT C BASEMENT -01: Goods In Store B1.00.30	152	-	-	25
PLOT C 00: RETAIL C3	-	122	15	5471
PLOT C BASEMENT -01: Platform Stair B1.00.49	-	100	-	93
PLOT C BASEMENT -01: Retail BOH B1.00.50	152	-	-	88
PLOT C BASEMENT -01: Retail BOH B1.00.50	152	-	-	76
PLOT C BASEMENT -01: Lobby B1.00.50A	-	152	-	22
PLOT C BASEMENT -01: Lobby B1.00.50B	-	152	-	24

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?
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	NO (-23.8%)	NO
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	NO (-32.1%)	NO
PLOT C 1ST FLOOR: OPEN PLAN OFFICE	NO (-19.1%)	NO
PLOT C: First Floor Open Plan Office	NO (-32.5%)	NO
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	NO (-23.8%)	NO
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	NO (-32.1%)	NO
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	NO (-1.9%)	NO
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	NO (-9.2%)	NO
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	NO (-23.8%)	NO
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	NO (-32.1%)	NO
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	NO (-1.9%)	NO
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	NO (-9.2%)	NO
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	NO (-1.9%)	NO
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	NO (-9.5%)	NO
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: Open Plan Office	NO (-38.4%)	NO
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 10TH FLOOR: Open Plan Office	NO (-45.7%)	NO
PLOT C BASEMENT -01: Class E/SUI General Use B1.A	N/A 0.45	N/A
PLOT C BASEMENT -01: Class E/SUI General Use B1.A	N/A 0.45	N/A
PLOT C BASEMENT -01: Class E/SUI General Use B1.A	N/A 0.45	N/A
PLOT C BASEMENT -01: Class E/SUI General Use B1.A	N/A 0.45	N/A
PLOT C BASEMENT -01: Class E/SUI General Use B1.A	N/A 0.45	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
PLOT C Ground Floor: Retail 3A C3.00.23	NO (-33.7%)	NO
PLOT C Ground Floor: Reception Lobby C3.00.30	NO (-12.7%)	NO
PLOT C BASEMENT -01: Class E General Use	N/A	N/A
PLOT C BASEMENT -01: Class E General Use	N/A	N/A
PLOT C BASEMENT -01: Class E General Use	N/A	N/A
PLOT C BASEMENT -01: Security Office B1.0036	N/A	N/A
PLOT C BASEMENT -01: Security Office B1.0036	N/A	N/A
PLOT C BASEMENT -01: Client management Suite B1.0	0.54K	N/A
PLOT C BASEMENT -01: Client management Suite B1.0	0.54K	N/A
PLOT C Upper Ground Floor: Retail C3B	NO (-20.2%)	NO
PLOT C Upper Ground Floor: Dock Office C3.00.11A	N/A	N/A
PLOT C Upper Ground Floor: Dock Office C3.00.11A	N/A	N/A
PLOT C 00: RETAIL C3	YES (+17.9%)	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?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	26564.6	26564.6
External area [m²]	18362.7	18362.7
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	8678.46	8370.11
Average U-value [W/m²K]	0.47	0.46
Alpha value* [%]	10.08	10

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

Building Use

% Area	Building Type
7	**A1/A2 Retail/Financial and Professional services**
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
93	**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	4.41	1.92
Cooling	6.2	7.99
Auxiliary	10.23	9.22
Lighting	7.92	18.83
Hot water	4.64	4.7
Equipment*	42.07	42.07
TOTAL**	33.4	42.66

* 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]	83.12	114.89
Primary energy* [kWh/m²]	87.57	115.69
Total emissions [kg/m²]	14.9	19.9

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

APPENDIX 2 – BRUKL OUTPUT DOCUMENT (BE GREEN)

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Camden Plot C1 - Be Green P09 — As designed

Date: Wed Jul 19 14:47:56 2023

Administrative information

Building Details

Address: St Pancras Way, LONDON, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.21

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.21

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	16.2
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	16.2
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	12.9
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.2	PL0000CF:Surf[7]
Floor	0.25	0.13	0.13	PL000129:Surf[0]
Roof	0.25	0.13	0.13	PL000194:Surf[2]
Windows***, roof windows, and rooflights	2.2	1.26	1.29	PL0000CF:Surf[0]
Personnel doors	2.2	-	-	No personnel doors in building
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

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* 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

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Building services

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

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

1- AHU01 (Office) - FCU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.72	3.16	0	1.64	0.75
Standard value	2.5*	3.2	N/A	1.6^	0.65
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.

^ 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- AHU 09 (Basement Toilets & Showers)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.72	-	0.2	1.67	0.77
Standard value	2.5*	N/A	N/A	1.5^	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.

^ 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.

3- AHU 3 (WC)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.72	-	0.2	1.57	0.9
Standard value	2.5*	N/A	N/A	1.5^	0.65
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.

^ 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.

"No HWS in project, or hot water is provided by HVAC system"

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**
PLOT C1 GROUND FLOOR: Reception Lobby C1.00.04	-	-	-	-	-	-	-	0.2	-	-	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
PLOT C1 GROUND FLOOR: Retail C1A	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 GROUND FLOOR: Retail C1C C1.00.12	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 GROUND FLOOR: Retail C1B C1.00.11	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 GROUND FLOOR: Reception	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 FIRST FLOOR: Open Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 2ND FLOOR: Open Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 5TH FLOOR: 5th Floor Open-Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 6TH FLOOR: 6th Floor Open-Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 3RD FLOOR: Open Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C1 4TH FLOOR: 4th Floor Open-Plan Office	-	-	-	-	-	-	-	0.2	-	-	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	
PLOT C1 GROUND FLOOR: Reception Lobby C1.00.04	-	102	-	133
PLOT C1 GROUND FLOOR: Retail C1A	-	100	15	2554
PLOT C1- BASEMENT: Circulation B1.00.13	-	152	-	13
PLOT C1- BASEMENT: Bike Store B1.00.59	154	-	-	13
PLOT C1- BASEMENT: TX Room B1.00.09	154	-	-	132
PLOT C1- BASEMENT: Escape Corridor B1.00.03	-	110	-	126
PLOT C1- BASEMENT: Store B1.00.15	154	-	-	13
PLOT C1- BASEMENT: Lift Lobby B1.00.14	-	110	-	112
PLOT C1- BASEMENT: Goods Lift Lobby B1.00.50C	-	110	-	51
PLOT C1- BASEMENT: Gym	-	100	-	436
PLOT C1- BASEMENT: Circulation B1.00.47	-	152	-	24
PLOT C1- BASEMENT: North Staircase B1.00.11	-	110	-	76
PLOT C1- BASEMENT	-	152	-	56
PLOT C1- BASEMENT: North Staircase B1.00.11	-	110	-	119
PLOT C1- BASEMENT: Comms Intake B1.00.28	154	-	-	102
PLOT C1- BASEMENT: C1 LTHW & CHW Plant room B1.00.22	154	-	-	170
PLOT C1- BASEMENT: CW Water Tanks B1.00.23	154	-	-	171
PLOT C1- BASEMENT: Commercial Sprinkler Room B1.00.16	154	-	-	182
PLOT C1- BASEMENT: Resi Sprinkler Pump Room B1.00.24	154	-	-	114
PLOT C1- BASEMENT: Circualtion B1.00.50J	-	152	-	72
PLOT C1- BASEMENT: Generator Fuel Tank Room B1.00.27	154	-	-	165
PLOT C1- BASEMENT: LV Switchroom B1.00.29C	154	-	-	165
PLOT C1- BASEMENT: Ventialtion Plantroom B1.00.29	154	-	-	287
PLOT C1- BASEMENT: Lift Lobby B1.00.50E	-	118	-	117
PLOT C1- BASEMENT: Store B1.00.50G	154	-	-	34
PLOT C1- BASEMENT: Lift Lobby B1.00.50E	-	118	-	98
PLOT C1- BASEMENT: Gym	-	100	-	266
PLOT C1- BASEMENT: Retail BOH B1.00.04	100	-	-	72
PLOT C1- BASEMENT: Escape Corridor B1.00.03	-	152	-	187

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C1- BASEMENT: Gym	-	100	-	1229
PLOT C1- BASEMENT: Circulation B1.00.47	-	152	-	53
PLOT C1- BASEMENT: Bike Store B1.00.59	154	-	-	184
PLOT C1- BASEMENT: Circulation B1.00.47	-	152	-	26
PLOT C1- BASEMENT: Circulation B1.00.13	-	152	-	75
PLOT C1- BASEMENT: Bike Store B1.00.59	154	-	-	42
PLOT C1 GROUND FLOOR: Lift Lobby C1.00.01	-	118	-	76
PLOT C1 GROUND FLOOR: Escape Corridor C1.00.05		152	-	69
PLOT C1 GROUND FLOOR: Goods Lift Lobby C1.00.13		118	-	31
PLOT C1 GROUND FLOOR: Staircase C1.00.04	-	100	-	63
PLOT C1 GROUND FLOOR: AWC C1.00.06	-	102	-	37
PLOT C1 GROUND FLOOR: Gym Entrance C1.00.01B		152	-	91
PLOT C1 GROUND FLOOR: Retail C1C C1.00.12	-	100	15	519
PLOT C1 GROUND FLOOR: Retail C1B C1.00.11	-	100	15	1343
PLOT C1- BASEMENT: Refuse Store B1.00.50F	154	-	-	31
PLOT C1- BASEMENT: Circulation B1.00.31	-	152	-	137
PLOT C1- BASEMENT: Commercial Sprinkler Tank B1.00.02		-	-	113
PLOT C1- BASEMENT: Commercial Sprinkler Tank B1.00.01		-	-	99
PLOT C1- BASEMENT: TX Room B1.00.09	154	-	-	85
PLOT C1- BASEMENT: Refuse Store B1.00.02	154	-	-	37
PLOT C1- BASEMENT: Retail BOH B1.00.04	100	-	-	53
PLOT C1- BASEMENT: Circulation B1.00.47	-	152	-	117
PLOT C1 GROUND FLOOR: Cycle Stair C1.00.09	-	100	-	105
PLOT C1 GROUND FLOOR: Escape Corridor C1.00.07		152	-	75
PLOT C1 GROUND FLOOR: Reception	-	122	15	9
PLOT C1 GROUND FLOOR: South Staircase C1.00.02		100	-	51
PLOT C1 FIRST FLOOR: Open Plan Office	122	-	-	3379
PLOT C1 FIRST FLOOR: Escape Corridor C1.01.06	-	152	-	29
PLOT C1 FIRST FLOOR: Toilet Lobby C1.01.08	-	118	-	38
PLOT C1 FIRST FLOOR: WC C1.01.08C	-	102	-	76
PLOT C1 FIRST FLOOR: AWC C1.01.08C	-	102	-	38
PLOT C1 FIRST FLOOR: North Staircase C1.01.03	-	152	-	39
PLOT C1 FIRST FLOOR: Lobby C1.01.05	-	118	-	18
PLOT C1 FIRST FLOOR: Goods Lift Lobby C1.01.07	-	118	-	26
PLOT C1 FIRST FLOOR: Lift Lobby C1.01.01	-	118	-	66
PLOT C1 FIRST FLOOR: Fire Fighting Lobby C1.01.04		118	-	29
PLOT C1 FIRST FLOOR: South Staircase C1.01.02	-	152	-	34
PLOT C1 FIRST FLOOR: WC C1.01.08	-	102	-	42
PLOT C1 FIRST FLOOR: Cleaners C1.01.08B	154	-	-	5
PLOT C1 2ND FLOOR: Open Plan Office	122	-	-	3379
PLOT C1 2ND FLOOR: Escape Corridor C1.02.06	-	152	-	29
PLOT C1 2ND FLOOR: Toilet Lobby C1.02.08	-	118	-	38
PLOT C1 2ND FLOOR: WC C1.02.08C	-	102	-	76

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C1 3RD FLOOR: AWC C1.03.08C	-	102	-	38
PLOT C1 3RD FLOOR: WC C1.03.08C	-	102	-	76
PLOT C1 3RD FLOOR: Toilet Lobby C1.03.08	-	118	-	38
PLOT C1 3RD FLOOR: Escape Corridor C1.03.06	-	100	-	44
PLOT C1 3RD FLOOR: Open Plan Office	122	-	-	3379
PLOT C1 4TH FLOOR: Cleaners C1.04.08B	154	-	-	5
PLOT C1 3RD FLOOR: WC C1.03.08	-	102	-	42
PLOT C1 4TH FLOOR: South Staircase C1.04.02	-	110	-	46
PLOT C1 4TH FLOOR: Fire Fighting Lobby C1.04.04	-	100	-	34
PLOT C1 4TH FLOOR: Lift Lobby C1.04.01	-	118	-	66
PLOT C1 4TH FLOOR: Goods Lift Lobby C1.04.07	-	100	-	31
PLOT C1 4TH FLOOR: Lobby C1.04.05	-	118	-	18
PLOT C1 4TH FLOOR: North Staircase C1.04.03	-	100	-	59
PLOT C1 4TH FLOOR: AWC C1.04.08C	-	102	-	38
PLOT C1 3RD FLOOR: WC C1.03.08C	-	102	-	76
PLOT C1 4TH FLOOR: Toilet Lobby C1.04.08	-	118	-	38
PLOT C1 4TH FLOOR: Escape Corridor C1.04.06	-	100	-	44
PLOT C1 4TH FLOOR: 4th Floor Open Plan Office	122	-	-	3379

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?
PLOT C1 GROUND FLOOR: Reception Lobby C1.00.04	NO (-38%)	NO
PLOT C1 GROUND FLOOR: Retail C1A	NO (-37.3%)	NO
PLOT C1- BASEMENT: Gym	N/A	N/A
PLOT C1- BASEMENT: Gym	N/A	N/A
PLOT C1- BASEMENT: Gym	N/A	N/A
PLOT C1 GROUND FLOOR: Retail C1C C1.00.12	NO (-49.2%)	NO
PLOT C1 GROUND FLOOR: Retail C1B C1.00.11	NO (-51.2%)	NO
PLOT C1 GROUND FLOOR: Reception	N/A	N/A
PLOT C1 FIRST FLOOR: Open Plan Office	NO (-26.6%)	NO
PLOT C1 2ND FLOOR: Open Plan Office	NO (-26.6%)	NO
PLOT C1 5TH FLOOR: 5th Floor Open Plan Office	YES (+27.7%)	NO
PLOT C1 6TH FLOOR: 6th Floor Open Plan Office	YES (+28.1%)	NO
PLOT C1 3RD FLOOR: Open Plan Office	NO (-26.6%)	NO
PLOT C1 4TH FLOOR: 4th Floor Open Plan Office	NO (-26.6%)	NO

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

Separate submission

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C1 2ND FLOOR: AWC C1.02.08C	-	102	-	38
PLOT C1 2ND FLOOR: North Staircase C1.02.03	-	100	-	59
PLOT C1 2ND FLOOR: Lobby C1.02.05	-	118	-	18
PLOT C1 2ND FLOOR: Goods Lift Lobby C1.02.07	-	118	-	26
PLOT C1 2ND FLOOR: Lift Lobby C1.02.01	-	118	-	66
PLOT C1 2ND FLOOR: Fire Fighting Lobby C1.02.04	-	118	-	29
PLOT C1 2ND FLOOR: South Staircase C1.02.02	-	152	-	34
PLOT C1 2ND FLOOR: WC C1.02.08	-	102	-	42
PLOT C1 2ND FLOOR: Cleaners C1.02.08B	154	-	-	5
PLOT C1 5TH FLOOR: Escape Corridor C1.05.06	-	152	-	29
PLOT C1 5TH FLOOR: Toilet Lobby C1.05.08	-	118	-	38
PLOT C1 5TH FLOOR: WC C1.05.08C	-	102	-	76
PLOT C1 5TH FLOOR: AWC C1.05.08C	-	102	-	38
PLOT C1 5TH FLOOR: North Staircase C1.05.03	-	100	-	59
PLOT C1 5TH FLOOR: Lobby C1.05.05	-	118	-	18
PLOT C1 5TH FLOOR: Goods Lift Lobby C1.05.07	-	100	-	31
PLOT C1 5TH FLOOR: Lift Lobby C1.05.01	-	118	-	66
PLOT C1 5TH FLOOR: Fire Fighting Lobby C1.05.04	-	118	-	29
PLOT C1 5TH FLOOR: South Staircase C1.05.02	-	100	-	51
PLOT C1 5TH FLOOR: WC C1.05.08	-	102	-	42
PLOT C1 5TH FLOOR: Cleaners C1.05.08B	154	-	-	5
PLOT C1 5TH FLOOR: 5th Floor Open Plan Office	122	-	-	2272
PLOT C1 6TH FLOOR: Escape Corridor C1.06.06	-	152	-	34
PLOT C1 6TH FLOOR: Toilet Lobby C1.06.08	-	118	-	45
PLOT C1 6TH FLOOR: WC C1.06.08C	-	102	-	88
PLOT C1 6TH FLOOR: AWC C1.06.08C	-	102	-	40
PLOT C1 6TH FLOOR: North Staircase C1.06.03	-	100	-	65
PLOT C1 6TH FLOOR: Lobby C1.06.05	-	118	-	22
PLOT C1 6TH FLOOR: Goods Lift Lobby C1.06.07	-	118	-	31
PLOT C1 6TH FLOOR: Lift Lobby C1.06.01	-	118	-	74
PLOT C1 6TH FLOOR: Fire Fighting Lobby C1.06.04	-	100	-	40
PLOT C1 6TH FLOOR: South Staircase C1.06.02	-	100	-	58
PLOT C1 6TH FLOOR: WC C1.06.08	-	102	-	52
PLOT C1 6TH FLOOR: Cleaners C1.06.08B	154	-	-	5
PLOT C1 6TH FLOOR: 6th Floor Open Plan Office	122	-	-	2331
PLOT C1 3RD FLOOR: Cleaners C1.03.08B	154	-	-	5
PLOT C1 3RD FLOOR: WC C1.03.08	-	102	-	42
PLOT C1 3RD FLOOR: South Staircase C1.03.02	-	100	-	51
PLOT C1 3RD FLOOR: Fire Fighting Lobby C1.03.04	-	118	-	29
PLOT C1 3RD FLOOR: Lift Lobby C1.03.01	-	118	-	66
PLOT C1 3RD FLOOR: Goods Lift Lobby C1.03.07	-	118	-	26
PLOT C1 3RD FLOOR: Lobby C1.03.05	-	118	-	18
PLOT C1 3RD FLOOR: North Staircase C1.03.03	-	100	-	59

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?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	8224.4	8224.4
External area [m²]	8511.9	8511.9
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	3134.31	3239.08
Average U-value [W/m²K]	0.37	0.38
Alpha value* [%]	10.15	10

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

Building Use

% Area	Building Type
7	**A1/A2 Retail/Financial and Professional services**
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
93	**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	1.85	1.21
Cooling	3.74	4.8
Auxiliary	10.63	9.01
Lighting	7.78	15.97
Hot water	1.46	1.52
Equipment*	41.28	41.28
TOTAL**	**25.46**	**32.52**

* 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]	77.61	76.68
Primary energy* [kWh/m²]	76.2	94.46
Total emissions [kg/m²]	12.9	16.2

* 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] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	43.3	105.9	3.5	7.3	14.4	3.46	4.05	3.72	5.07
	Notional	18.9	127.4	2.1	9.3	13.3	2.56	3.79	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	17.6	0	1.2	0	12.3	4.02	0	3.72	0
	Notional	7.6	0	0.8	0	6.3	2.56	0	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	8.8	0	0.6	0	33.8	4.07	0	3.72	0
	Notional	14.8	0	1.6	0	22.6	2.56	0	----	----
[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	$U_{l\text{-}Typ}$	$U_{l\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.2	PL0000CF:Surf[7]
Floor	0.2	0.13	PL000129:Surf[0]
Roof	0.15	0.13	PL000194:Surf[2]
Windows, roof windows, and rooflights	1.5	0.15	PL0000CF:Surf[2]
Personnel doors	1.5	-	No personnel doors in building
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

$U_{l\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{l\text{-}Min}$ = 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

Camden Plot C2 - Retail - Be Green Part L - 2013 - P18

As built

Date: Wed Sep 13 16:08:42 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.22

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.22

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	29.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	29.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	18.3
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.15	PL00001A:Surf[6]
Floor	0.25	0.13	0.13	PL00000C:Surf[0]
Roof	0.25	0.13	0.13	PL00001A:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.4	1.4	PL00001A:Surf[1]
Personnel doors	2.2	2.2	2.2	PL00001A:Surf[7]
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

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* 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	>0.95

1- C2718 - Be Green - ASHP (Heat) + Fail Coil (Cool) + MVHR (Vent)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.83	3.19	0	1.64	0.88
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ 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.

"No HWS in project, or hot water is provided by HVAC system"

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
Entrenace Lobby - Private - C2.00.01	-	-	-	-	-	-	-	0.3	-	-	N/A
Retail CB2 - C2.00.12	-	-	-	-	-	-	-	0.3	-	-	N/A
Retail C2A - C2.00.11	-	-	-	-	-	-	-	0.3	-	-	N/A
Lobby - C2.00.07	-	-	-	-	-	-	-	0.3	-	-	N/A
Entrance Lobby - Afforable - C2.00.08	-	-	-	-	-	-	-	0.3	-	-	N/A
Entrance Lobby - Afforable - C2.00.08	-	-	-	-	-	-	-	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	
Unisex Accessible WC - C2.00.02	-	102	-	33
Post Room - C2.00.03	-	100	-	15
Entrenace Lobby - Private - C2.00.01	-	118	-	154
Retail CB2 - C2.00.12	-	100	15	1185
Staircase 2 - C2.00.06	-	100	-	33
Retail C2A - C2.00.11	-	100	15	2053

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Staircase 1 - C2.00.05	-	100	-	19
Escape Corridor - C2.00.04	-	100	-	69
Lobby - C2.00.07	-	118	-	12
Cycle Stair Entrance and Cycle Lift Lobby - C2.00.09	-	100	-	37
Cycle Stair - C2.00.10	-	100	-	30
Entrance Lobby - Afforable - C2.00.08	-	118	-	50
Entrance Lobby - Afforable - C2.00.08	-	118	-	28

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?
Entrenace Lobby - Private - C2.00.01	NO (-51.1%)	NO
Retail CB2 - C2.00.12	NO (-40.2%)	NO
Retail C2A - C2.00.11	NO (-31.7%)	NO
Lobby - C2.00.07	N/A	N/A
Entrance Lobby - Afforable - C2.00.08	N/A	N/A
Entrance Lobby - Afforable - C2.00.08	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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	623.7	623.7
External area [m²]	1060.6	1060.6
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	348.59	418.18
Average U-value [W/m²K]	0.33	0.39
Alpha value* [%]	12.04	10

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

Building Use

% Area	Building Type
100	**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
	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	2.61	3.99
Cooling	5.08	5.32
Auxiliary	14.75	13.36
Lighting	27.37	34.98
Hot water	1.12	1.08
Equipment*	15.24	15.24
TOTAL**	50.93	58.72

* 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	13.7	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]	108.5	109.34
Primary energy* [kWh/m²]	150.47	173.86
Total emissions [kg/m²]	18.3	29.4

* 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] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	40.3	90.7	3.1	6.1	17.8	3.56	4.11	3.83	5.14
	Notional	44.4	87.6	4.8	6.4	16.1	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	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.15	PL00001A:Surf[6]
Floor	0.2	0.13	PL00000C:Surf[0]
Roof	0.15	0.13	PL00001A:Surf[0]
Windows, roof windows, and rooflights	1.5	1.4	PL00001A:Surf[1]
Personnel doors	1.5	2.2	PL00001A:Surf[7]
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

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

Camden Plot C-3 - Be Green Part L 2013 - P04

As designed

Date: Tue Jan 31 14:32:39 2023

Administrative information

Building Details

Address: St Pancras Way, LONDON, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.16

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.16

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	19.7
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	19.7
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	13
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.2	PL00000D:Surf[36]
Floor	0.25	0.13	0.13	PL00003F:Surf[202]
Roof	0.25	0.13	0.13	PL000071:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.43	1.43	PL00000D:Surf[0]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	1.3	1.3	PL000174:Surf[3]
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* 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	>0.95

1- AHU 08A (WC East)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.83	-	0.2	1.07	0.88
Standard value	2.5*	N/A	N/A	1.5^	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.

^ 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- AHU04 (Office East) - FCU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.83	3.19	0	1.64	0.75
Standard value	2.5*	3.2	N/A	1.6^	0.65
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.

^ 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.

3- AHU 08B (WC West)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.83	-	0.2	1.24	0.87
Standard value	2.5*	N/A	N/A	1.5^	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.

^ 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.

4- AHU05 (Office West) - FCU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.83	3.19	0	1.64	0.75
Standard value	2.5*	3.2	N/A	1.6^	0.65
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.

^ 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.

5- Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.76	-	0.2	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
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.

6- AHU 11 (Basement general)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.83	-	0.2	1.65	0.75
Standard value	2.5*	N/A	N/A	1.5^	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.

^ 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.

7- AHU 09 (Basement Toilets & Showers)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.83	-	0.2	1.67	0.77
Standard value	2.5*	N/A	N/A	1.5^	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.

^ 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.

"No HWS in project, or hot water is provided by HVAC system"

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
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 1ST FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C: First Floor Open Plan Office	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	-	-	-	-	-	-	-	0.2	-	-	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
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: Open Plan Office		-	-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	-		-	-	-	-	-	0.2	-	-	N/A
PLOT C 10TH FLOOR: Open Plan Office		-	-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45			-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45			-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45			-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45			-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E/SUI-General Use B1.09.45			-	-	-	-	-	0.2	-	-	N/A
PLOT C Ground Floor: Retail 3A C3.00.23		-	-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E General Use			-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E General Use			-	-	-	-	-	0.2	-	-	N/A
PLOT C BASEMENT -01: Class E General Use			-	-	-	-	-	0.2	-	-	N/A
PLOT C Upper Ground Floor: Retail C3B		-	-	-	-	-	-	0.2	-	-	N/A
PLOT C Upper Ground Floor: Dock Office C3.00.11A			-	-	-	-	-	0.2	-	-	N/A
PLOT C Upper Ground Floor: Dock Office C3.00.11A			-	-	-	-	-	0.2	-	-	N/A
PLOT C 00: RETAIL C3	-		-	-	-	-	-	0.2	-	-	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	
PLOT C 2ND FLOOR: WC LOBBY C3.02.11	-	152	-	30
PLOT C 2ND FLOOR: CLEANERS C3.02.11D	102	-	-	7
PLOT C 2ND FLOOR: AWC C3.02.11B	-	102	-	39
PLOT C 2ND FLOOR: UNISEX WC C3.02.11B	-	102	-	89
PLOT C 2ND FLOOR: WEST STAIRS	-	100	-	51
PLOT C 2ND FLOOR: TOILET LOBBY C3.02.10	-	152	-	30
PLOT C 2ND FLOOR: AWC C3.02.10A	-	102	-	40
PLOT C 2ND FLOOR: UNISEX C3.02.10	-	102	-	89
PLOT C 2ND FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 2ND FLOOR: FIRE FIGHTING LOBBY C3.02.04		152	-	27
PLOT C 2ND FLOOR: LOBBY C3.02.06	-	152	-	18
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	122	-	-	2267
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	122	-	-	8475
PLOT C 1ST FLOOR: WC LOBBY C3.01.11	-	152	-	30

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 1ST FLOOR: CLEANERS C3.01.11D	152	-	-	5
PLOT C 1ST FLOOR: AWC C3.01.11B	-	102	-	39
PLOT C 1ST FLOOR: UNISEX WC C3.01.11B	-	102	-	89
PLOT C 1ST FLOOR: WEST STAIRS C3.01.05	-	100	-	51
PLOT C 1ST FLOOR: TOILET LOBBY C3.01.10	-	152	-	30
PLOT C 1ST FLOOR: AWC C3.01.10B	-	102	-	40
PLOT C 1ST FLOOR: UNISEX C3.01.10B	-	102	-	89
PLOT C 1ST FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 1ST FLOOR: LIFT LOBBY C3.01.01	-	152	-	79
PLOT C 1ST FLOOR: LOBBY C3.01.09	-	152	-	47
PLOT C 1ST FLOOR: FIRE FIGHTING LOBBY C3.01.04		152	-	27
PLOT C 1ST FLOOR: LOBBY C3.01.06	-	152	-	18
PLOT C 1ST FLOOR: OPEN PLAN OFFICE	122	-	-	2267
PLOT C: First Floor Open Plan Office	122	-	-	8271
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	152	-	30
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	152	-	10
PLOT C 3RD FLOOR: AWC C3.03.11B	-	102	-	39
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	102	-	89
PLOT C 3RD FLOOR: WEST STAIRS C3.03.05	-	100	-	51
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	152	-	30
PLOT C 3RD FLOOR: AWC C3.03.10B	-	102	-	40
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	102	-	89
PLOT C 3RD FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 3RD FLOOR: LIFT LOBBY C3.03.01	-	152	-	79
PLOT C 3RD FLOOR: FIRE FIGHTING LOBBY C3.03.04		152	-	27
PLOT C 3RD FLOOR: LOBBY C3.03.06	-	152	-	18
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	122	-	-	2267
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	122	-	-	8475
PLOT C 5TH FLOOR: WC LOBBY C3.05.11	-	152	-	30
PLOT C 5TH FLOOR: CLEANERS C3.05.11D	152	-	-	5
PLOT C 5TH FLOOR: AWC C3.05.11B	-	102	-	39
PLOT C 5TH FLOOR: UNISEX WC C3.05.11B	-	102	-	89
PLOT C 5TH FLOOR: WEST STAIRS C3.05.05	-	100	-	51
PLOT C 5TH FLOOR: TOILET LOBBY C3.05.10	-	152	-	30
PLOT C 5th FLOOR: AWC C3.05.10B	-	102	-	40
PLOT C 5TH FLOOR: UNISEX C3.05.10B	-	102	-	89
PLOT C 5TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 5TH FLOOR: LIFT LOBBY C3.05.01	-	152	-	79
PLOT C 5TH FLOOR: FIRE FIGHTING LOBBY C3.05.04		152	-	27
PLOT C 5TH FLOOR: LOBBY C3.05.06	-	152	-	18
PLOT C 2ND FLOOR: LOBBY C3.02.09	-	152	-	18
PLOT C 2ND FLOOR: FF LOBBY C3.02.02	-	152	-	34
PLOT C 2ND FLOOR: LIFT LOBBY C3.02.01	-	152	-	79

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 3RD FLOOR: LOBBY C3.03.09	-	152	-	18
PLOT C 3RD FLOOR: FF LOBBY C3.03.09	-	152	-	34
PLOT C 5TH FLOOR: LOBBY C3.05.09	-	152	-	18
PLOT C 5TH FLOOR: FF LOBBY C3.05.09	-	152	-	34
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	122	-	-	2212
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	122	-	-	7937
PLOT C 4TH FLOOR: WC LOBBY C3.04.11	-	152	-	30
PLOT C 4TH FLOOR: CLEANERS C3.04.11D	152	-	-	5
PLOT C 4TH FLOOR: AWC C3.04.11B	-	102	-	39
PLOT C 4TH FLOOR: UNISEX WC C3.04.11B	-	102	-	89
PLOT C 4TH FLOOR: WEST STAIRS C3.04.05	-	100	-	51
PLOT C 4TH FLOOR: TOILET LOBBY C3.04.10	-	152	-	30
PLOT C 4TH FLOOR: AWC C3.04.10B	-	102	-	40
PLOT C 4TH FLOOR: UNISEX C3.04.10B	-	102	-	89
PLOT C 4TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 4TH FLOOR: LIFT LOBBY C3.04.01	-	152	-	79
PLOT C 4TH FLOOR: FIRE FIGHTING LOBBY C3.04.04		152	-	27
PLOT C 4TH FLOOR: LOBBY C3.04.06	-	152	-	18
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	122	-	-	2267
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	122	-	-	8475
PLOT C 4TH FLOOR: LOBBY C3.04.09	-	152	-	18
PLOT C 4TH FLOOR: FF LOBBY C3.04.09	-	152	-	34
PLOT C 6TH FLOOR: WC LOBBY C3.06.11	-	152	-	30
PLOT C 6TH FLOOR: CLEANERS C3.06.11D	152	-	-	5
PLOT C 6THFLOOR: AWC C3.06.11B	-	102	-	39
PLOT C 6TH FLOOR: UNISEX WC C3.06.11B	-	102	-	89
PLOT C 6TH FLOOR: WEST STAIRS C3.06.05	-	100	-	51
PLOT C 6TH FLOOR: TOILET LOBBY C3.06.10	-	152	-	30
PLOT C 6th FLOOR: AWC C3.06.10B	-	102	-	40
PLOT C 6TH FLOOR: UNISEX C3.06.10B	-	102	-	89
PLOT C 6TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 6TH FLOOR: LIFT LOBBY C3.06.01	-	152	-	79
PLOT C 6TH FLOOR: FIRE FIGHTING LOBBY C3.06.04		152	-	27
PLOT C 6TH FLOOR: LOBBY C3.06.06	-	152	-	18
PLOT C 6TH FLOOR: LOBBY C3.06.09	-	152	-	18
PLOT C 6TH FLOOR: FF LOBBY C3.06.09	-	152	-	34
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	122	-	-	2212
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	122	-	-	7937
PLOT C 7TH FLOOR: WC LOBBY C3.07.11	-	152	-	30
PLOT C 7TH FLOOR: CLEANERS C3.07.11D	152	-	-	5
PLOT C 7TH FLOOR: AWC C3.07.11B	-	102	-	39
PLOT C 7TH FLOOR: UNISEX WC C3.07.11B	-	102	-	89
PLOT C 7TH FLOOR: WEST STAIRS C3.07.05	-	100	-	51

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 7TH FLOOR: TOILET LOBBY C3.07.10	-	152	-	30
PLOT C 7th FLOOR: AWC C3.07.10B	-	102	-	40
PLOT C 5TH FLOOR: UNISEX C3.05.10B	-	102	-	89
PLOT C 7TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 7TH FLOOR: LIFT LOBBY C3.07.01	-	152	-	79
PLOT C 7TH FLOOR: FIRE FIGHTING LOBBY C3.07.04		152	-	27
PLOT C 7TH FLOOR: LOBBY C3.07.06	-	152	-	18
PLOT C 7TH FLOOR: LOBBY C3.07.09	-	152	-	18
PLOT C 7TH FLOOR: FF LOBBY C3.07.09	-	152	-	34
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	122	-	-	2212
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	122	-	-	7937
PLOT C 8TH FLOOR: WEST STAIRS C3.08.05	-	100	-	51
PLOT C 8TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	99
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	88
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	105
PLOT C 8TH FLOOR: LIFT LOBBY C3.08.01	-	152	-	30
PLOT C 8TH FLOOR: FF LOBBY C3.08.04	-	152	-	47
PLOT C 8TH FLOOR: NORTH STAIRS	-	100	-	53
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	8
PLOT C 8TH FLOOR: NORTH STAIRS	-	100	-	23
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	52
PLOT C 8TH FLOOR: LIFT LOBBY C3.08.01	-	152	-	77
PLOT C 8TH FLOOR: UNISEX C3.08.10D	-	102	-	43
PLOT C 8TH FLOOR: CLEANERS C3.08.08C	152	-	-	7
PLOT C 8TH FLOOR: UNISEX C3.08.10D	-	102	-	41
PLOT C 8TH FLOOR: UNISEX C3.08.10D	-	102	-	41
PLOT C 8TH FLOOR: UNISEX C3.08.10D	-	102	-	41
PLOT C 8TH FLOOR: ESCAPE CORRIDOR C3.08.10		152	-	25
PLOT C 8TH FLOOR: LOBBY C3.08.07	-	152	-	17
PLOT C 8TH FLOOR: FF LOBBY C3.08.02	-	152	-	27
PLOT C 8TH FLOOR: AWC C3.08.08A	-	102	-	37
PLOT C 8TH FLOOR: WC LOBBY C3.08.08	-	152	-	35
PLOT C 9TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	8
PLOT C 9TH FLOOR: UNISEX C3.09.08C	-	102	-	43
PLOT C 8TH FLOOR: Cleaners C3.09.08B	152	-	-	7
PLOT C 9TH FLOOR: UNISEX C3.09.08C	-	102	-	41
PLOT C 9TH FLOOR: UNISEX C3.09.08C	-	102	-	41
PLOT C 9TH FLOOR: UNISEX C3.09.08C	-	102	-	41
PLOT C 9TH FLOOR: Escape corridor C3.09.09	-	152	-	25
PLOT C 9TH FLOOR: LOBBY C3.09.05	-	152	-	17
PLOT C 9TH FLOOR: FF LOBBY C3.09.02	-	152	-	27

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C 8TH FLOOR: AWC C3.09.08D	-	102	-	37
PLOT C 9TH FLOOR: WC Lobby C3.09.08	-	152	-	35
PLOT C 9TH FLOOR North Stair	-	100	-	53
PLOT C 9TH FLOOR North Stair	-	100	-	25
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	58
PLOT C 9TH FLOOR: Lift Lobby C3.09.01	-	152	-	101
PLOT C 8TH FLOOR: Open Plan Office	122	-	-	5015
PLOT C 10TH FLOOR: EAST STAIRS 01	-	100	-	52
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	8
PLOT C10tH FLOOR: UNISEX C3.10.08C	-	102	-	43
PLOT C 10TH FLOOR: Cleaners C3.10.08B	152	-	-	7
PLOT C 10TH FLOOR: UNISEX C3.10.08C	-	102	-	41
PLOT C 10TH FLOOR: UNISEX C3.10.08C	-	102	-	41
PLOT C 10TH FLOOR: UNISEX C3.10.08C	-	102	-	41
PLOT C 10TH FLOOR: Escape corridor C3.10.09	-	152	-	23
PLOT C 10TH FLOOR: LOBBY C3.10.05	-	152	-	17
PLOT C 10TH FLOOR: FF LOBBY C3.10.02	-	152	-	27
PLOT C 10TH FLOOR: AWC C3.10.08D	-	102	-	37
PLOT C 10TH FLOOR: WC Lobby C3.10.08	-	152	-	33
PLOT C 10TH FLOOR North Stair	-	100	-	53
PLOT C 10TH FLOOR North Stair	-	100	-	25
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	122	-	-	58
PLOT C 10tH FLOOR: Lift Lobby C3.10.01	-	152	-	101
PLOT C 10TH FLOOR: Open Plan Office	122	-	-	5015
PLOT C BASEMENT -01: Changing Room DHW Storage B1.00.51	152	-	-	326
PLOT C BASEMENT -01: Fire Control Centre B1.00.54	122	-	-	165
PLOT C BASEMENT -01: HV Switch Room B1.00.41C	152	-	-	125
PLOT C BASEMENT -01: Tank Room B1.00.35	152	-	-	132
PLOT C BASEMENT -01: WC Circ B1.00.48	-	152	-	53
PLOT C BASEMENT -01: Cleaners Cpbd B1.00.48G	152	-	-	3
PLOT C BASEMENT -01: WC B1.00.48	-	102	-	94
PLOT C BASEMENT -01: WC B1.00.48	-	102	-	113
PLOT C BASEMENT -01: AWC B1.00.48A	-	102	-	39
PLOT C BASEMENT -01: Lift Lobby B1.00.40	-	152	-	136
PLOT C BASEMENT -01: Fire Fighting Lobby B1.00.39		152	-	43
PLOT C BASEMENT -01: East Stairs B1.00.38	-	100	-	112
PLOT C BASEMENT -01: IN Bulding Tech B1.00.29D	122	-	-	189
PLOT C BASEMENT -01: Unisex Staff Circ B1.00.41	-	152	-	41
PLOT C BASEMENT -01: Male Showers Lobby B1.00.53A		152	-	22
PLOT C BASEMENT -01: Male Changing circ B1.00.53B		152	-	184
PLOT C BASEMENT -01: Male WC B1.00.53E	-	102	-	27
PLOT C BASEMENT -01: Male AWC B1.0053.F	-	102	-	40
PLOT C BASEMENT -01: Male WC B1.00.53G	-	102	-	55

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C BASEMENT -01: Male Showers Circulation	B1.00.53D	152	-	89
PLOT C BASEMENT -01: Male Showers B1.00.53D	-	101	-	58
PLOT C BASEMENT -01: Male Shower Area B1.00.53D		101	-	54
PLOT C BASEMENT -01: Unisex Shower B1.00.54	-	101	-	8
PLOT C BASEMENT -01:Unisex AWC B1.00.54	-	102	-	86
PLOT C BASEMENT -01: Male Shower Area B1.00.53D		101	-	37
PLOT C BASEMENT -01: Male Showers B1.00.53D	-	101	-	47
PLOT C BASEMENT -01: Female Showers Lobby B1.00.52A		152	-	23
PLOT C BASEMENT -01: Female Changing Room B1.00.52B		152	-	173
PLOT C BASEMENT -01: Female Showers Circualtion B1.00.52		152	-	92
PLOT C BASEMENT -01: Female Shower Area B1.00.52D		101	-	51
PLOT C BASEMENT -01: Female Showers B1.00.52D		101	-	55
PLOT C BASEMENT -01: Female WC B1.00.52E	-	102	-	27
PLOT C BASEMENT -01: Female AWC B1.00.52F	-	102	-	37
PLOT C BASEMENT -01: Female Showers B1.00.52G		101	-	45
PLOT C BASEMENT -01: Female Shower Area B1.00.52D		101	-	42
PLOT C BASEMENT -01: Female WC B1.00.52F	-	102	-	29
PLOT C BASEMENT -01: Female WC B1.00.52G	-	102	-	27
PLOT C BASEMENT -01: Circulation B1.00.47	-	152	-	401
PLOT C BASEMENT -01: Unisex Staff Change Shower B1.00.41		101	-	8
PLOT C BASEMENT -01: Unisex Staff Change Shower Area B1.00.41		101	-	7
PLOT C BASEMENT -01: Unisex Staff WC B1.00.41	-	102	-	85
PLOT C BASEMENT -01: Unisex Staff Change Shower B1.00.41		101	-	8
PLOT C BASEMENT -01: Unisex Staff Change Shower Area B1.00.41		101	-	7
PLOT C BASEMENT -01: West Stair B1.00.43	-	100	-	93
PLOT C BASEMENT -01: Fire Fighting Lobby B1.00.42		152	-	69
PLOT C BASEMENT -02: LV Switchroom B2.00.03	152	-	-	224
PLOT C BASEMENT -02: Heat Pumps & Energy Storage B2.00.06		-	-	970
PLOT C BASEMENT -02: Water Tank & Booster B2.00.09		-	-	262
PLOT C BASEMENT -02: West Stair B2.00.01	-	152	-	36
PLOT C BASEMENT -02: Firefighting Lobby B2.00.02	-	152	-	21
PLOT C BASEMENT -02: LTHW & CHW Plantroom CMB2.00.10		-	-	341
PLOT C BASEMENT -02: Fire Escape Corridor B2.00.05		152	-	56
PLOT C BASEMENT -02: Escape Corridor B2.00.07	-	152	-	45
PLOT C BASEMENT -02: District Hea Network B2.00.08		-	-	66
PLOT C BASEMENT -01: Circulation B1.00.41A	-	152	-	27
PLOT C BASEMENT -01: Circulation B1.00.41A	-	152	-	123
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45		-	-	466
PLOT C BASEMENT -01: Escape Corridor B1.00.44	-	152	-	86
PLOT C BASEMENT -01: Escape Corridor B1.00.44	-	152	-	59
PLOT C BASEMENT -01: Escape Corridor B1.00.44	-	152	-	39
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45		-	-	606
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45		-	-	399

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45	-	-	-	3428
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45	-	-	-	354
PLOT C Lower Ground Floor	-	152	-	1
PLOT C 00: UKPN SUbstation C3.00.21	152	-	-	106
PLOTC 00: UKPN HV Intake room C3.00.20	152	-	-	97
PLOT C 00: Lobby C3.00.20A	-	152	-	22
PLOT C Ground Floor: West Stair C3.00.05	-	100	-	61
PLOT C Ground Floor: Fire Fighting Lobby C3.00.04	-	152	-	54
PLOT C Ground Floor: Escape Corridor C3.00.08	-	152	-	109
PLOT C Ground Floor: Retail BOH C3.00.25	152	-	-	39
PLOT C Ground Floor: Unisex WC C3.00.28	-	102	-	73
PLOT C Ground Floor: AWC C3.00.29	-	102	-	42
PLOT C Ground Floor: Retail 3A C3.00.23	-	100	15	2475
PLOT C Ground Floor: Retail BOH C3.00.24	152	-	-	15
PLOT C Ground Floor: Lobby C3.00.32	-	152	-	28
PLOT C Ground Floor: Firefighting Lobby C3.00.02	-	152	-	71
PLOT C Ground Floor: east Stair C3.00.03	-	100	-	61
PLOT C Ground Floor: Back of House C3.00.14	152	-	-	39
PLOT C Ground Floor Lift Lobby C3.00.01	-	152	-	104
PLOT C Ground Floor: Reception Lobby C3.00.30	-	152	15	605
PLOT C Ground Floor: Loading Bay C3.00.09	-	100	-	585
PLOT C BASEMENT -01: Class E General Use	122	-	-	101
PLOT C BASEMENT -01: Class E General Use	122	-	-	607
PLOT C BASEMENT -01: Class E General Use	122	-	-	2066
PLOT C BASEMENT -01: Security Office B1.0036	122	-	-	162
PLOT C BASEMENT -01: Security Office B1.0036	122	-	-	349
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	14
PLOT C BASEMENT -01: Client management Suite B1.00.54K	-	-	-	11
PLOT C BASEMENT -01: Client management Suite B1.00.54K	-	-	-	479
PLOT C BASEMENT -01: Tank Room B1.00.34	152	-	-	83
PLOT C BASEMENT -01: Tank Room B1.00.34	152	-	-	63
PLOT C BASEMENT -01: Circulatiom B1.00.41	-	152	-	24
PLOT C BASEMENT -01: Circulatiom B1.00.41	-	152	-	91
PLOT C BASEMENT -01: Refuse Store B1.00.33	152	-	-	9
PLOT C BASEMENT -01: Refuse Store B1.00.33	152	-	-	66
PLOT C BASEMENT -01: AWC B1.00.29E	-	102	-	25
PLOT C BASEMENT -01: AWC B1.00.29E	-	102	-	14
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	33
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	184
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	41
PLOT C BASEMENT -01: Circualtion B1.00.31	-	152	-	101
PLOT C Upper Ground Floor: Post RoomC3.00.11B	122	-	-	16
PLOT C Upper Ground Floor: Retail C3B	-	122	15	1136

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
PLOT C Ground Floor: Accessible Parking C3.00.10	-	100	-	121
PLOT C Upper Ground Floor: Escape Corridor C3.00.12		152	-	82
PLOT C Upper Ground Floor: LN2 Store C3.00.27	152	-	-	19
PLOT C Upper Ground Floor: Lobby C3.00.26	-	152	-	30
PLOT C Upper Ground Floor: Dock Office C3.00.11A	122	-	-	46
PLOT C Upper Ground Floor: Dock Office C3.00.11A	122	-	-	85
PLOT C BASEMENT -01: Goods In Store B1.00.30	152	-	-	25
PLOT C 00: RETAIL C3	-	122	15	5471
PLOT C BASEMENT -01: Platform Stair B1.00.49	-	100	-	93
PLOT C BASEMENT -01: Retail BOH B1.00.50	152	-	-	88
PLOT C BASEMENT -01: Retail BOH B1.00.50	152	-	-	76
PLOT C BASEMENT -01: Lobby B1.00.50A	-	152	-	22
PLOT C BASEMENT -01: Lobby B1.00.50B	-	152	-	24

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?
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	NO (-23.9%)	NO
PLOT C 2ND FLOOR: OPEN PLAN OFFICE	NO (-32.2%)	NO
PLOT C 1ST FLOOR: OPEN PLAN OFFICE	NO (-19.1%)	NO
PLOT C: First Floor Open Plan Office	NO (-32.5%)	NO
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	NO (-23.9%)	NO
PLOT C 3RD FLOOR: OPEN PLAN OFFICE	NO (-32.2%)	NO
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	NO (-2%)	NO
PLOT C 5TH FLOOR: OPEN PLAN OFFICE	NO (-9.3%)	NO
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	NO (-23.9%)	NO
PLOT C 4TH FLOOR: OPEN PLAN OFFICE	NO (-32.2%)	NO
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	NO (-2%)	NO
PLOT C 6TH FLOOR: OPEN PLAN OFFICE	NO (-9.3%)	NO
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	NO (-2%)	NO
PLOT C 7TH FLOOR: OPEN PLAN OFFICE	NO (-9.5%)	NO
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: Open Plan Office	NO (-38.5%)	NO
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 8TH FLOOR: OPEN PLAN OFFICE	N/A	N/A
PLOT C 10TH FLOOR: Open Plan Office	NO (-45.8%)	NO
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45	N/A	N/A
PLOT C BASEMENT -01: Class E/SUI General Use B1.00.45	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
PLOT C BASEMENT -01: Class E/SUI General Use B1.0045	N/A	N/A
PLOT C BASEMENT -01: Class E/SUI General Use B1.0045	N/A	N/A
PLOT C BASEMENT -01: Class E/SUI General Use B1.0045	N/A	N/A
PLOT C Ground Floor: Retail 3A C3.00.23	NO (-33.7%)	NO
PLOT C Ground Floor: Reception Lobby C3.00.30	NO (-12.8%)	NO
PLOT C BASEMENT -01: Class E General Use	N/A	N/A
PLOT C BASEMENT -01: Class E General Use	N/A	N/A
PLOT C BASEMENT -01: Class E General Use	N/A	N/A
PLOT C BASEMENT -01: Security Office B1.0036	N/A	N/A
PLOT C BASEMENT -01: Security Office B1.0036	N/A	N/A
PLOT C BASEMENT -01: Client management Suite B1.0054K	N/A	N/A
PLOT C BASEMENT -01: Client management Suite B1.0054K	N/A	N/A
PLOT C Upper Ground Floor: Retail C3B	NO (-20.3%)	NO
PLOT C Upper Ground Floor: Dock Office C3.00.11A	N/A	N/A
PLOT C Upper Ground Floor: Dock Office C3.00.11A	N/A	N/A
PLOT C 00: RETAIL C3	YES (+18.6%)	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?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	26564.6	26564.6
External area [m²]	18362.7	18362.7
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	9190.25	8369.05
Average U-value [W/m²K]	0.5	0.46
Alpha value* [%]	10.08	10

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

Building Use

% Area	Building Type
7	**A1/A2 Retail/Financial and Professional services**
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
93	**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	1.24	0.65
Cooling	4.56	7.99
Auxiliary	10.23	9.22
Lighting	7.92	18.83
Hot water	2.69	3.01
Equipment*	42.07	42.07
TOTAL**	**26.63**	39.69

* 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	0.91	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]	83.26	114.89
Primary energy* [kWh/m²]	79.71	114.75
Total emissions [kg/m²]	13	19.7

* 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] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	14.9	99.6	1.2	6.7	13.6	3.56	4.11	3.83	5.14
	Notional	4.2	158.6	0.5	11.6	12.3	2.56	3.79	----	----
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	31.9	70.9	2.5	4.8	13.5	3.56	4.1	3.83	5.14
	Notional	12.2	120	1.3	8.8	12.1	2.56	3.79	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	4.3	0	0.3	0	5	3.88	0	3.83	0
	Notional	0.6	0	0.1	0	5.4	2.56	0	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	19	0	1.3	0	5.6	3.97	0	3.83	0
	Notional	8.5	0	0.9	0	4.2	2.56	0	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	28.6	0	1.9	0	7.4	4.19	0	3.83	0
	Notional	44.9	0	4.9	0	6.3	2.56	0	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	13.5	0	0.9	0	4.9	4.19	0	3.83	0
	Notional	12.2	0	1.3	0	4.4	2.56	0	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	43.4	0	3.4	0	1.7	3.53	0	3.76	0
	Notional	44.6	0	4.8	0	1	2.56	0	----	----
[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	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.15	PL00013F:Surf[6]
Floor	0.2	0.13	PL00003F:Surf[202]
Roof	0.15	0.13	PL000071:Surf[0]
Windows, roof windows, and rooflights	1.5	1.43	PL00000D:Surf[0]
Personnel doors	1.5	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	1.3	PL000174:Surf[3]
High usage entrance doors	1.5	-	No High usage entrance doors in building

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Camden Plot C-4 - Be Green Part L - 2013 - P10

As designed

Date: Tue Aug 08 16:13:35 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.21

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.21

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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/m².annum	71.8
Target CO_2 emission rate (TER), kgCO_2/m².annum	71.8
Building CO_2 emission rate (BER), kgCO_2/m².annum	58.9
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.2	FR000000:Surf[0]
Floor	0.25	0.13	0.13	SP000018:Surf[0]
Roof	0.25	0.13	0.13	SP000004:Surf[1]
Windows***, roof windows, and rooflights	2.2	1.3	1.3	SP000027:Surf[0]
Personnel doors	2.2	-	-	No personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No vehicle access doors in building
High usage entrance doors	3.5	1.5	1.5	SP000025:Surf[0]

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

$U_{a\text{-}Calc}$ = 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
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	>0.95

1- AHU - WC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.69	-	0.2	1.07	0.88
Standard value	2.5*	N/A	N/A	1.5^	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.

^ 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- FCU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.69	3.09	0	1.3	0.8
Standard value	2.5*	2.55	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 all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ 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.

"No HWS in project, or hot water is provided by HVAC system"

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**
Basment - BOH	-	-	-	-	-	-	-	0.2	-	-	N/A
GF - Tenant Floor Bar	-	-	-	-	-	-	-	0.2	-	-	N/A
1st Floor - Tenant Floor Restaurant	-	-	-	-	-	-	-	0.2	-	-	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	
Basement - Circulation Female toilets	-	152	-	46

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Basement - Unisex Toilets	-	102	-	45
Basement - Toilet Lobby	-	118	-	32
Basement - Cleaners	100	-	-	4
Basement - Circulation Male Toilets	-	153	-	52
Basement - Lobby	-	118	-	68
Basement - Store	100	-	-	19
Basment - BOH	-	122	-	1117
Roof - Dry store	100	-	-	18
Roof - Cold Store Condenser	100	-	-	10
GF - Store	100	-	-	7
GF - Tenant Floor Bar	-	122	15	422
GF - Cleaner Store	100	-	-	7
1st Floor - Tenant Floor Restaurant	-	122	15	425
1st Floor - Unisex AWC	-	102	-	47
Basement - Female toilets 1	-	102	-	45
Basement - Female toilets 2	-	102	-	47
Basement - Male Toilets 1	-	102	-	41

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?
Basment - BOH	NO (-100%)	NO
GF - Tenant Floor Bar	NO (-59.2%)	NO
1st Floor - Tenant Floor Restaurant	NO (-50.4%)	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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	702.3	702.3
External area [m²]	1624.4	1624.4
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	454.99	616.05
Average U-value [W/m²K]	0.28	0.38
Alpha value* [%]	10.56	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
100	**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
	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	2.65	2.9
Cooling	11.41	18.64
Auxiliary	29.19	30.18
Lighting	51.16	61.55
Hot water	21.98	28.57
Equipment*	124.17	124.17
TOTAL**	116.38	141.85

* 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]	200.13	280.94
Primary energy* [kWh/m²]	348.37	424.57
Total emissions [kg/m²]	58.9	71.8

* 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 air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	106.5	0	8	0	16.9	3.67	0	3.69	0
	Notional	31	0	3.4	0	14.1	2.56	0	----	----
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	34.2	204.7	2.9	13.9	34.6	3.32	4.09	3.69	5.04
	Notional	31.1	309.5	3.4	22.7	35.5	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	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.12	BS000001:Surf[2]
Floor	0.2	0.13	SP000004:Surf[0]
Roof	0.15	0.13	SP000004:Surf[1]
Windows, roof windows, and rooflights	1.5	1.3	SP000027:Surf[0]
Personnel doors	1.5	-	No personnel doors in building
Vehicle access & similar large doors	1.5	-	No vehicle access doors in building
High usage entrance doors	1.5	1.5	SP000025:Surf[0]

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

APPENDIX 3 – SAP CALCULATIONS (PLOT C2)

		Baseline	Be Lean	
First (Lowest) Floor	Floor Area	kg/ CO2 (TER)	kg/ CO2 (DER)	% Reduction
INTERMEDIATE - 1 BED	52.2m2	19.68	16.48	-16%
INTERMEDIATE - 1 BED	51.97m2	19.54	15.98	-18%
INTERMEDIATE - 2 BED	78.18m2	18.63	17.44	-6%
SOCIAL - 2 BED	72.37m2	17.12	16.05	-6%
SOCIAL - 2 BED	96.07m2	16.10	15.25	-5%
PRIVATE - 1 BED	75.04m2	18.93	17.28	-9%
Second				
AFFORDABLE INTERMEDIATE - 1 BED	52.23m2	16.67	14.3	-14%
AFFORDABLE INTERMEDIATE - 1 BED	52.01m2	16.71	14.33	-14%
AFFORDABLE INTERMEDIATE - 2 BED	78.18m2	15.80	14.18	-10%
AFFORDABLE SOCIAL - 2 BED	72.37m2	14.42	12.99	-10%
AFFORDABLE SOCIAL - 2 BED	96.07m2	13.47	13.00	-3%
PRIVATE - 1 BED	75.00m2	16.05	14.74	-8%
Third				
AFFORDABLE INTERMEDIATE - 1 BED	52.23m2	16.67	14.3	-14%
AFFORDABLE INTERMEDIATE - 1 BED	52.01m2	16.71	14.33	-14%
AFFORDABLE INTERMEDIATE - 2 BED	78.18m2	15.80	14.18	-10%
AFFORDABLE SOCIAL - 2 BED	72.37m2	14.42	12.99	-10%
AFFORDABLE SOCIAL - 2 BED	95.60m2	13.47	13.00	-3%
PRIVATE - 1 BED	75.00m2	16.05	14.74	-8%
Fourth Floor				
AFFORDABLE INTERMEDIATE - 2 BED	78.34m2	15.80	14.18	-10%
AFFORDABLE SOCIAL - 2 BED	77.73m2	14.5	13.28	-8%
AFFORDABLE SOCIAL - 3 BED	90.09m2	13.34	12.52	-6%
PRIVATE - 1 BED	52.23m2	16.67	14.3	-14%
PRIVATE - 2 BED	84.92m2	15.21	14.05	-8%
PRIVATE - STUDIO	42.67m2	18.19	15.13	-17%
Fifth Floor				
SOCIAL - 2 BED (5th Floor)	77.73m2	14.5	13.28	-8%
SOCIAL - 3 BED (5th Floor)	90.10m2	13.34	12.52	-6%
PRIVATE - 1 BED (5th Floor)	52.23m2	16.67	14.3	-14%
PRIVATE - 2 BED (5th Floor)	78.35m2	15.80	14.18	-10%
PRIVATE - 2 BED (5th Floor)	84.92m2	15.21	14.05	-8%
PRIVATE - STUDIO (5th Floor)	42.68m2	18.19	15.13	-17%
Sixth Floor				
AFFORDABLE SOCIAL - 2 BED	77.73m2	14.5	13.28	-8%
AFFORDABLE SOCIAL - 3 BED	90.14m2	13.34	12.52	-6%
PRIVATE - 1 BED	52.23m2	16.67	14.3	-14%
PRIVATE - 2 BED	78.35m2	15.80	14.18	-10%
PRIVATE - 2 BED	84.92m2	15.21	14.05	-8%
PRIVATE - STUDIO	42.68m2	18.19	15.13	-17%

Seventh Floor				
AFFORDABLE SOCIAL - 2 BED	77.73m2	14.5	13.28	-8%
AFFORDABLE SOCIAL - 3 BED	90.09m2	13.34	12.52	-6%
PRIVATE - 1 BED	52.23m2	16.67	14.3	-14%
PRIVATE - 2 BED	78.34m2	15.80	14.18	-10%
PRIVATE - 2 BED	84.92m2	15.21	14.05	-8%
PRIVATE - STUDIO	42.68m2	18.19	15.13	-17%

Eighth Floor				
AFFORDABLE INTERMEDIATE - 2 BED	77.73m2	14.5	13.28	-8%
AFFORDABLE SOCIAL - 3 BED	90.10m2	13.34	12.52	-6%
PRIVATE - 1 BED	52.23m2	16.67	14.3	-14%
PRIVATE - 2 BED	78.34m2	15.80	14.18	-10%
PRIVATE - 2 BED	84.92m2	15.21	14.05	-8%
PRIVATE - STUDIO	42.68m2	18.19	15.13	-17%

Ninth Floor				
AFFORDABLE INTERMEDIATE - STUDIO	40.47m2	18.51	16.88	-9%
AFFORDABLE INTERMEDIATE - 1 BED	50.73m2	16.25	14.58	-10%
PRIVATE - 1 BED	52.23m2	16.67	14.3	-14%
PRIVATE - 1 BED	70.17m2	15.40	14.35	-7%
PRIVATE - 2 BED	78.24m2	15.80	14.18	-10%
PRIVATE - 2 BED	84.92m2	15.21	14.05	-8%
PRIVATE - STUDIO	42.68m2	18.19	15.13	-17%

Tenth Floor				
AFFORDABLE INTERMEDIATE - STUDIO	40.55m2	18.51	16.88	-9%
AFFORDABLE INTERMEDIATE - 1 BED	50.73m2	16.25	14.58	-10%
PRIVATE - 1 BED	52.23m2	16.67	14.3	-14%
PRIVATE - 1 BED	70.20m2	15.40	14.35	-7%
PRIVATE - 2 BED	78.28m2	15.80	14.18	-10%
PRIVATE - 2 BED	84.92m2	15.21	14.05	-8%
PRIVATE - STUDIO	42.68m2	18.19	15.13	-17%

Eleventh (Top) Floor				
PRIVATE - 1 BED	52.23m2	19.82	16.93	-15%
PRIVATE - 1 BED	70.21m2	18.69	16.74	-10%
PRIVATE - 1 BED	50.73m2	19.40	17.03	-12%
PRIVATE - 2 BED	78.27m2	18.97	16.77	-12%
PRIVATE - 2 BED	84.92m2	18.67	16.87	-10%
PRIVATE - STUDIO	42.68m2	21.06	17.49	-17%
PRIVATE - STUDIO	40.40m2	21.35	18.97	-11%

AVERAGE (LONDON PLAN)		16.45	14.65	-11%

Be Green			Fabric		
kg/ CO2 (DER)	Rating	% Reduction	Target Fabric (TFEE)	Dwelling Fabric (DFEE)	% Reduction
11.27	84/B	-43%	47.83	37.89	-20.8%
11.07	84/B	-43%	45.43	35.02	-22.9%
11.78	83/B	-37%	54.98	48.57	-11.7%
10.98	84/B	-36%	44.73	41.63	-6.9%
10.43	84/B	-35%	47.72	42.90	-10.1%
11.63	83/B	-39%	55.60	47.8	-14.0%
9.98	85/B	-40%	32.12	27.47	-14.5%
10.00	85/B	-40%	32.18	27.52	-14.5%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.18	86/B	-36%	30.70	29.18	-5.0%
9.10	86/B	-32%	34.33	33.97	-1.0%
10.13	85/B	-37%	40.87	37.9	-7.3%
9.98	85/B	-40%	32.12	27.47	-14.5%
10.00	85/B	-40%	32.18	27.52	-14.5%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.18	86/B	-36%	30.70	29.18	-5.0%
9.10	86/B	-32%	34.33	33.97	-1.0%
10.13	85/B	-37%	40.87	37.9	-7.3%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.33	86/B	-36%	33.04	31.32	-5.2%
8.84	86/B	-34%	31.45	31.32	-0.4%
9.98	85/B	-40%	32.12	27.47	-14.5%
9.76	85/B	-36%	39.56	36.35	-8.1%
10.56	84/B	-42%	32.17	27.2	-15.4%
9.33	86/B	-36%	33.04	31.32	-5.2%
8.84	86/B	-34%	31.45	31.32	-0.4%
9.98	85/B	-40%	32.12	27.47	-14.5%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.76	85/B	-36%	39.56	36.35	-8.1%
10.56	84/B	-42%	32.17	27.2	-15.4%
9.33	86/B	-36%	33.04	31.32	-5.2%
8.84	86/B	-34%	31.45	31.32	-0.4%
9.98	85/B	-40%	32.12	27.47	-14.5%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.76	85/B	-36%	39.56	36.35	-8.1%
10.56	84/B	-42%	32.17	27.2	-15.4%

9.33	86/B	-36%	33.04	31.32	-5.2%
8.84	86/B	-34%	31.45	31.32	-0.4%
9.98	85/B	-40%	32.12	27.47	-14.5%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.76	85/B	-36%	39.56	36.35	-8.1%
10.56	84/B	-42%	32.17	27.2	-15.4%

9.33	86/B	-36%	33.04	31.32	-5.2%
8.84	86/B	-34%	31.45	31.32	-0.4%
9.98	85/B	-40%	32.12	27.47	-14.5%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.76	85/B	-36%	39.56	36.35	-8.1%
10.56	84/B	-42%	32.17	27.2	-15.4%

11.5	84/B	-38%	33.81	33.45	-1.1%
10.1	85/B	-38%	29.65	27.74	-6.4%
9.98	85/B	-40%	32.12	27.47	-14.5%
9.91	85/B	-36%	35.74	33.88	-5.2%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.76	85/B	-36%	39.56	36.35	-8.1%
10.56	84/B	-42%	32.17	27.2	-15.4%

11.5	84/B	-38%	33.81	33.45	-1.1%
10.1	85/B	-38%	29.65	27.74	-6.4%
9.98	85/B	-40%	32.12	27.47	-14.5%
9.91	85/B	-36%	35.74	33.88	-5.2%
9.85	85/B	-38%	40.56	36.06	-11.1%
9.76	85/B	-36%	39.56	36.35	-8.1%
10.56	84/B	-42%	32.17	27.2	-15.4%

11.54	84/B	-42%	48.58	38.49	-20.8%
11.32	83/B	-39%	52.73	43.48	-17.5%
11.55	83/B	-40%	46.26	38.3	-17.2%
11.38	83/B	-40%	56.76	46.04	-18.9%
11.43	84/B	-39%	57.29	46.43	-19.0%
11.94	83/B	-43%	47.49	37.09	-21.9%
12.71	83/B	-40%	48.87	41.81	-14.4%

10.15		-38%	37.79	33.66	-11%

APPENDIX 4 – PLOT B ENERGY STATEMENT (FOR REFERENCE)

KJ TAIT ENGINEERS

REEF GROUP

UBB PLOT B

ST PANCRAS WAY, LONDON

ENERGY STATEMENT

REVISION P01

Document History

SUITABILITY	REVISION	DATE	DETAILS	BY	CHKD
S2	P01	15th January 2021	First issue	MC	BH
S2	P02	22nd April 2021	Comments incorporated from DP9	MC	BH

CONTENTS

EXECUTIVE SUMMARY

KJ Tait Engineers were appointed by Reef Group to develop the Energy Strategy and produce an Energy Statement for a full planning application to redevelop Plot B of the Ugly Brown Building (UBB) at 6A St Pancras Way, London, NW1 0TB. The site is located between St Pancras Way and Regents Canal.

The proposed development consists of 8 storeys above ground and two basement levels. The proposed building shall contain a designated loading bay at ground floor and open plan office accommodation to the floors above. The building will be fitted out to Cat A standard.

The gross internal area of the proposed development is 20,912m^2.

The building is being assessed under BREEAM UK New Construction 2014 and is targeting an Excellent rating.

The building's energy strategy has been developed in accordance with the London Plan 2021 (Adopted March 2021), which at time of writing has not been adopted but is a material consideration in new Planning applications.

To obtain likely energy demands for the proposed development, IES Virtual Environment 2019 has been used to develop a thermal simulation model of the proposed building.

In line with guidance from the Greater London Authority (GLA)[1] for referable applications, the carbon emissions factors have been altered from SAP 2012 to SAP10 figures. The GLA Carbon Emissions Reporting spreadsheet has been provided alongside the application.

The following Energy Strategy is proposed to reduce the emissions from the proposed development. This follows the structure set out within the London Plan 2021 and the GLA guidance with respect to the Energy Hierarchy.

Be Lean

The following elements have been considered and optimised:

- Thermal insulation bettering Building Regulations Part L (2013) values, with the figures in the LETI Climate Emergency Design Guide targeted where possible.
- Minimising solar gains by the installation of high performance glazing with sufficient g-values.
- Optimising fabric air permeability improvements over the minimum Building Regulations Part L (2013) standard.
- Utilising mechanical ventilation with heat recovery to all areas with appropriate time and temperature control. Fan coil units with integral EC motors and low specific fan powers to be utilised.
- Efficient building services systems, including the use of smart metering and controls.

[1] Energy Assessment Guidance, Greater London Authority guidance on preparing energy assessments as part of planning applications (April 2020)

- All lighting will be efficient LED fittings with automatic controls.

Be Clean

The London Heat Mapping tool indicates that there are no known existing or proposed district heat networks in the vicinity of the development.

An on-site district energy network will be created to link all Plots within the UBB development site.

Be Green

Through detailed design development of the adjacent Plot A, it has been shown that air source heat pumps (ASHP) are the best suited renewable technology for the redevelopment. Similarly, with Plot B ASHPs are proposed to serve the proposed development. The key driver behind using an electricity-based technology offers the opportunity to reduce the reliance on natural gas and to take advantage of the increasing improvement of the carbon intensity of the National Grid.

Roof-mounted photovoltaic (PV) panels are also proposed to available roof space, with a PV array of approximately 130m^2.

CO_2 Savings Summary

By utilising good design principles led by the Energy Hierarchy and then incorporating low/zero carbon generating technologies, there has been a total saving of **40%** of non-domestic regulated CO_2 emissions compared to Part L2A 2013 compliance, using SAP10 carbon factors as per the GLA Energy Assessment Guidance.

Carbon Offset

To comply with the GLA and Camden's Local Plan for Net Zero Carbon, the development will be required to pay an offset payment into the Borough's carbon offset fund. The current rate for this payment is £95 per tonne over a period of 30 years. This results in a carbon offset payment of £298,580.

Cooling Demand

In line with London Plan policy SI 4 – Managing Heat Risk, the proposed building's cooling demand is lower than the Notional Building.

	Area weighted average non-domestic cooling demand (MJ/m^2)	Total area weighted non-domestic cooling demand (MJ/year)
Actual	15.19	317,653
Notional	24.55	513,431

1.0 INTRODUCTION

Planning approval for the redevelopment of the Ugly Brown Building (UBB) on St Pancras Way, London was granted by the London Borough of Camden under application reference 2017/5497/P. Since making the original Planning application and receiving the conditional approval, the development has been through a process of rationalisation and technical development, including the overall energy strategy and the proposals for Plot B. This Energy Statement describes the revised energy strategy for Plot B of the proposed development.

Since the development was originally submitted for Planning there has been significant improvement in the carbon intensity of the National Grid. This has resulted in a move away from the use of natural gas in generating heat for buildings and this change is a key element of the London Plan 2021 and the Mayor's zero carbon target by 2050. The energy strategy originally proposed for the building was heavily reliant on natural gas and is therefore not ideally suited to current and emerging energy strategies and policies.

This report details the Energy Strategy for Plot B and follows guidance from the GLA with respect to preparing energy assessments for proposed developments within London. The scheme has been modelled in IES VE 2019 to determine the following parameters:

- The baseline carbon emissions prescribed from Part L2A Building Regulations known as the Target Emission Rate (TER)
- The site's regulated CO_2 emissions from the 'Be Lean' analysis after passive energy saving measures are added
- The site's regulated CO_2 emissions from the 'Be Clean' analysis after investigating any connections to existing district heating networks or incorporating combined heat & power (CHP) where applicable
- The site's regulated CO_2 emissions from the 'Be Green' analysis which involves the installation of renewable energy where applicable.

This step-by-step approach will ensure that that the site is sustainable and that any energy provided by any district heating or renewable installation is not being used for energy that could otherwise have been mitigated earlier in the design process. Emissions associated with unregulated energy will also be calculated using guidance contained within CIBSE Guide F – Energy Efficiency in Buildings.

1.1 Site Information

The UBB site is split into three plots – Plot A (Office and Retail), Plot B (Office and Retail), and Plot C1-4 (Office, Residential and Retail). This Energy Statement will focus only on Plot B. The site will be redeveloped sequentially, with Plot A currently under construction.

Plot B comprises two basement levels with a cycle park, changing room facilities and plant space. The ground floor will host a large open foyer with a loading bay at the north of the building. The upper floors are intended for office spaces that are to be fitted out to a Cat A standard. The gross internal area of the development is approximately 19,714m^2.

For energy assessment purposes, the following notional use mix has been applied:

- 3% Retail
- 97% Office

Plot B Location Plan

1.2 Policy Review

The following policies have been identified as being essential to follow with regards to Part L2A Building Regulations and local Planning requirements.

1.2.1 Building Regulations

Non-Domestic

Non Domestic Building Regulations Technical Standards Part L

Part L2A 2013 incorporating 2016 amendments, Conservation of fuel and power in new buildings other than dwellings, sets maximum carbon dioxide emissions for buildings. The regulations apply to the construction of all new buildings (with an area over 1,000m²) and set a reduction in carbon dioxide emissions of 9% compared to 2010 Regulations for non-domestic buildings.

These targets mean that even with good building fabric and low energy building systems, Low or Zero Carbon Technologies will need to be carefully evaluated to establish the most functional and cost-effective design for compliance and maximum reduction of a building's CO_2 footprint.

Regulation 25B, 'nearly zero-energy requirements for new buildings' is currently enforced at a minimum by passing the Target Emissions Rate (TER) under regulation 26. Consideration of

high-efficiency alternative systems and BREEAM credits can also be used as evidence of Regulation 25B being met.

Consideration of High-Efficiency Alternative Systems in New Buildings

Revised legislation within the Building Regulations was introduced on 9 January 2013 in response to Article 6 of Directive 2010/31/EU on the Energy Performance of Buildings.

For new buildings, the technical, environmental, and economic feasibility of high efficiency alternative systems such as those listed below must be considered:

- Decentralised energy supply systems based on energy from renewable sources
- Cogeneration
- District or block heating or cooling
- Heat pumps.

This analysis may be carried out for individual buildings, for groups of similar buildings or for common typologies of buildings in the same area.

Irrespective of whether the building is to be air-conditioned or not, Criterion 3 – Limiting the effects of heat gains in summer must be satisfied within the compliance assessment.

1.2.2 National Planning Policy

The updated National Planning Policy Framework (NPPF) document was published in February 2019. The NPPF states a clear presumption in favour of sustainable development. It supports the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, encouraging the re-use of existing resources, and the use of renewable resources.

Chapter 14 of the NPPF specifies the framework for climate change and energy where local planning authorities should:

- Ensure risks associated with vulnerable areas are mitigated through suitable adaptation measures which may include planning of green infrastructure
- Reduce greenhouse gas emissions through a building's location, orientation and design
- Provide a strategy for the implementation of renewable and low carbon energy and heat that maximises their potential
- Identify opportunities for developments to draw energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

The NPPF allows for Local Planning Authorities to list buildings that are important to the local area to be conserved. This requires that the desirability of sustaining and enhancing the significance of heritage assets is taken into account when planning decisions are made.

1.2.3 The London Plan

The London Plan[2], the London Plan 2021[3] and the GLA Energy Assessment Guidance[4] are considered to be the benchmark for Local Planning Regulation. Together they provide the regulatory framework against which to undertake energy and sustainability assessments.

The London Plan 2021 was formally adopted in March 2021. The London Plan 2021 stipulates that non-domestic buildings should be zero carbon with a mandatory 35% reduction in carbon emissions from Part L2A, 15% of which must be from efficiency measures (Be Lean).

The development's Energy Strategy has been structured in accordance with the GLA energy hierarchy: Be Lean, Be Clean, Be Green and Be Seen. The energy strategy has been developed to comply with the London Plan 2021 and the GLA Energy Assessment Guidance on preparing energy assessments as part of planning applications. The key polices of the London Plan 2021 are as follows:

Policy SI 1: Improving Air Quality

A) Development plans, through relevant strategic, site specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or Borough's activities to improve air quality.

B) To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

1. Development proposals should not:

    a) Lead to further deterioration of existing poor air quality
    b) Create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits
    c) Create unacceptable risk of high levels of exposure to poor air quality.

2. In order to meet the requirements in Part 1, as a minimum:

    a) Development proposals must be at least Air Quality Neutral
    b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures
    c) Major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1
    d) Development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.

[2] The London Plan (March 2016)
[3] London Plan 2021 (March 2021)
[4] Energy Assessment Guidance, GLA guidance on preparing energy assessments as part of planning applications (April 2020)

C) Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:

a) How proposals have considered ways to maximise benefits to local air quality, and
b) What measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.

D) In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.151

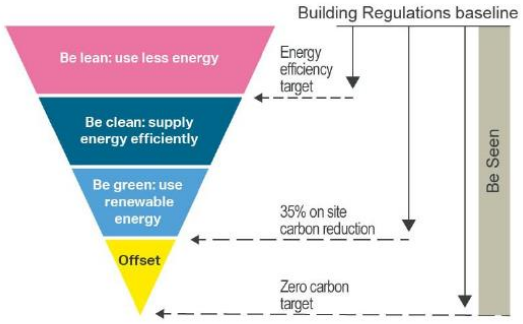
E) Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development.

Policy SI 2: Minimising Carbon Dioxide Emissions

Major non-domestic developments must achieve an on-site reduction of at least 35% beyond baseline Building Regulations.

Major developments should be net zero-carbon. By making a contribution to minimising carbon dioxide emissions and minimising both annual and peak energy demand 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
4. Be Seen: Monitor and report energy performance



Source: Greater London Authority

A new requirement in the new London Plan 2021, Be Seen, explores the management of energy carried out post occupancy. The Energy Statement must contain proposals on how this will be

monitored post construction for at least five years. Proposals on how to future proof the site to achieve net zero-carbon emissions by 2050 must also be investigated along with the expected cost to the occupants of the proposed Energy Strategy.

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

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

Where it is demonstrated that the zero-carbon target cannot be met on site, any shortfall should be provided either through a cash in lieu contribution to the relevant Borough's carbon offset fund or by providing an alternative proposal.

Policy SI 3 - Energy Infrastructure

Developers should engage at an early stage with relevant energy companies and bodies to establish the future energy requirements and infrastructure arising from large-scale developments. Energy masterplans should be developed for large scale developments which establishes the most effective energy supply options.

Major development proposals within Heat Network Priority areas should have a communal low-temperature heating system. The heat source for this should be assessed in line with the heating hierarchy.

- Connect to local existing or planned heat network
- Use zero-emission or local secondary heat sources in conjunction with heat pump, if required
- Use low emission CHP (only if there is a case for CHP to enable the delivery of an area wide heat network)
- Use ultra-low NO_x gas boilers.

Where a heat network is planned but not yet in existence, the development should be designed for connection at a later date.

Policy SI 4 – Managing Heat Risk

Developments should minimise adverse impacts on the urban heat island through design, layout, orientation materials and the incorporation of green infrastructure. Major development proposals should indicate how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the cooling hierarchy.

- Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
- Minimise internal heat generation through energy efficient design
- Provide passive ventilation
- Provide mechanical ventilation

- Provide active cooling systems.

CIBSE Guide TM52 – Limits of thermal comfort: Avoiding overheating in European buildings should be used to assess the overheating risk in non-domestic buildings.

1.2.4 Local Policy

The Camden Local Plan (June 2017) sets out the council's planning policies and replaces the Core strategy and Development Policies planning documents (adopted in 2010). Policies CC1 and CC2 of *Section 8 – Sustainability and Climate Change* of the Camden Local Plan, must be adhered to.

Policy CC1 Climate Change Mitigation

All developments shall be required to minimise the effect of climate change and be encouraged to meet the highest feasible environmental standards that are financially available.

The local council will:

- Promote zero carbon development and require all developments to reduce carbon dioxide emissions through the steps stipulated in the energy hierarchy.
- Require major developments to demonstrate how the London Plan targets have been met.
- Support decentralised energy networks.
- Encourage sensitive energy efficiency improvements to existing buildings
- Expect all developments to optimise resource efficiency

Policy CC2 Adapting to Climate Change

The council requires new developments to adopt appropriate climate change adaptations measures such as:

- Incorporating bio-diverse roofs, green and blue roofs where appropriate
- Demonstrations to show the impact of urban overheating and the application of mitigating the risk of overheating
- Expecting non-domestic developments of 500sqm of floor space or above to achieve Excellent in BREEAM assessments and encouraging zero carbon in new developments from 2019.

Policy CC4 Air Quality

The council will ensure that the impact of development on air quality is mitigated and ensure the exposure to poor air quality is reduced in the borough.

The council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Councils Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents

to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the council will not grant planning permission unless measures are adopted to mitigate the impact.

Development that involved significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.

2.0 DEMAND REDUCTION (BE LEAN)

2.1 Introduction

In line with good design principles and London Plan requirements, the development will follow the energy hierarchy so that any low or zero carbon generation is not supplying energy to areas that could have been mitigated early in the design process. The relevant steps in this process are shown below:

Stage 1 - Maximise Passive Design

In the first instance the building design should be efficient, incorporating measures such as good fabric and glazing insulation levels, control of solar heat gain whilst providing good levels of day lighting.

Stage 2 - Minimise Active Design

Having reduced the energy demand, energy requirements will then need to be minimised where possible by installing energy efficient plant and systems to meet the building's energy demands. Suitable control systems should be provided to ensure system energy efficiencies can be realised. Where mechanical intervention cannot be avoided, the design should incorporate the lowest possible level of intervention and energy use.

2.2 Stage 1 - Maximise Passive Design

Passive design measures will be optimised across the development and in conjunction with active measures, such as efficient building services systems, will reduce demand (Be Lean). Building design should be optimised to limit heat loss, reduce cooling loads by limiting solar gain and optimise the use of natural light and ventilation.

The following elements have been considered and optimised:

- Solar gain will be limited through limiting the extent of glazing, specifying high-performance glazing system, external shading, etc.
- High-performance building fabric, to significantly exceed the minimum criteria set by Part L.

Improving the thermal insulation standards beyond the minimum Building Regulations (2013) standards has been applied to achieve reduction to the annual CO_2 emissions associated with the building heating systems by limiting the heat loss through the building fabric. The

performance criteria from the LETI Climate Emergency Design Guide have been targeted where practicable.

In accordance with the requirements of a low energy building, attention has been focussed on the air tightness. The air permeability rate of the redevelopment has been designed to 3.0 $m^3/hr.m^2$ at 50Pa which is a significant improvement over Part L2A Building Regulations of 10.0 $m^3/hr.m^2$. ·

Glazing has been carefully selected to ensure that solar gains have been limited to reduce the risk of overheating and to reduce the annual cooling loads. Fins on all facades of the office floors also assist in creating local shade to the occupied areas and in turn reduce solar gains to the building.

2.3 Summary of Be Lean Passive Measures

Element	As Designed
Wall U-value (W/m^2K)	0.2
Basement Slab (W/m^2K)	0.13
Roof (W/m^2K)	0.13
Glazing (W/m^2K)	1.3 (0.28 g)
Air Permeability ($m^3/hr.m^2$ at 50Pa)	3.0

2.4 Stage 2 - Maximise Active Design

The development will be served by mechanical ventilation with heat recovery to all areas. The air handling units (AHU) will be fitted with a direct drive EC motor with low specific fan powers (SFP) with variable speed drives fitted to all pumps and fans. Control of the HVAC system will include local time and temperature control along with an optimum start program. Fan coil units (FCUs) will be used to deliver heating, cooling and ventilation to the main spaces. Motors within FCUs will incorporate EC motor technology and low SFPs.

All lighting will be efficient LED fittings with a minimum efficacy of 100lm/W with occupancy sensor and daylight controls.

2.5 Summary of Be Lean Active Measures

Element	As Designed
Lighting Efficacy (lm/W)	100 (as minimum)
AHU Heat Recovery Efficiency (%)	0.71
AHU SFP (W/l/s)	1.13
Terminal Fan Coil Unit SFP (W/l/s)	0.12

2.6 Energy Demand Following Energy Efficiency Measures

The energy demand across the site, including unregulated electricity and gas following the implementation of energy efficiency measures is the following:

Building use	Energy demand following energy efficiency measures (MWh/year)						
	Space Heating	Hot Water	Lighting	Auxiliary	Cooling	Unregulated electricity	Unregulated gas
Non-domestic	76	132	117	139	122	98	0.0

2.7 Pavilion Building

The energy strategy for the separate Pavilion building is unchanged from the original application in that it will be supplied with heating and cooling energy from Plot C via the on-site energy network. The thermal performance of the proposed building envelope of the Pavilion has been reviewed and the specification matches or betters the original proposals. The energy considerations for the Pavilion therefore remain largely unchanged from the original application and the assessment of the energy use of the Pavilion has been excluded from this application.

3.0 HEATING INFRASTRUCTURE (BE CLEAN)

3.1 Off-Site and On-Site Energy Networks

The Section 106 Agreement (S106) associated with the original Planning decision (207/5497/P_ included requirements for the provision of on-site and off-site energy network studies and connection plans.

Clause 2.59 (a) of the S106 stipulates a requirement to safeguard Plot C for a future connection to an off-site decentralised energy network (DEN). Clause 3 of the S106 sets out the requirements for the DEN off-site feasibility study and connection plan.

The S106 Agreement stipulates that Plot C should be connected to Plots A and B to form an on-site energy network across all plots. The development is intended to be constructed in three phases; Plots A to C chronologically. As noted above, this Energy Statement is only for Plot B and a revised Energy Statement for Plot A has been submitted separately. The energy systems for Plot C will be developed in due course, however the principles set out here are anticipated to be applicable to the future plots. Under the alternative energy strategy it is proposed that heat pump systems are provided on a per plot basis, rather than Plot A & B sharing heating plant as per the original proposal.

Each plot's individual heating/cooling plant can be interconnected to provide an on-site energy network, as per the original proposals and as required by the S106 Agreement. The heat pump system on each site could connect to a central energy buffer/store, which could be located in Plot B or C. With this configuration, there is potential to run the full development from a reduced number of heat pumps during periods of lower demand, e.g. only heat pumps in Plots B & C operating with Plot A drawing energy from the central buffer. The network would incorporate efficient monitoring and controls to enable an efficient on-site energy network.

The contribution of the on-site energy network has not been quantified at this stage as it will be necessary to further develop and analyse Plots B and C to estimate the Be Clean contribution. This analysis will be carried out at a later date, however it should be noted that there will be some contribution to Plots A and B.

The S106 requirements for permission 2017/5497/P in terms of Off-Site and On-Site Energy Networks are unaffected and can be met by the alternative energy strategy proposals.

3.2 Secondary Heat Generation

Secondary heat can potentially be obtained from various heat sources such as infrastructure and environmental sources within the vicinity. Regents Canal, which runs behind the plot, could potentially be a source for heat generation, however this was discounted in the original Max Fordham energy strategy for various reasons, including low flow rate, shallow water depth, potential to be drained for maintenance, etc.

There are no other viable potential secondary heat sources known to be within the vicinity of the site.

4.0 RENEWABLE ENERGY (BE GREEN)

The incorporation of low and zero carbon technologies (LZCT) can reduce demand on finite natural energy sources, benefit the environment and reduce running costs.

Potential Sources of Energy

Due to the unique constraints of the development, there is limited scope to incorporate many of the available renewable energy technologies within the scheme. As well as the selected LZC technologies, the following were reviewed and the implications are summarised below:

Technology	Implications
Ground source heat pump	- Complex borehole construction logistics beneath basement - Expensive
River Source Heat Pump	- Canal has low flow rate, discharging heat to canal will cause canal water temperature to rise - Canal is periodically drained for maintenance - Potential of environmental harm to aquatic life
Wind turbines	- Not feasible in this location
Biomass boiler	- Air quality implications - Delivery and storage implications

Air source heat pumps shall be installed on the roof of Plot B to provide simultaneous heating and cooling, improving the energy efficiency on site with their high seasonal performance.

A PV array of 130m² shall be installed on the roof facing in a south and west orientation. The PV panels will be able to optimise their full efficiency with no local or topical shading of surrounding buildings or vegetation.

The savings after applying the Be Green measures are outlined below.

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	45	26%
Savings from heat network / CHP	0	0%
Savings from renewable energy	25	14%
Total Cumulative Savings	**69**	**40%**

5.0 CARBON OFFSETTING

By utilising good design principles and Be Lean, Be Clean, Be Green, the development is estimated to save at least 40% of non-domestic regulated CO2 emissions compared to Part L 2013 compliance using SAP10 Carbon Factors as suggested in the GLA Energy Assessment Guidance.

The London Plan calls for at least 15% to be offset from the Be Lean step. As shown above, the predicted carbon dioxide savings achieve the requirements set out in the London Plan. By adding ASHP and PV panels, the carbon reductions have been improved by a further 14%.

As part of the London Plan 2021 and Local Camden Plan, new developments must target a Net Zero Carbon building where any remaining emissions must be offset by means of a monetary payment into the Boroughs Carbon Offset Fund. The Camden Local Plan states that the updated London Plan price of £95 per tonne of CO_2 shall be used. This equates to £298,580.

	Annual Shortfall (Tonnes CO_2)	Cumulative Shortfall (Tonnes CO_2)
Total Target Savings	174	-
Shortfall	105	3,143
Cash in-lieu contribution (£)	**298,580**	-

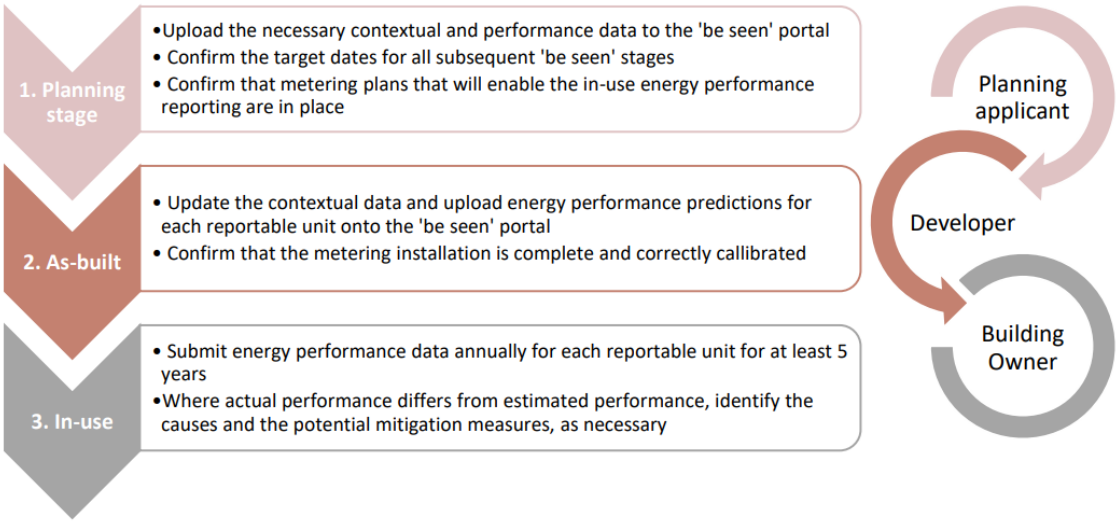
6.0 MEASUREMENT & VERIFICATION (BE SEEN)

6.1 Requirements

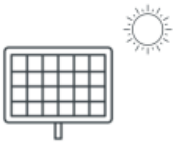
To address the gap between theoretical and actual performance of new buildings, the London Plan Policy SI 2 introduces a fourth stage to the energy hierarchy. The 'Be Seen' stage requires monitoring and reporting of the actual operational energy performance of major developments for at least five years via the Mayor's Be Seen monitoring portal. This establishes post-construction monitoring as good practice, enabling developers and building owners to better understand their buildings and identify methods for improving energy performance from the

project inception stage and throughout the building's lifetime.

The below sets out the expected Be Seen process through the mandated 5-year period from planning stage to in use.



There are expected to be six performance indicators that are required to be reported on within the GLA Be Seen reporting spreadsheet.

Performance indicator group	Description
 **Contextual data**	Applicants will be expected to provide contextual data relating to the development's reportable units (RUs) (see section 3.4). This includes non-energy information such as data on location and typology of buildings.
 **Building energy use**	Applicants will be expected to report on the energy and fuel imports into each RU of a development. This includes data from national energy grids (e.g. electricity, gas etc.) and district heating connections. This information will enable the building owner to report on the amount of energy being consumed on-site for distinct building uses.
 **Renewable energy**	Applicants will be expected to report on the renewable energy generation within the development to identify how much energy is being generated on-site and where this is used.
 **Energy storage equipment**	Applicants will be expected to report on building energy storage equipment data.

Performance indicator group	Description
 **Plant parameters**	Applicants will be expected to report on parameters that relate to the performance of heat or cooling generation plant within energy centres that form part of a development. This will include energy inputs and outputs of energy centres, energy use and contribution of heating and cooling technologies, and network efficiency data to monitor losses in district and communal energy networks.
 **Carbon emissions**	Applicants will be expected to report on the development's estimated carbon emissions at planning stage based on the appropriate carbon emission factors, as set out in the GLA's Energy Assessment Guidance. When on-site carbon reductions have been maximised, but a carbon shortfall still exists, applicants will be expected to report on and confirm the carbon offsetting contribution to the relevant local authority's fund in line with the net zero carbon target.

For planning, a CIBSE Guide TM54 – Operational Performance of Buildings at the Design Stage has been built that will assess the carbon emissions and energy demand of the building as a whole.

Once the as-built design has been completed (upon commencement of RIBA Stage 6) and prior to the building being handed over, an update should be provided to the GLA of the estimated performance indicators submitted at planning stage. This will include a number of additional indicators and a greater level of detail over the actual operation of the building.

The Be Seen portal will be hosted on the London Building Stock Model (LBSM) website and will contain a summary of the building's estimated and actual performance. From here the xml output files, used to predict Display Energy Certificate (DEC) ratings, should be uploaded for individual RUs.

During the in use stage, the responsibility for monitoring and reporting actual performance rests with the building owner. This will require actual data from the whole building and individual RUs. This period lasts for a total of five years. If the building owner changes, then responsibility for reporting reverts to the new owner.

6.2 Be Seen Strategy

Good metering is a fundamental energy monitoring and targeting tool and an essential part of energy management. Sub metering energy end uses such as lighting, fans and pumps provides the means to identify where and when energy is being wasted. As such, the development will incorporate metering in line with guidance contained within CIBSE Guide TM39 – Building Energy Metering.

The office floors will be split to provide individual RU electrical metering as follows:

- 01 First Floor Open Plan Office
- 02 Second Floor Open Plan Office
- 03 Third Floor Open Plan Office
- 04 Fourth Floor Open Plan Office
- 05 Fifth Floor Open Plan Office
- 06 Sixth Floor Open Plan Office
- 07 Seventh Floor Open Plan Office
- 08 Eighth Floor Open Plan Office

WCs and core areas shall be metered via the associated above meters. Heat meters for communal heating and cooling will be provided to each unit,

Each retail unit will be split to create individual RUs where electrical and communal heat is metered.

An online platform where data from the above meters can be sent back ready for analysis by interested parties will be provided. This will help to ensure that data from the meters are being used to reduce energy consumption on site. The BSRIA Soft Landings framework will be utilised to ensure that the transition from building construction to occupation is smooth and that systems are operating as they are designed to.

7.0 REDUCING IN USE ENERGY

As part of the London Plan (March 2021) SI 2 policy: Minimising greenhouse gas emissions, considerations in methods of reducing annual and peak energy demands must be completed.

Smart buildings have been identified and acknowledged as key enablers of future energy systems where will be a larger share of renewables, distributed power and heat generation, and demand-side flexibility to match demand to supply and make best use of existing network connection and local generation capacity. By providing smart metering on site with ease of access to the data, demand side response (DSR) techniques can be incorporated to reduce demand at peak times.

An automatic monitoring and targeting (AM&T) sub-metering system will be provided to assist in managing energy use throughout the development. The system will measure, record and distribute energy data for all energy uses throughout the building and will provide reporting on energy consumption to enable analysis and targeting of energy reduction opportunities.

Monitoring and adjusting control strategies, such as lowering heating set points or turning off the heat pumps earlier in the day when there is enough heat or coolth in the building, could assist in reducing peak loads.

The building has been designed to use point of use water heaters throughout, which in turn negates the requirement of pre-heat times and storage losses. This provides a higher rated domestic hot water distribution efficiency to the end user.

The BRUKL document predicts that the proposed PV array shall provide an annual electricity generation of 22,376kWh. This could be extended further by the introduction of energy storage where electricity is only used during triad periods to reduce strain on the electrical grid.

8.0 WHOLE LIFE CARBON ASSESSMENT

In line with the London Plan (Adopted March 2021), a Whole Life Carbon Assessment has been carried out using GLA approved software, One Click LCA. This analysis was built using the design information for the proposed building. A baseline model was constructed using information for materials contained within the RICS guide – Whole life carbon assessment for the built environment (November 2017). From this baseline, savings from implementing less carbon intensive materials were calculated.

The following measures have contributed to reducing the embodied carbon of the proposed development:

Action	WLC reduction ($kgCO_2e/m^2$ GIA)
Concrete to have at least 60% GGBS replacement	43.0
100% recycled Rebar	13.0
Lime mortar	0.2

This assessment found that the propose building performs well against GLA Aspirational Benchmarks contained within the GLA supplementary guidance.

Module	Aspirational Benchmark ($kgCO_2e/m^2$ GIA)	Actual ($kgCO_2e/m^2$ GIA)
A1-A5	550-600	348
B-C (Excluding B6 – B7)	250-300	251

The complete assessment is contained within the GLA spreadsheet which has been provided alongside the application.

APPENDIX 1 – BRUKL OUTPUT DOCUMENT (BE LEAN)

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

D1 - Camden Plot B Be Lean 150121 As designed

Date: Fri Jan 15 12:59:23 2021

Administrative information

Building Details

Address: 6A St Pancras Way, LONDON, NW1 0TB

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	17.5
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	17.5
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	13.1
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	$U_{k\text{-Limit}}$	$U_{k\text{-Calc}}$	$U_{i\text{-Calc}}$	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.2	BS000002:Surf[0]
Floor	0.25	0.13	0.13	BS000006:Surf[0]
Roof	0.25	0.13	0.13	BS000059:Surf[7]
Windows***, roof windows, and rooflights	2.2	1.2	1.2	GR000002:Surf[4]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	1.5	1.5	GR00001E:Surf[4]
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{k\text{-Limit}}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{k\text{-Calc}}$ = Calculated area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* 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

APPENDIX 2 – BRUKL OUTPUT DOCUMENT (BE GREEN)

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

F2 - Camden Plot B Be Green 150121 As designed

Date: Fri Jan 15 12:23:15 2021

Administrative information

Building Details

Address: 6A St Pancras Way, LONDON, NW1 0TB

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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/m².annum	16.9
Target CO_2 emission rate (TER), kgCO_2/m².annum	16.9
Building CO_2 emission rate (BER), kgCO_2/m².annum	11.2
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	$U_{k\text{-Limit}}$	$U_{k\text{-Calc}}$	$U_{i\text{-Calc}}$	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.15	BS000002:Surf[0]
Floor	0.25	0.13	0.13	BS000006:Surf[0]
Roof	0.25	0.13	0.13	BS000059:Surf[7]
Windows***, roof windows, and rooflights	2.2	1.2	1.2	GR000002:Surf[4]
Personnel doors	2.2	2.2	2.2	GR00001E:Surf[4]
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

$U_{k\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{k\text{-Calc}}$ = 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
m³/(h.m²) at 50 Pa	10	3

APPENDIX 3 – THERMAL COMFORT REPORT

KJ TAIT ENGINEERS

REEF GROUP

UBB PLOT B

ST PANCRAS WAY, LONDON

THERMAL COMFORT REPORT

REVISION P01

Document History

SUITABILITY	REVISION	DATE	DETAILS	BY	CHKD
S2	P01	15th January 2021	First Issue	MC	BH

CONTENTS

EXECUTIVE SUMMARY

KJ Tait Engineers carried out an overheating assessment of the new build Plot B of the Ugly Brown Building (UBB) at 6A St Pancras Way, London, NW1 0TB as part of the Planning application for the development. The site is located between St Pancras Way and the Regents Canal.

As the occupied spaces have been designed with mechanical cooling, the assessment has been conducted on the basis of the Predicted Mean Vote (PMV) and Percentage of People Dissatisfied (PPD) of the occupants to assess whether the ventilation provisions will be sufficient to prevent overheating and provide thermal comfort throughout the summer period. The modelling has been conducted using Design Summer Year (DSY) weather files.

It was found that under a DSY2 50th percentile weather file, all occupied spaces pass the PMV/PPD and TM52 assessment.

Using a London future weather file, all occupied spaces pass the PMD/PPD criteria and TM52 assessment,

1.0 INTRODUCTION

The purpose of this report is to demonstrate that the internal temperatures at the proposed UBB Plot B, Camden meet the requirements set out in CIBSE TM52: The Limits of Thermal Comfort and CIBSE Guide A.

A full dynamic simulation analysis was carried out using the IES VE software, in accordance with CIBSE AM11. A Design Summer Year (DSY) file was used in all simulations in line with CIBSE Guide A.

A further full dynamic simulation analysis was carried out using the same software. In this instance, a '2050 Future Weather File' was used in all simulations in line with BREEAM requirements.

The results contained in this report shall be presented as BREEAM evidence for Hea04 Thermal Comfort and to demonstrate compliance with Policy SI 4 Managing heat risk of the draft London Plan 2020.

2.0 POLICY REQUIREMENTS & DESIGN STANDARDS

2.1 London Plan

Policy SI 4 Managing heat risk of the draft London Plan 2020 states the following regarding overheating within proposed developments:

B Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:

1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
2) minimise internal heat generation through energy efficient design
3) manage the heat within the building through exposed internal thermal mass and high ceilings
4) provide passive ventilation
5) provide mechanical ventilation
6) provide active cooling systems.

As detailed in the Energy Statement, passive design elements have been optimised to reduce the heat entering the building through careful design of the building envelope. Exposed thermal mass and high soffits are also been proposed to contribute to managing the heat within the building.

The proposed development is being future-proofed for Research Laboratory use and passive ventilation and mechanical ventilation only are not compatible with laboratory use, therefore mechanical ventilation and active cooling systems are proposed to meet the required internal environmental conditions.

2.2 BREEAM Compliance

All occupied spaces are required to be in accordance with the criteria set out in CIBSE Guide A Environmental Design 2015, Table 1.5. The building has been designed to limit the risk of overheating in accordance with the adaptive comfort methodology outlined in CIBSE TM52: The limits of Thermal Comfort: Avoiding Overheating in European Buildings 2013.

The building has also been modelled using the relevant 2030 weather file to demonstrate CIBSE Guide A, Table 1.5 and CIBSE TM52 compliance for predicted climate change.

2.3 Predicted Mean Vote (PMV) and Percentage of People Dissatisfied (PPD)

Buildings that are cooled or heated mechanically can also overheat if the ventilation system is, for example, undersized or poorly controlled. The PMV/PPD Model developed by Fanger has the advantage over the CIBSE TM52 assessment by incorporating the influence of temperature, air speed, relative humidity, clothing and activity levels.

The PMV/PPD system is a measurement to predict the occupant's comfortability within the building, taking into account the influence of air temperature, mean radiant temperature, air movement, humidity, clothing and activity levels. Where the system is deemed to be a rough insight into how 'hot' or 'cold' the occupants will be, the aim is to provide to an optimum thermal for the whole group.

To assess human discomfort, the ASHRAE comfort scale can be used. This works by surveying the occupants of the building and averaging the results. Between +1 to -1 would be considered to be comfortable to the occupants as a whole.

- +3 – Hot
- +2 – Warm
- +1 – Slightly warm
- 0 – Neutral
- -1 – Slightly cool
- -2 – Cool
- -3 – Cold

A building's mechanical conditioning system can be said to have performed its task if the occupants are not conscious of its temperature. Where occupants may be comfortable with conditions when using a building for a particular use, they may become uncomfortable if these conditions are prevalent in a building where the space is used differently.

A mechanically cooled building should aim to provide an indoor environment where the PMV index is near to or equal to zero. As each occupant reacts to warmth or coolth differently, there will always be a minimum of 5% of all occupants that are dissatisfied. Therefore it is recommended to aim as close to the 5% PPD as possible. For Category B buildings, set out in Table A.1 of Annex A of ISO 7730:2005, the building will be considered as overheating if the

value of the PMV index is above 0.5 (PPD≥10%).

Operative temperature can also be used for assessing the potential for overheating in mechanically cooled buildings with a temperature of 26°C normally applicable.

3.0 DESIGN CRITERIA

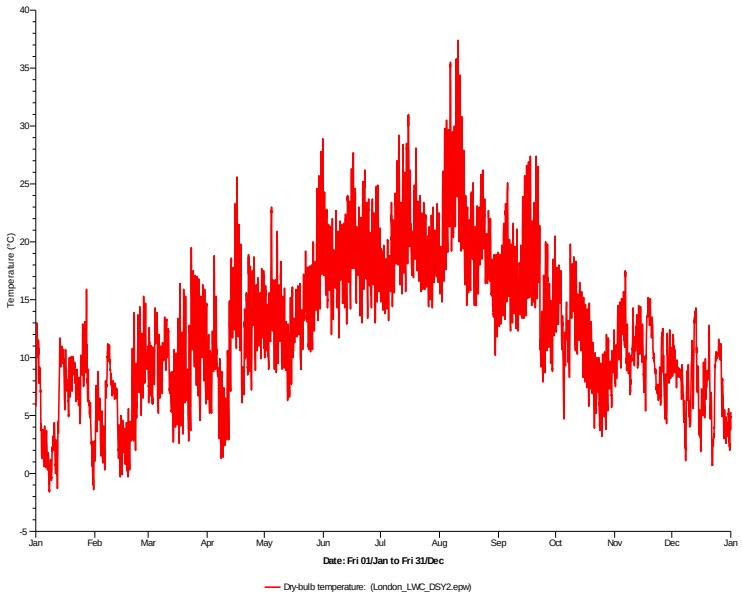
The data used to input into the modelling is presented below. The number of occupants within each room has been entered as recommended in CIBSE Guide A.

3.1 External Conditions & Weather Files

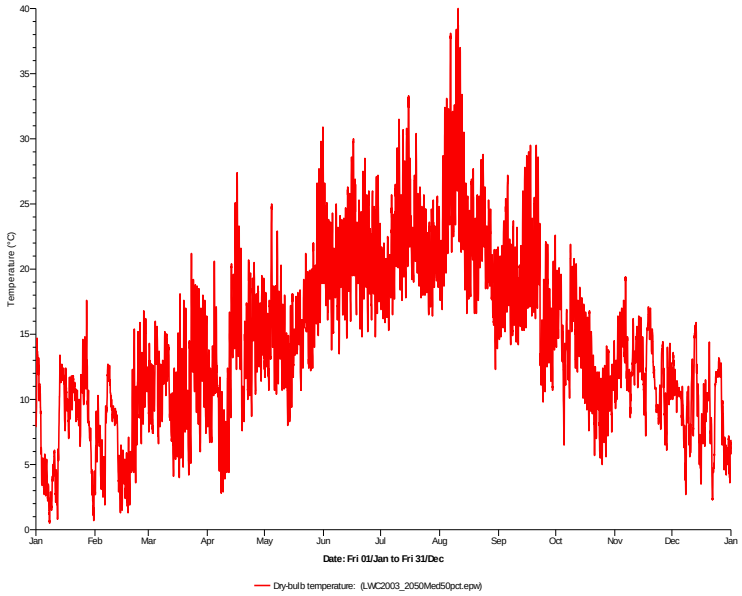
The design has been based upon historical weather data for London. In line with CIBSE guidelines, a "Design Summer Year" (DSY2) weather file was used for the current simulation. BREEAM future weather file 2050 High 50th Percentile has been used for the future condition.

Outside peak temperatures:

- Current: 10 August = 38.70ºC



- Future: 10 August = 40.30ºC



3.2 Internal Conditions

Internal design criteria for the rooms is detailed CIBSE Guide A. This typically provides the following internal design conditions.

Room Type	Summer Operative Temperature (°C)	Winter Operative Temperature (°C)
Offices	23°C DB ± 2°C	21°C DB ± 2°C
Ground Floor Open Area	23°C DB ± 2°C	21°C DB ± 2°C

3.3 Internal Gains/Occupancy

Following guidance contained in CIBSE Guide A, the internal gains modelled for each space is as follows.

Room Type	Occupancy	Equipment Load
Offices	8m^2 per person (8am – 6pm)	10W/m^2 lighting (9am-6pm) 15W/m^2 equipment (9am-6pm)
Ground Floor Open Area	3m^2 per person (7am – 7pm)	10W/m^2 lighting (12pm–10pm) 5W/m^2 equipment (12pm-10pm)

The occupancy profiles were created assuming a typical work day of 8am to 6pm, Monday to Friday and it is expected that internal gains could vary once equipment layouts and schedules will be finalized.

3.4 Auxiliary Ventilation Rates

Windows will be inoperable throughout the development, therefore no allowance has been made for them to open within the modelling. The infiltration rate has been set in line with Part L2A Building Regulations for all spaces at 0.15 ACH. The following temperature and ventilation rates have been assumed in line with CIBSE Guide A.

Unit/Room Type	Ventilation Rate
Offices	10l/s/person
Ground Floor Open Area	10l/s/person

3.5 Building Details

Modelling Software

The software used to predict the internal temperatures within the building is the IES Virtual Environment software v. 2019 which is AM11 approved. In line with CIBSE Guide A, a 'Design Summer Year' (DSY) weather file was used for the simulations.

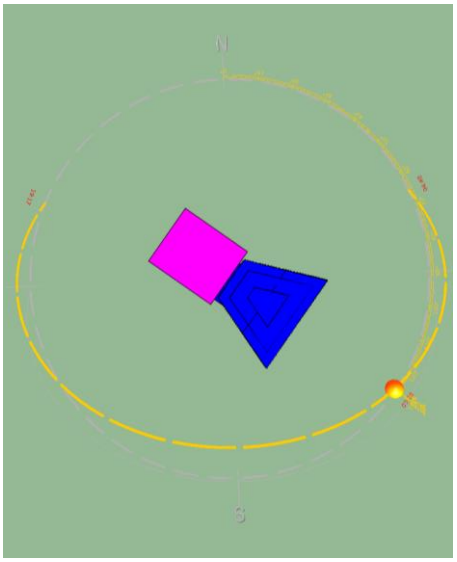
Building Geometry

The building model used for the thermal calculations have been based on the general arrangement drawings prepared by Bennetts Associates.

The air permeability has been entered as $3m^3/m^2.hr$ @ 50 Pa in line with Energy Strategy.

Building Orientation

The image below is an extract from the simulation model and indicates the building orientation.



Building Fabric

The building has been constructed with the following U-values which better Part L2A of the Building Regulations. Low g-values of the glazing are used to ensure that during the summer months, solar gains through the building fabric are reduced.

Thermal Element	U-Value (W/m^2K)

Roof	0.13
External Wall	0.2
Floor	0.13
Window	1.6 (g-value: 0.28)

4.0 RESULTS

4.1 PMV/PPD – Current Weather File

The following table shows the output of the simulation, detailing the outcome of the "People dissatisfied" and "Predicted mean vote" analysis.

In Table 1.7 of CIBSE Guide A 2015, the accepted PPD/PMV range for new buildings is 10%/ ±0.5 respectively.

The results below show that under a current weather file, the occupants predicted thermal comfort will be kept in the accepted ranges.

	Current Weather File (2020)	
Room Name	**PPD (predicted percentage of dissatisfied Max)**	**PMV (predicted mean vote Max)**
Ground Floor Foyer	9.36	-0.44
First Floor Open Plan Office	9.31	-0.45
Second Floor Open Plan Office	9.39	-.0.45
Third Floor Open Plan Office	9.51	-0.47
Fourth Floor Open Plan Office	9.44	-0.46
Fifth Floor Open Plan Office	8.98	-0.44
Sixth Floor Open Plan Office	8.90	-0.44
Seventh Floor Open Plan Office	8.92	-0.43
Eighth Floor Open Plan Office	8.63	-0.41

4.2 PMV/PPD – Future Weather File

The results in the following table have been simulated using a predicted future London 2050 DSY2 High 50th percentile weather file for London. This demonstrates that under the predicted future weather file, the occupants predicted thermal comfort will be kept in the accepted ranges.

	Future Weather File (2050)	
Room Name	**PPD (predicted percentage of dissatisfied Max)**	**PMV (predicted mean vote Max)**
Ground Floor Foyer	9.23	-0.44
First Floor Open Plan Office	9.21	-0.45
Second Floor Open Plan Office	9.35	-0.46
Third Floor Open Plan Office	9.43	-0.46
Fourth Floor Open Plan Office	9.24	-0.45
Fifth Floor Open Plan Office	8.56	-0.41
Sixth Floor Open Plan Office	8.65	-0.42
Seventh Floor Open Plan Office	8.59	-0.41
Eighth Floor Open Plan Office	8.27	-0.40

5.0 SUMMARY OF RESULTS

The modelling shows that the there are no hours where the PMV is above 0.5 nor above 10% of people dissatisfied for the building in either the current or future scenario given the ventilation strategy and assumed internal gains.

The Fanger methodology of the PMV/PPD assessment provides a better insight into how occupants would feel in current and future climates where temperatures, humidity and activity levels may change. As it is known that is impossible to keep every occupant happy with the internal resultant temperature, the methodology adopts a 5% base to acknowledge this. The aim from the analysis is to keep a PPD range between 5% and 10%, keeping minimal dissatisfaction across the occupied spaces.

The future weather file futureproofs the building usage, showing that even with predicted climate changes and higher external temperatures, the occupants will still be comfortable within the working environment.

The results displayed in Section 4.2 can be used as evidence for BREEAM HEA04 Thermal Comfort.

The internal conditions used within the model show compliance with CIBSE Guide A, changing such condition in a negative way, such as higher internal gains will cause a knock on effect onto the occupants satisfaction.