FEBRUARY 2024

Sustainability and Energy Statement

3 The Square, Stockley Park, Hayes, Uxbridge, UB11 1ET

ICENI PROJECTS LIMITED ON BEHALF OF F&C COMMERCIAL PROPERTY HOLDINGS C/O COLUMBIA THREADNEEDLE REAL ESTATE PARTNERS

Iceni Projects Limited on behalf of F&C Commercial Property Holdings c/o Columbia Threadneedle Real Estate Partners

February 2024

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Sustainability and Energy Statement
3 THE SQUARE, STOCKLEY PARK, HAYES, UXBRIDGE, UB11 1ET

CONTENTS

1. EXECUTIVE SUMMARY

1.1 Iceni Projects Ltd has been commissioned by F&C Commercial Property Holdings c/o Columbia Threadneedle Real Estate Partners to produce a Sustainability, and Energy Statement to support the proposed redevelopment of 3 The Square, Stockley Park, Hayes, Uxbridge, UB11 1ET.

1.2 This application proposes the redevelopment of the site to provide a post-operative care facility, alongside high-quality landscaping.

1.3 Sustainability is a core consideration of the application, and has been incorporated from the project outset. Resource and water efficiency have been maximised, whilst the production of waste and pollution is to be minimised, thus ensuring the impact of the proposals on its immediate surroundings and the environment as a whole is minimised.

1.4 By designing to rigorous energy standards and employing electric-only systems, including air source heat pumps (ASHPs), the application will respond directly to the Climate Emergency declared by the Council in January 2020. These measures combine to provide an approximate carbon dioxide emissions saving of 72% compared to the Part L:2021 baseline, significantly exceeding the requirements of London Borough of Hillingdon and the Greater London Authority (GLA).

1.5 Through the use of electric-only systems for space heating and cooling and hot water, the scheme will be fossil fuel free, and compatible with the Government's intended trajectory to achieve net zero carbon emissions by 2050.

1.6 Consideration has been given to the London Borough of Hillingdon Local Plan Part 1 and 2 in the overall formulation of this strategy, aiming to minimise the environmental impact of the proposed development during construction and operation, and to ensure the development is constructed to rigorous sustainability standards.

1.7 The proposed strategy has been based around the objectives of the Local Plan Part 1 strategic objectives 8, 10, 11 and 13 and policy EM1, and Local Plan Part 2 policy DMEI 2. In summary, based on this strategy, the proposed development will;

- make efficient use of land, retaining and converting an existing building, and developing brownfield land;
- promote the use of sustainable modes of transport;

- minimise internal water consumption through the incorporation of water-efficient fittings and services;
- incorporate low-impact materials, according to the BRE Green Guide to Specification;
- minimise waste production during construction and maximise the proportion of waste to be diverted from landfill;
- ensure that the risk of overheating is mitigated;
- incorporate measures to improve site biodiversity, including biodiverse planting;
- provide access to areas of green space in the form of a central podium landscaped courtyard;
- not increase the risk of surface water flooding onsite;
- ensure air, noise, land, light and water pollution are minimised as far as possible;
- minimise energy demand through the specification of low U-values, low air permeability and energy efficient systems and appliances; and
- utilise electric-only systems, such as air source heat pump (ASHP) systems or a multi-function heat recovery (hybrid) chiller system to serve the space heating and cooling demands and water heating demands of the proposed development.

1.8 By designing to rigorous energy standards, and omitting the use of fossil fuels for heating and cooling within the apart-hotel portion of the scheme, the proposed development will achieve an approximate minimum 72% reduction in CO_2 emissions, following the Energy Hierarchy methodology. The remaining 126 tonnes of CO_2 per annum of non-domestic emissions from the development will be offset through a cash-in-lieu contribution.

Figure 1.1 Carbon dioxide emissions after each stage of the Energy Hierarchy

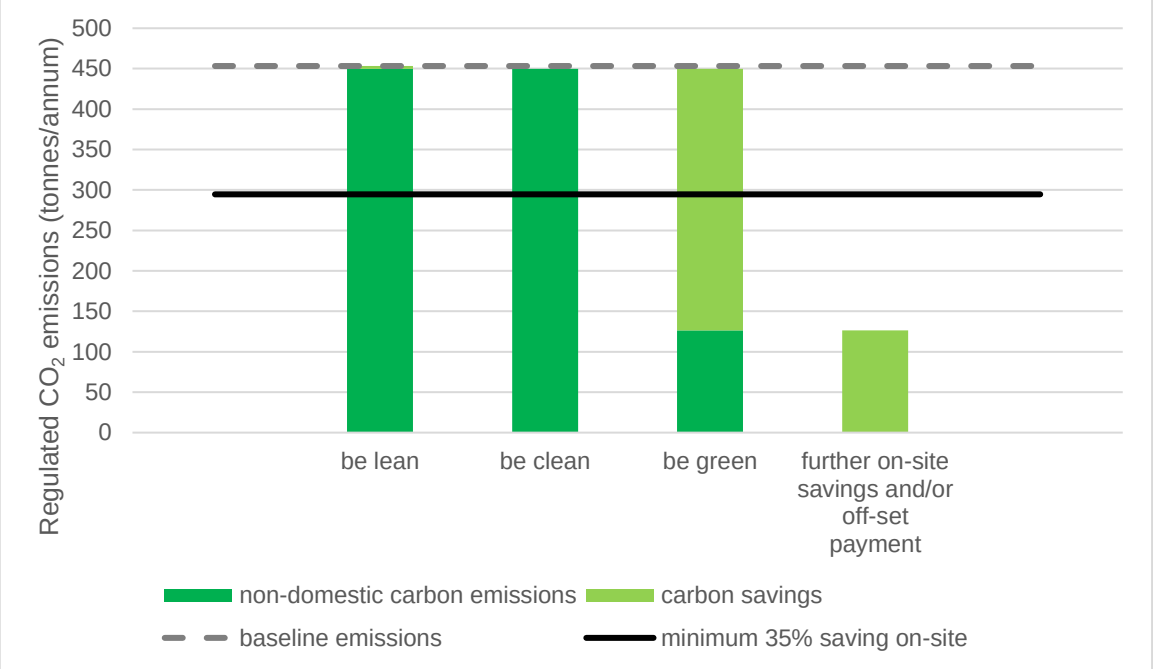


Table 1.1 Carbon dioxide emissions after each stage of the Energy Hierarchy

	Site-wide carbon dioxide emissions (Tonnes CO_2 per annum)
Baseline: Part L 2021 of the Building Regulations Compliant Development	453.3
After energy demand reduction	449.9
After renewable energy	126.3

Table 1.2 Regulated carbon dioxide savings from each stage of the Energy Hierarchy

	Regulated carbon dioxide savings	
	Tonnes CO_2 per annum	**%**
Savings from energy demand reduction	3.4	1.0%
Savings from renewable energy	323.6	71.4%

Cumulative on-site savings	327.1	72.2%
Annual savings from offset payment	126.3	-
	Tonnes CO_2	
Cumulative savings for offset payment	3,788	-
Cash-in-lieu contribution	£359,901	-

1.9 Overall, the proposals constitute sustainable development in accordance with national, regional and local policy requirements and will provide a development that seeks to promote these principles in operation

2. INTRODUCTION

2.1 Iceni Projects Ltd has been commissioned by F&C Commercial Property Holdings c/o Columbia Threadneedle Real Estate Partners to produce a Sustainability, and Energy Statement to support the proposed redevelopment of 3 The Square, Stockley Park, Hayes, Uxbridge, UB11 1ET.

Report Objective

2.2 This document details the sustainable design and construction measures adopted by the proposed redevelopment and gives an overview of the design proposals that will ensure the development operates in a sustainable manner over the lifespan of the scheme. The Sustainability and Energy Statement report headlines will provide a framework for the project team to operate consistently within sustainability guidelines set out by London Borough of Hillingdon.

2.3 The report is structured to meet these guidelines as follows:

- Section 3 discusses the planning context and policies which are relevant to sustainability;
- Section 4 discusses the development response to the policy drivers for sustainability;
- Section 5 sets out the development's energy strategy to minimise CO_2 emissions; and
- Section 6 summarises the development's design response.

Site and Surroundings

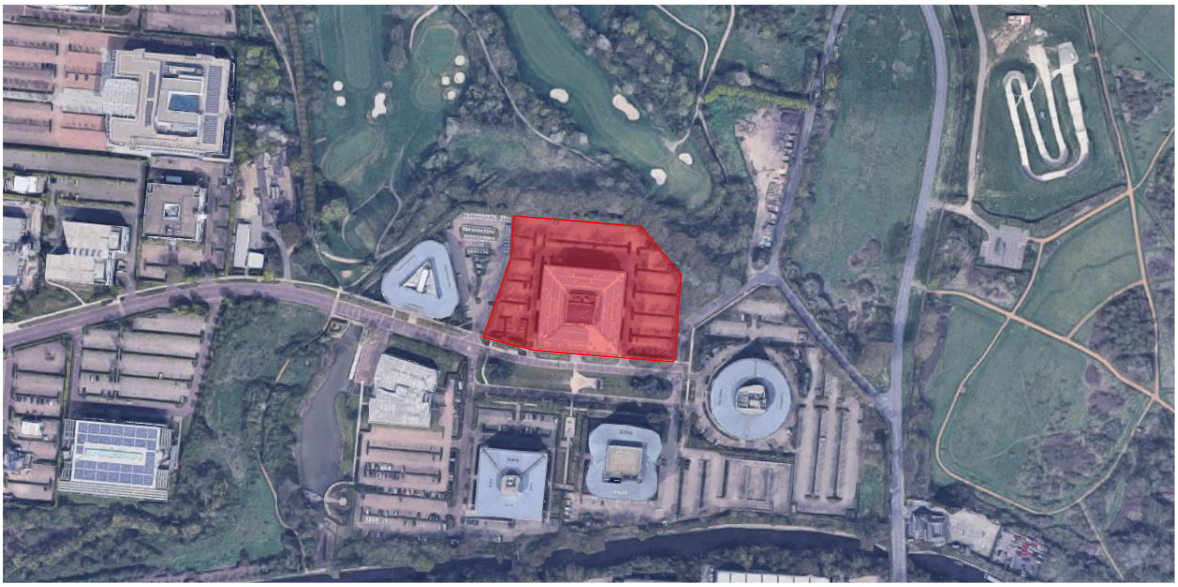
2.4 The application site (Appendix A1) is located within the London Borough of Hillingdon, to the north of London Heathrow Airport. The site, which is situated within the Stockley Park business estate, is bounded by The Square to the south, an office building at 2 The Square to the west, and an office building at 4 The Square to the east, which is currently in use by Hikvision UK, as well as Hasbro UK and Hasbro European Services. The northern boundary of the site is formed by the Stockley Park Golf Course.

2.5 The application site itself currently comprises a vacant office building, with associated car parking and hard surfaces, that was previously used as the European headquarters for the Japanese electronics manufacturer, Canon. The surrounding area is characterised by business and office uses, with the Grade II listed Registered Park and Garden, Stockley Park, located to the northwest of the site, the Stockley Park Golf Club to the north, and the Lake Farm Country Park to the east.

2.6 The approximate location and site boundary of the site are shown in Figure 2.1 below.

Figure 2.1 The site

Approximate Site Boundary



The Proposed Development

2.7 The description of development is as follows:

> *"Full planning permission for the change of use of existing office building (Use Class E, formerly Use Class B1) to a post-operative care facility (Use Class C2) and the provision of landscaping and associated works."*

2.8 The images below show selected elevations and plans of the scheme, based on the information provided by Hale Architecture Ltd.

Figure 2.2 South elevation

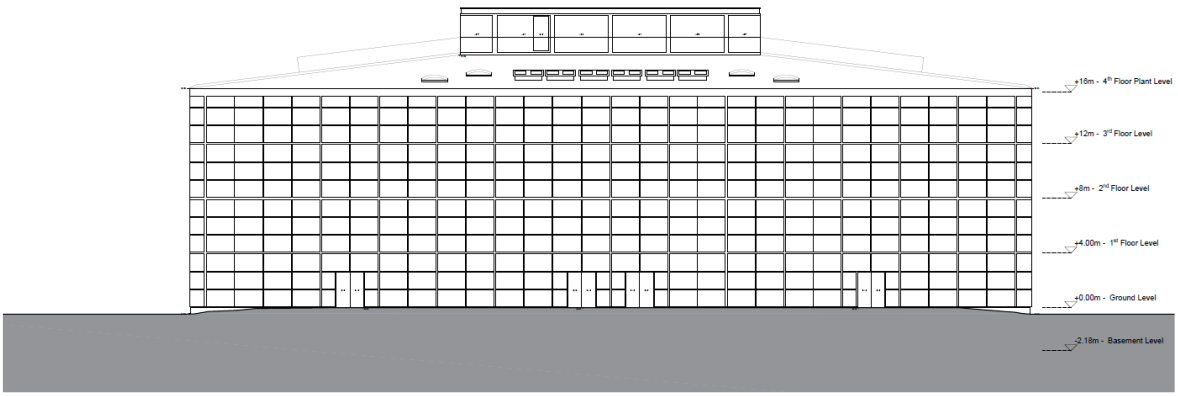


Figure 2.3 North elevation

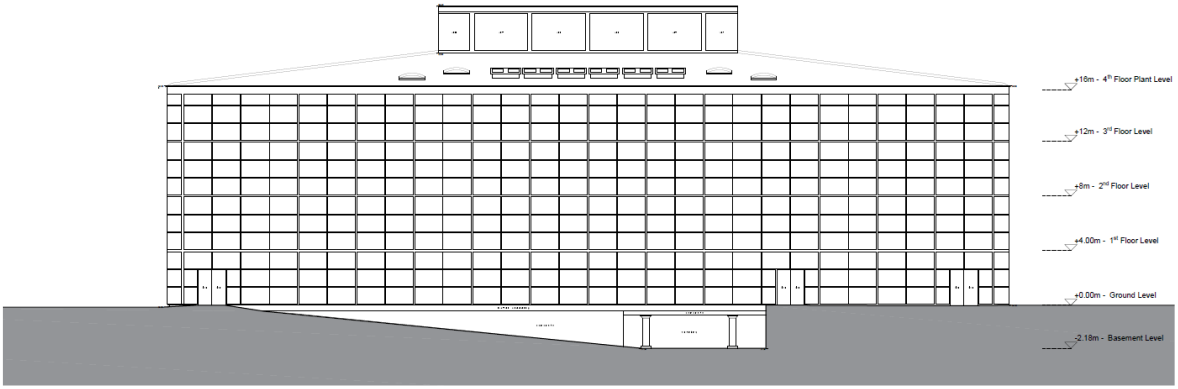


Figure 2.4 West elevation

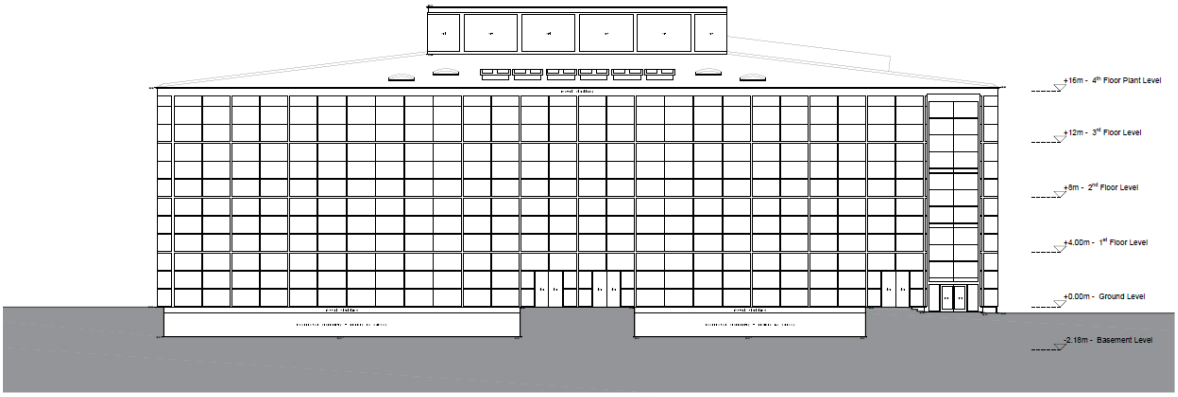


Figure 2.5 East elevation

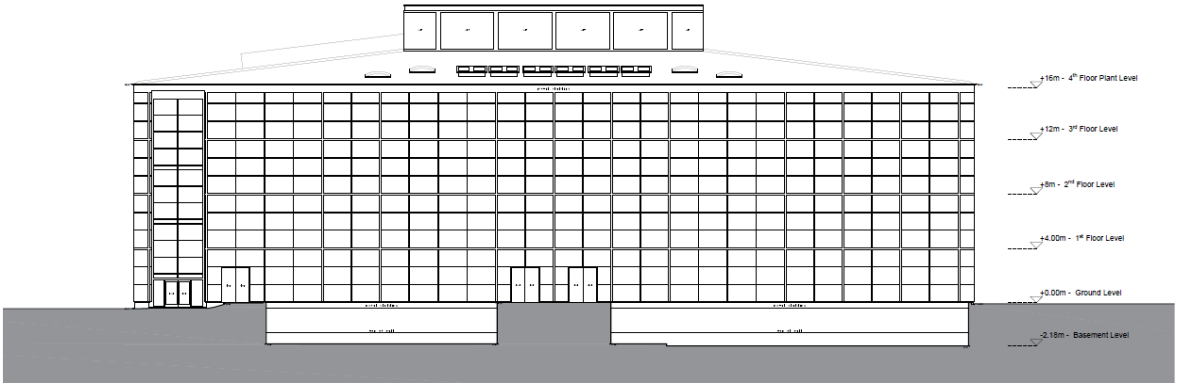


Figure 2.6 Basement floor

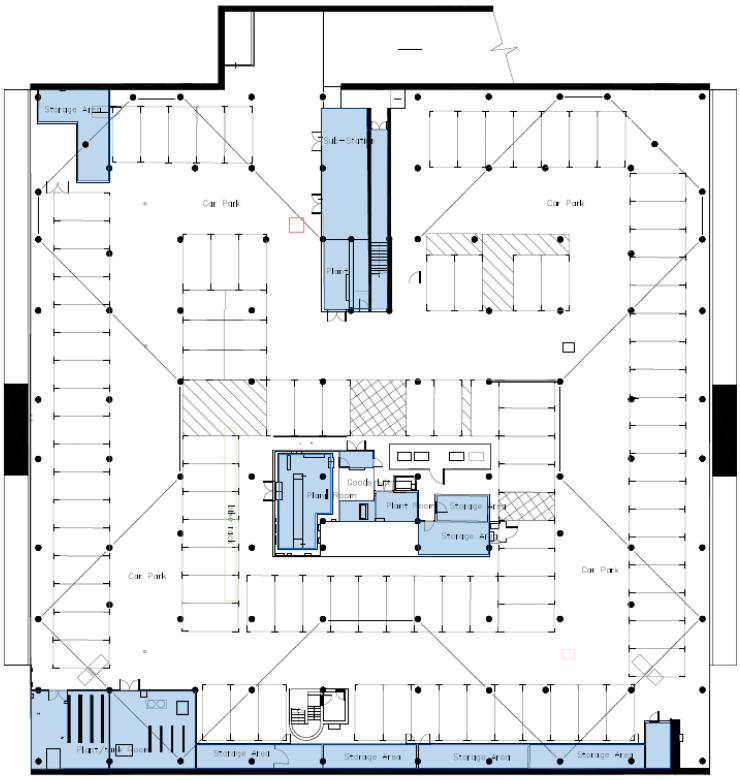


Figure 2.7 Ground floor

Figure 2.8 First floor

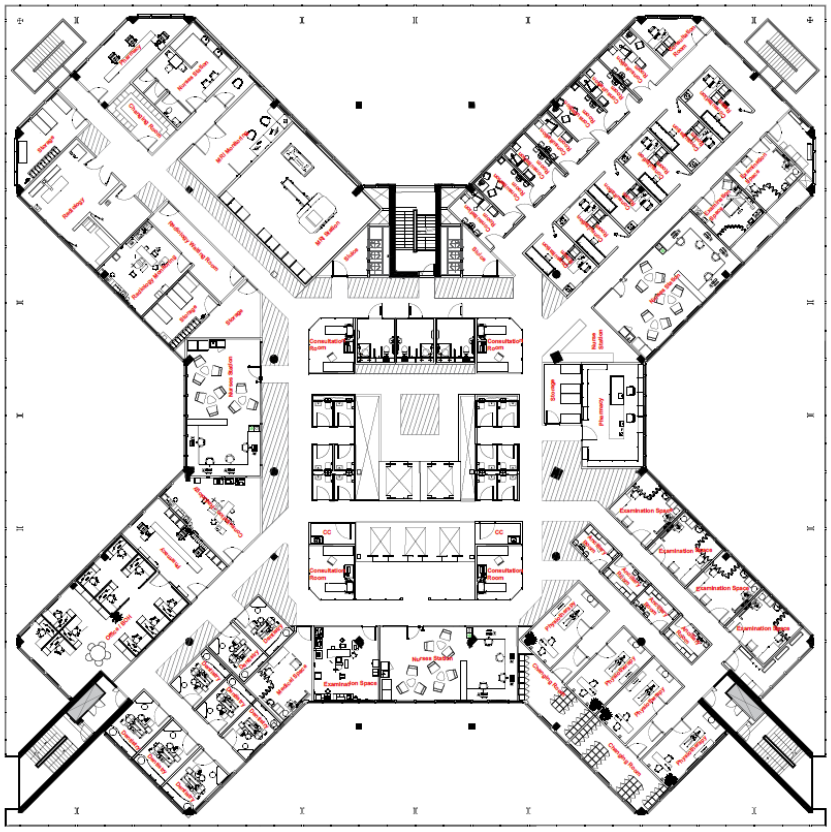


Figure 2.9 Second floor

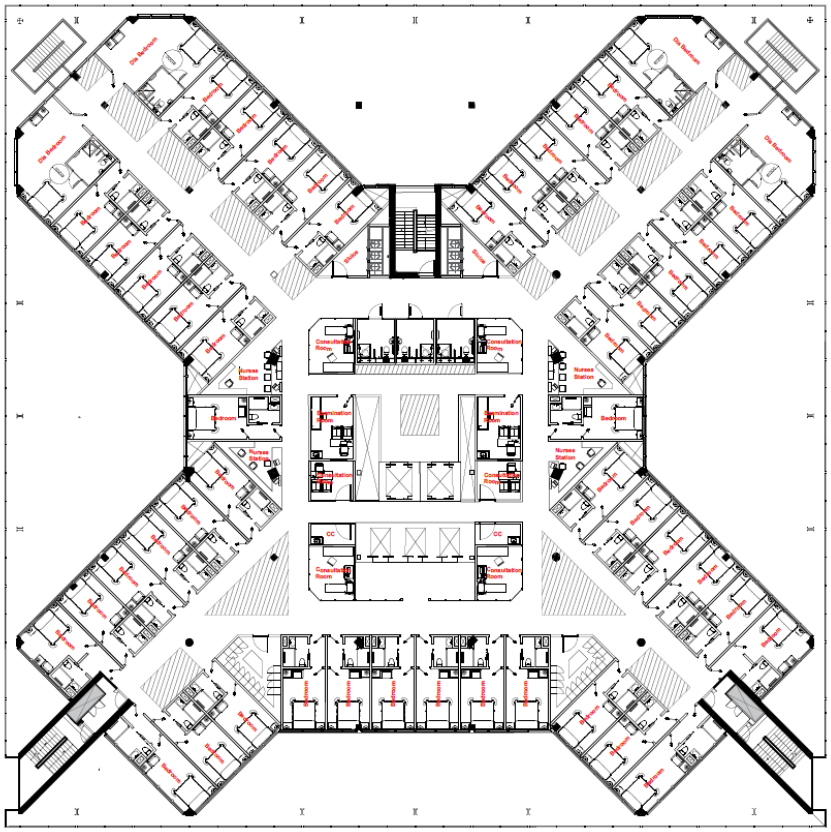


Figure 2.10 Third floor

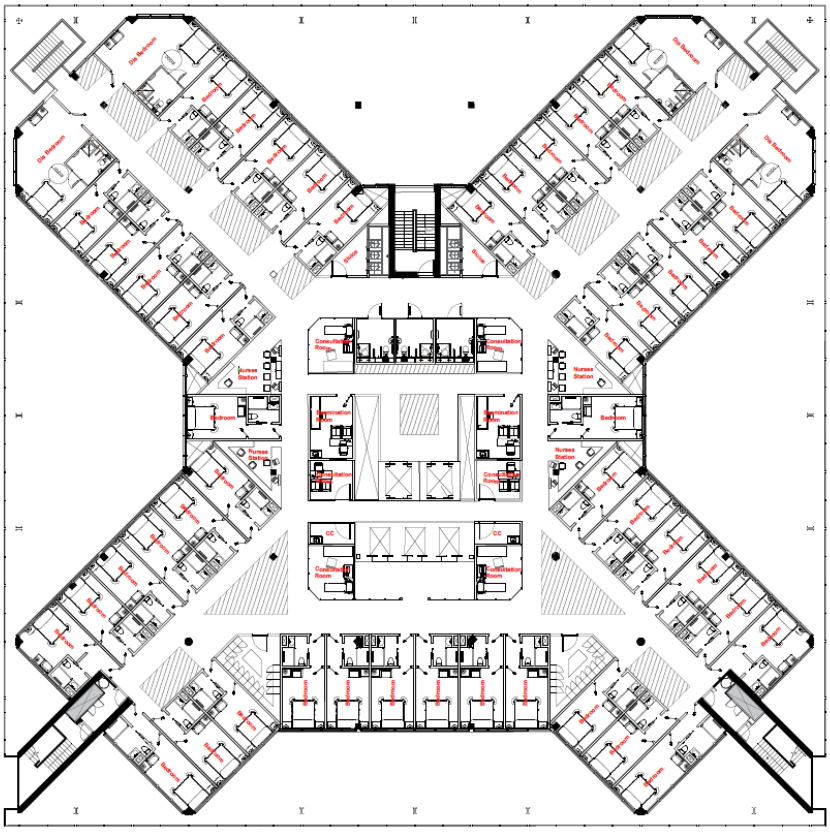
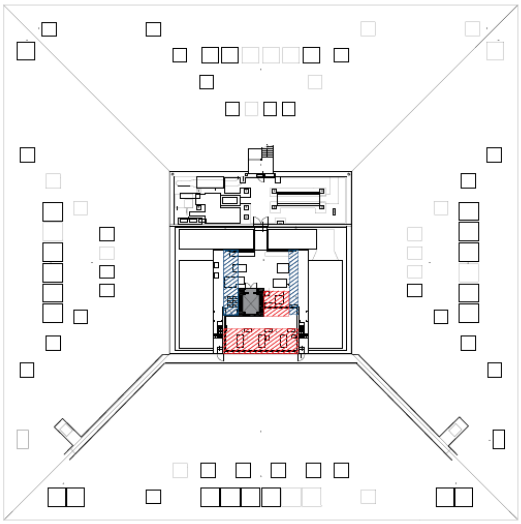


Figure 2.11 Fourth floor



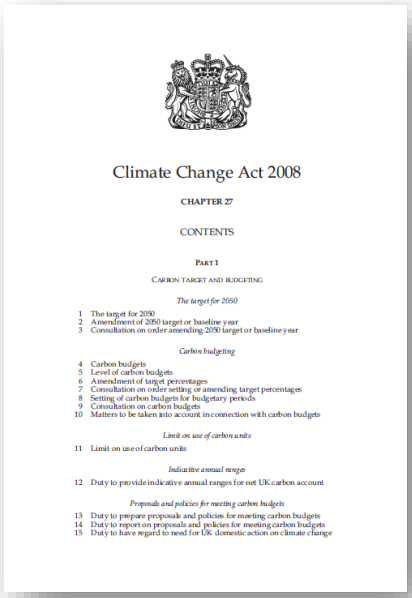
3. PLANNING AND REGULATORY CONTEXT

3.1 Built environment sustainability is incorporated within policy and regulation at a national, regional and local level, as set out below.

National

Climate Change Act 2008

3.2 On 26th November 2008, the UK Government published the Climate Change Act 2008; the world's first long-term legally binding framework to mitigate against climate change. Within this framework, the Act sets legally binding targets to increase greenhouse gas emission reductions through action in the UK and abroad from the 60% target set out in the Energy White Paper, to 80% by 2050.



Climate Change Act 2008

CHAPTER 27

CONTENTS

PART 1

CARBON TARGET AND BUDGETING

The target for 2050

1 The target for 2050
2 Amendment of 2050 target or baseline year
3 Consultation on order amending 2050 target or baseline year

Carbon budgeting

4 Carbon budgets
5 Level of carbon budgets
6 Amendment of target percentages
7 Consultation on order setting or amending target percentages
8 Setting of carbon budgets for budgetary periods
9 Consultation on carbon budgets
10 Matters to be taken into account in connection with carbon budgets

Limit on use of carbon units

11 Limit on use of carbon units

Indicative annual ranges

12 Duty to provide indicative annual ranges for net UK carbon account

Proposals and policies for meeting carbon budgets

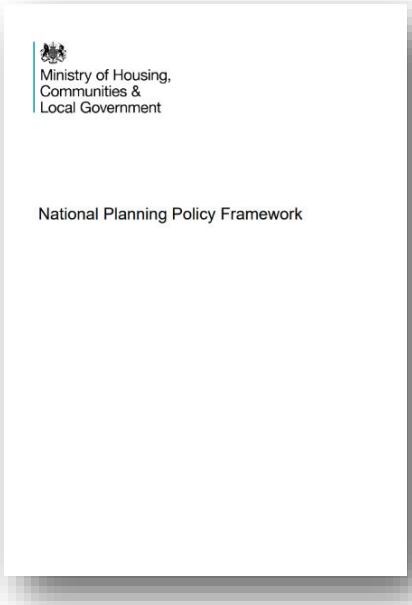
13 Duty to prepare proposals and policies for meeting carbon budgets
14 Duty to report on proposals and policies for meeting carbon budgets
15 Duty to have regard to need for UK domestic action on climate change

3.3 As required under Section 34 of the Climate Change Act, the Sixth Annual Carbon Budget was accepted by the Government in April 2021. This sets out a budget for UK emissions for the period 2033 – 2037.

3.4 Following a commitment in June 2019, the Climate Change Act has been amended to target net zero carbon emissions by 2050.

National Planning Policy Framework

3.5 The Ministry of Housing, Communities & Local Government determines national policies on different aspects of planning and the rules that govern the operation of the system. Accordingly, the National Planning Policy Framework (NPPF), which came into force in March 2012 and was updated in February 2019, aims to strengthen local decision making. Additional updates have since been made through the latter half of 2020 and in January and July 2021 to reflect changes related to use classes, permitted development rights, the calculation of housing need, and requirements to achieve beauty alongside sustainability. Further updates were made in September



Ministry of Housing, Communities & Local Government

National Planning Policy Framework

and December 2023 with respect to onshore wind development, and beauty, design, infrastructure, neighbourhood and the environment, respectively.

3.6 Paragraphs 10 and 11 of the NPPF confirm that at the heart of this document is a "*presumption in favour of sustainable development*", and that development proposals that accord with an up-to-date development plan should be approved without delay.

3.7 Paragraph 7 states that the purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

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

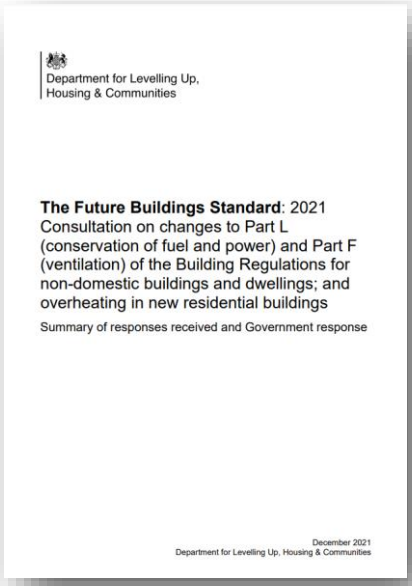
- **An Economic Role –** ensuring the provision of land and infrastructure needed to help build a *strong, responsive and competitive economy.*

- **A Social Role –** supplying the required amount of housing while at the same time ensuring and building *strong, vibrant and healthy communities.* Ensuring that the built environment is sited around accessible local services which help support a community's *health, social and cultural well-being.*

- **An Environmental Role –** ensuring development contributes to the protection and enhancement of the *natural, built and historic environment* through the improvement of biodiversity, minimising the use of natural resources and production of pollution / waste, and guaranteeing sufficient adaptation to climate change.

Future Buildings Standard

3.9 On 19th January 2021, the government announced the future introduction of the Future Buildings Standard. The Standard will deliver new non-domestic buildings that are zero-carbon ready from 2025 onward, which use low-carbon heat, and which have the best fabric standards possible. As the electricity grid continues to decarbonise, buildings built to the Standard will become net-zero carbon over time, with no need for further energy efficiency retrofit work as they will not rely on fossil fuels for heating and hot water.



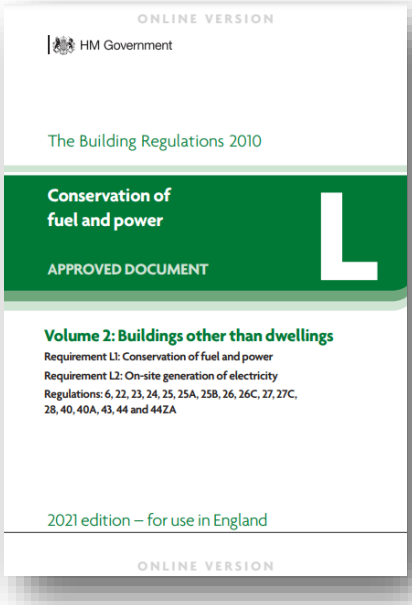
3.10 This Standard is expected to build on the Prime Minister's Clean Growth Grand Challenge mission, which aims to at least halve the energy usage of new buildings by 2030. It also looks to halve the costs of renovating new existing buildings to achieve a similar standard of energy efficiency as new buildings, whilst improving their quality and safety.

Part L:2021 of the Building Regulations

Part L of the Building Regulations relates to the conservation of fuel and power, and applies to both new and existing buildings. The current edition covers the energy efficiency requirements of the building regulations as set out in Part L of Schedule 1 to the Building Regulations. Technical guidance is contained in two Part L Approved Documents.

3.11 The documents of relevance to this scheme include:

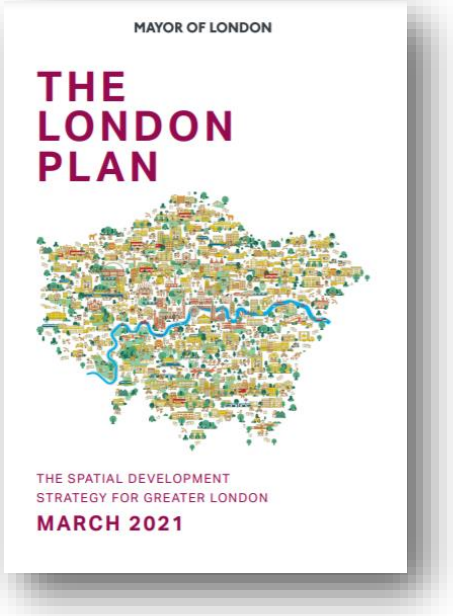
- **Approved Document L Volume 2: Buildings other than dwellings.** This provides the methodology for new build, non-domestic buildings to meet current energy efficiency standards, including backstop U-values, carbon dioxide emissions calculations and minimising the risk of overheating. Carbon dioxide emissions reductions are prescribed for 'regulated' emissions only, and relate to heating, hot water, lighting, auxiliary and cooling (where specified). Emissions from other equipment (computers, for example) are considered to be unregulated emissions, and are excluded from the analysis.



Regional

3.12 Within Greater London, key sustainable development principles for economic, environmental and social improvement are set out below:

The London Plan (March 2021)



3.13 The London Plan is the overall strategic plan for London and includes policies for sustainable development and energy within Chapter 9 (London's response to climate change). Key policies of relevance to this scheme are as follows:

- **Policy SI2 Minimising Greenhouse Gas Emissions.** This states that major development proposals should be net zero-carbon, by reducing greenhouse gas emissions in operation 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, verify and report on energy performance

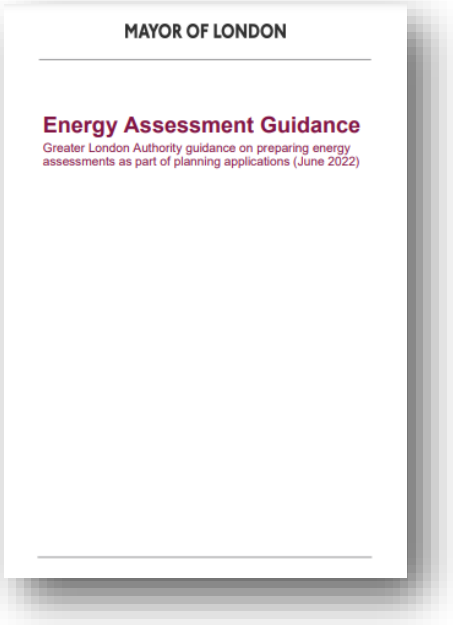
- **Policy SI3 Energy Infrastructure.** This policy recognises that combined heat and power installations can have negative effects on London's air quality and shifts the focus of decentralised energy networks to the use of waste or secondary heat sources, where available. The policy also recognises that, compared to increasingly decarbonised electricity generation, gas-fired heat will become comparatively more carbon intensive as the electricity grid is further decarbonised.

- **Policy SI4 Managing Heat Risk.** This policy states that development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

- **Policy SI5 Water Infrastructure.** This states that major development proposals should achieve at least the BREEAM excellent standard for the 'WAT 01' water category or equivalent (commercial development).

- **Policy SI7 Reducing Waste and Supporting the Circular Economy.** This states that resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved, in part, through designing developments with adequate, flexible and easily accessible storage space and collection systems.

Energy Planning – GLA guidance on preparing energy assessments (June 2022)



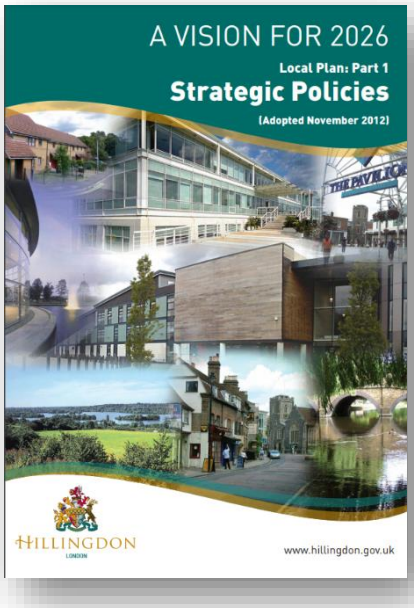
3.14 The guidance note provides further detail on addressing the London Plan's energy hierarchy through the provision of an energy assessment to accompany planning applications. The document sets out the expected carbon dioxide emissions targets for different building types.

3.15 The guidance outlines the requirement for all major application within London to achieve a minimum 35% carbon dioxide emissions savings over the Part L:2021 baseline through on-site means alone. The guidance also sets out the requirement to report the Energy Use Intensity (EUI) and the space heating demand of the development using the GLA's carbon emissions reporting spreadsheet.

Local

3.16 In determining the local context, the London Borough of Hillingdon Local Plan Part 1 Strategic Policies (November 2012) and the Local Plan Part 2: Development Management Policies (January 2020) set out policy relevant to sustainable development.

London Borough of Hillingdon Local Plan Part 1: Strategic Policies (November 2012)



3.17 The Local Plan: Part 1 sets out the planning vision and strategy for London Borough of Hillingdon. It identifies how the borough will guide future development in terms of the effective choice of housing, jobs and supporting infrastructure such as schools, health, leisure and community facilities, as well as ensuring places in the borough become vibrant, safe and welcoming. Policies and objectives of relevance to this project in the context of sustainability and energy are as follows:

- **Strategic Objective 8:** Protect and enhance biodiversity to support the necessary changes to adapt to climate change. Where possible, encourage the development of wildlife corridors.
- **Strategic Objective 10:** Improve and protect air and water quality, reduce adverse impacts from noise including the safeguarding of quiet areas and reduce the impacts of contaminated land.
- **Strategic Objective 11:** Address the impacts of climate change, and minimise emissions of carbon and local air quality pollutants from new development and transport.
- **Strategic Objective 13:** Support the objectives of sustainable waste management.
- **Policy EM1: Climate Change Adaption and Mitigation.** The Council will ensure that climate change mitigation is addressed at every stage of the development process by:
    - Prioritising higher density development in urban and town centres that are well served by sustainable forms of transport.
    - Promoting a modal shift away from private car use and requiring new development to include innovative initiatives to reduce car dependency.
    - Ensuring development meets the highest possible design standards whilst still retaining competitiveness within the market.

- Working with developers of major schemes to identify the opportunities to help provide efficiency initiatives that can benefit the existing building stock.

- Promoting the use of decentralised energy within large scale development whilst improving local air quality levels.

- Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other pollutants that impact on local air quality. Targeting areas of poor air quality for additional emissions reductions.

- Encouraging sustainable techniques to land remediation to reduce the need to transport waste to landfill. In particular developers should consider bioremediation as part of their proposals.

- Encouraging the installation of renewable energy for all new development in meeting the carbon reduction targets savings set out in the London Plan. Identify opportunities for new sources of electricity generation including anaerobic digestion, hydroelectricity and a greater use of waste as a resource.

- Promoting new development to contribute to the upgrading of existing housing stock where appropriate.

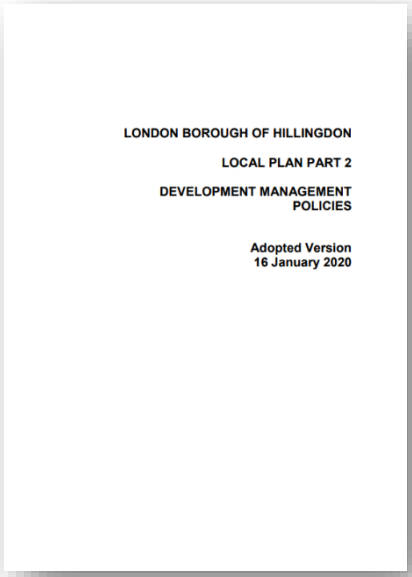
The Borough will ensure that climate change adaptation is addressed at every stage of the development process by:

- Locating and designing development to minimise the probability and impacts of flooding.

- Requiring major development proposals to consider the whole water cycle impact which includes flood risk management, foul and surface water drainage and water consumption.

- Giving preference to development of previously developed land to avoid the loss of further green areas.

London Borough of Hillingdon Local Plan Part 2: Development Management Policies (January 2020)



3.18 The purpose of the Local Plan Part 2: Development Management Policies is to provide policies that will form the basis of the decision making on individual planning applications. The document contains policies relating to new development and environmental protection and enhancement. Policies of relevance are as follows:

- **Policy DME 5: Hotels and Visitor Accommodation.** The Council will support a range of visitor accommodation, conference and related uses in accessible sustainable locations, as defined in the Site Allocations and Designations document, subject to:

    - A high standard of building and site design, including landscaping and placement of signage that makes a positive contribution to local amenity and the streetscape;

    - Provision of an accessible layout and rooms in accordance with Policy DME 6: Accessible Hotels and Visitor Accommodation; and

    - No adverse impact on nearby land uses or on the amenity of either adjoining occupants or proposed occupants by virtue of noise, lighting, emissions, privacy, overlooking, any other potential nuisance, parking or traffic congestion.

- **Policy DMEI 2: Reducing Carbon Emissions.**

A. All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets.

B. All major development proposals must be accompanied by an energy assessment showing how these reductions will be achieved.

C. Proposals that fail to take reasonable steps to achieve the required savings will be resisted. However, where it is clearly demonstrated that the targets for carbon emissions cannot be met onsite, the Council may approve the application and seek an off-site contribution to make up for the shortfall.

Other Considerations

Declaration of a Climate Emergency (January 2020)

3.19 On the 16th January 2020, the London Borough of Hillingdon Council declared a climate change emergency, agreeing to extend the Council's climate change targets beyond those set at the time to become carbon neutral across the Council's services by 2030, and to achieve 100% clean energy across the Council's services by 2030. The Council resolved that, to meet these targets practically and to be accountable to residents for them:

- Recognise that, initially, they will span the Council's direct services and, subject to future review by the Cabinet, may grow to encompass the Council's wider commercial supply chain;
- The Cabinet Member for Housing and the Environment, in consultation with the Leader of the Council assumes a new Executive responsibility within the Council's Constitution for climate change strategy;
- Responsibility for oversight and scrutiny of the Council's efforts in relation to climate change be given to the Corporate Services, Commerce and Communities Policy Overview Committee to review as they see fit and engage the community;
- The Chief Executive designate a lead officer to act corporately on climate change an in pursuit of the above targets;
- An annual action plan be submitted to Cabinet, aligned with the budget, to monitor achievement. Furthermore, a review of environmental performance reporting be undertaken to actively engage staff in ways to tackle climate change in their service areas and communicate progress more widely to residents.

4. SUSTAINABILITY STRATEGY

4.1 The Sustainability and Energy Statement for the proposed redevelopment is divided into two main parts.

4.2 The sustainability strategy for the proposed development has been assessed in line with the guidance set out within relevant policies of the London Borough of Hillingdon Local Plan Part 1: Strategic Policies and Part 2: Development Management Policies policy. This enables a holistic sustainability approach to be set out for the proposed redevelopment. The London Borough of Hillingdon Local Plan requires that all new development provides sustainable, high quality and inclusive design, and therefore represents best practice guidance to meet high standards of sustainable design and construction.

4.3 The carbon dioxide (CO_2) emissions reduction strategy for the proposed building to be delivered as part the development is based on the energy hierarchy to provide a rigorous methodology, which maximises cost-effective opportunities for emissions reduction, as detailed in Section 5.

Sustainable Design and Construction

4.4 In line with the guidance provided in the London Borough of Hillingdon Local Plan, the sustainability features of the proposed development are outlined below.

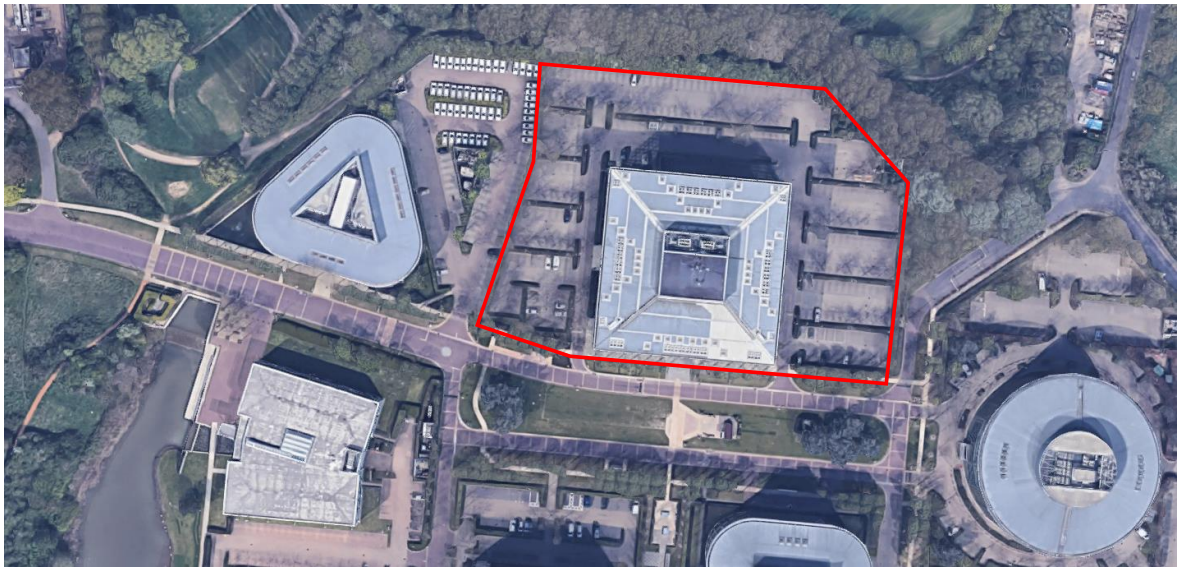
4.5 Issues related to energy conservation, renewables and reducing greenhouse gases follow in a dedicated section.

Land

4.6 As shown in Figure 4.1 below, the site is currently occupied by a vacant, four-storey office building, that was previously used as the European headquarters for the Japanese electronics manufacturer, Canon. Associated hard standing car parking and marginal planting is also present on the site.

Figure 4.1 View of the existing site

Approximate Site Boundary



4.7 Based on this, the land has been previously developed. In this way, the proposed redevelopment of the site within this location will provide new post-operative care facilities, in a sustainable location within the London Borough of Hillingdon.

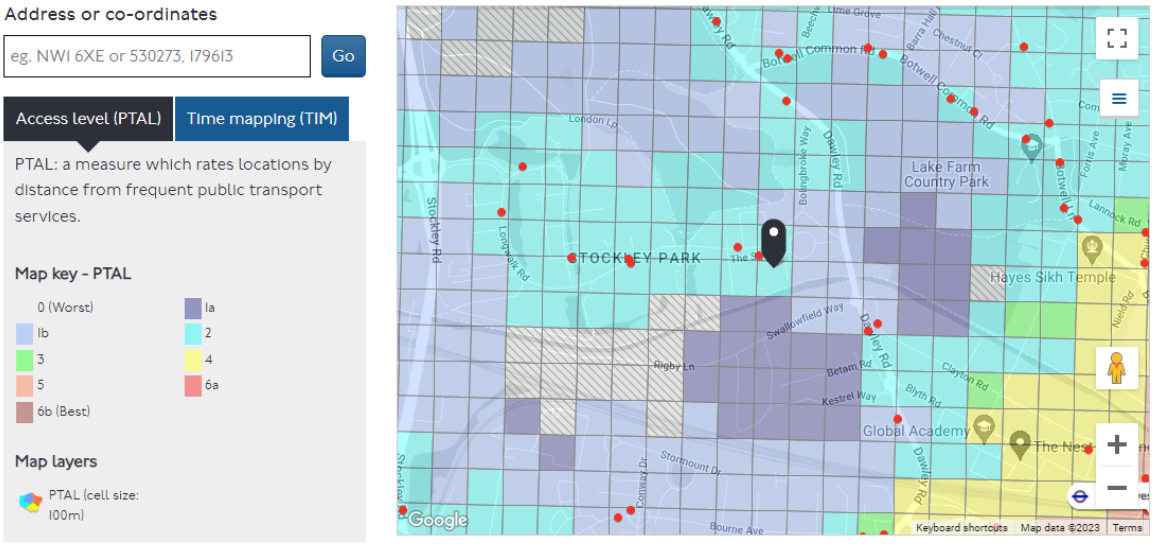
Location and Transport

4.8 According to the Transport Assessment, produced by Iceni Projects, the site has public transport connections for the London bus network, with the site scoring a PTAL rating of 2. The site is served by a number of regular bus stops, including two located on The Square to the south of the site. these bus stops are served by the following three services:

- Route 350, providing access to Uxbridge, Heathrow Airport, and Hayes Town;
- Route A10, providing access to Heathrow Airport and Uxbridge; and
- Route U5, providing access to Uxbridge and Hayes Town.

4.9 Hayes and Harlington station is also located approximately 1.6km to the south of the site, accessible by foot in approximately 25 minutes, or by cycling approximately 10 minutes. This station is served by the Elizabeth line, providing access to Heathrow Airport, Shenfield, Abbey Wood and Reading.

Figure 4.2 Extract from TFL PTAL map



4.10 Access to the site will be via the southern boundary from The Square, as per the existing case. The existing access arrangements will be provided to ensure that they accord with the necessary design standards with respect to carriageway widths, footways, kerb radii and surfacing. The existing car park to the west of the building is to be redeveloped to provide a Restorative Garden for future patients, whilst the existing car park area to the east of the building will undergo a comprehensive re-design to separately serve operational and HGV traffic, as well as to provide visitor and staff car parking spaces.

4.11 A total of 253 car parking spaces will be provided at the ground floor level to the east of the building, of which 235 will comprise standard spaces, and an additional 18 will comprise accessible space. This represents a reduction in the total number of car parking spaces at the site when compared to the existing case, however this is considered to be acceptable when accounting for the expected decrease in the number of staff and visitors that would use the proposed development. It is also intended that electric vehicle charging facilities on-site will meet Part S of Building Regulation requirements and BREEAM requirements.

4.12 A total of 92 cycle parking spaces will be provided in the form of Sheffield Stands. It is expected an adequate mix of cycle parking stands to be provided to accommodate for all users and types of cycles, as a minimum 20% of the long stay stands should be Sheffield stands with a further 5% designed to accommodate larger or adapted cycles.

4.13 A Travel Plan was prepared for the wider Stockley Park area by Velocity Transport Planning in 2022. This document has been developed as a long-term strategy with the aim of promoting sustainable modes of transport to reduce reliance on single occupancy private car travel users of and visitors to the Stockley Park business estate. A number of measures and initiatives have been implemented in order to work towards the objectives and targets of the Travel Plan. These include, but are not limited to:

- The provision of the easitSHARE car sharing scheme;
- The running of the easitSTOCKLEY PLUS+ shuttle service, which provides access to Hayes and Harlington Station;
- The provision of cycle docking stations within the wider Stockley Park area; and
- The detailing of travel information on the Stockley Park website.

Water Efficiency

4.14 The city often consumes more water than is available during dry weather. As the population continues to grow, and with changes to the frequency of rainfall events projected as a result of climate change, this situation will be further exacerbated, with even greater pressure exerted on the supply of potable water.

4.15 In order to reduce internal water consumption within the proposed scheme, it is intended that water-efficient fittings, such as low volume dual flush toilets and taps with restricted flow rates, will be provided within the building. During the detailed design stage, additional measures will be considered, such as the employment of an adjustable water leak detection system, based on differential meter flow rates, and the use of solenoid shut-off valves controlled with PIR sensors within toilet areas.

4.16 The potential for rainwater harvesting or grey water recycling on-site will also be explored during the further detailed design stages. In particular, the viability of harvesting rainwater for landscaping irrigation purposes will be explored, to further reduce the consumption of potable water.

Materials and Waste

4.17 Materials should be responsibly sourced by the main contractor, and be specified to have a low embodied impact. Materials with a low embodied impact, as defined within the BRE Green Guide to Specification, should be selected for use in the building design and construction.

4.18 The selection of materials is determined by a variety of factors, such as the architectural context, design rationale, embodied carbon and maintenance requirements. For the proposed development, consideration will be given to the lifecycle environmental performance with materials selected in consideration of the BRE's Green Guide to Specification, aiming for A or B rated materials wherever possible.

4.19 The use of locally sourced materials will be prioritised wherever possible to reduce the impacts associated with the transportation of materials. Using materials produced in the local area will also aid in developing the identity of the development, by ensuring it is in line with the local character and context. For the proposed development, there will be a focus on sustainable design, with materials

selected that are in keeping with the local vernacular and landscape character, aiming for locally sourced materials where possible.

4.20 During detailed design of the building fabric, consideration will be given to minimising the environmental impact of materials, by selecting non-toxic and robust materials to ensure longevity and a minimal impact on the health of occupants.

4.21 Timber will be selected and purchased in consideration of sustainability certification. It is intended that all structural timber elements along with any timber used for temporary uses, such as scaffolding, will be sustainably sourced, e.g. from FSC and/or PEFC sources.

4.22 Consideration has been given to the reduction and recycling of waste during both the construction and operation phases. During the construction phase, the principal contractor will be required to implement a Site Waste Management Plan (SWMP), which will detail who will be responsible for resource management, which types of waste will be generated, how the waste will be managed (e.g. reduced, reused or recycled), which contractors will be used, and how the quantity of waste generated by the project will be measured. Should any demolition be required on the site, demolition contractors will incorporate best practice measures to maximise the recovery of materials from the demolition site for reuse or recycling, in line with the guidance set out by the Institute of Civil Engineers' (ICE) "Demolition Protocol".

4.23 To encourage the responsible management of operational waste, a bulk waste container will be provided at the eastern boundary of the site. This container will be privately managed and serviced on-site, and the facilities will be considerate of Building Regulations and Council requirements.

4.24 A Circular Economy Statement and Whole Life Carbon Assessment have also been prepared by Iceni Projects to support this application. These documents provide further details of the measures incorporated to minimise resource consumption and reduce the generation of waste across the lifetime of the proposed development.

Tackling Increased Temperature and Drought

4.25 In order to protect the development against overheating in the future, a number of key design features have been proposed to ensure the proposals are resilient to increased temperatures, which may be experienced as a result of climate change and the urban heat island effect. A summary of the measures included to reduce overheating risk is provided below.

4.26 The design of the proposed development has been developed in line with the GLA's recommended 'Cooling Hierarchy' approach, detailed in London Plan policy SI4, taking into account the constraints associated with the redevelopment of an existing building. This applies a similar principle to the

thorough decision-making process of the Energy Hierarchy, with the aim of reducing CO_2 emissions from cooling and minimising the risk of overheating where no cooling is present:

Minimisation of internal heat generation through energy efficient design

- Heat gain from lighting is kept to a minimum as a result of an energy-efficient lighting design solution.

- The availability of natural light is maximised by optimising the light transmittance of the glass elements of the façade.

- The proposed development will employ either air source heat pump (ASHP) systems or a multi-function heat recovery (hybrid) chiller system for heating and hot water. This will include for a low temperature distribution system, leading to lower internal heat gains from distribution pipework.

Reduction of the amount of heat entering the building in the summer

- New soft landscaping will be incorporated within the surroundings of the proposed development, which will aid in reducing the urban heat island effect.

- The existing glazed façade of the building is to be retained; however occupiable spaces will be set back from this façade through the provision of winter gardens that have full height ceilings which will aid in dissipating heat entering the building.

Management of the heat within the building through exposed thermal mass and high ceilings

- Due to the dense nature of the proposed development, there is little external exposed thermal mass within the building structures, minimising thermal transmission.

Passive ventilation

- The existing glazed façade of the building is to be retained and improved as part of the proposed development to facilitate increased opportunities for passive ventilation. It is anticipated that the majority of occupiable spaces will be ventilated through passive means, specifically openable windows.

4.27 **Mechanical and active cooling**

- Mechanical ventilation with heat recovery (MVHR) with a low specific fan power will be employed, where deemed necessary. This may include spaces in which noise levels exceed comfortable levels during nighttime hours. It is anticipated that highly efficient MVHR systems with dedicated control systems will be employed to minimise energy wastage as far as possible.

- The requirement for active (comfort) cooling will be minimised as far as practically possible, however it is noted that there may be a need to provide this where heat dissipation from equipment dictates the need for cooling. Comfort cooling will be specified on a room-by-room

basis, with either air source heat pump or multi-function heat recovery (hybrid) chiller systems to be employed.

4.28 It is intended that dynamic thermal modelling of the proposed development will be undertaken as the detailed design continues to progress. As detailed above, at this stage, it is expected that the majority of the spaces to be delivered will be cooled through passive means, however the undertaking of dynamic thermal modelling will enable the identification of the spaces within the scheme that will require active cooling. The scheme will seek to minimise the need for active cooling as far as possible, however it is noted that for some spaces within the scheme, particularly areas containing large amounts of electrical equipment, it will be necessary to deliver active means of cooling. As detailed above, either air source heat pump or multi-function heat recovery (hybrid) chiller systems to serve the space heating demands of the proposals. The nature of these systems, which are highly efficient and reversible, will allow for the provision of cooling to spaces that require cooling on an individual, demand-basis. This will therefore aid in minimising energy consumption associated with active cooling as far as possible.

Nature Conservation and Ecology

4.29 The Preliminary Ecological Appraisal (PEA), prepared by Greenspace Ecological Solutions, confirms that there are no statutory or non-statutory nature conservation designations present within the site. No internationally designated or nationally designated statutory sites fall within 1km of the site, however there are four non-statutory designated sites are located within a 0.5km radius of the site: the London's Canals Site of Importance for Nature Conservation (SNCI) located 0.2km to the south; Bolingbroke Way Sunken Pasture SNCI located 0.2km to the north-east; Lake Farm Country Park SNCI located 0.4km to the north-east; and Stockley Business Park Lakes and Meadows SNCI located 0.5km to the south-west. The site also falls within the Impact Risk Zones of Wraysbury Reservoir Site of Special Scientific Interest (SSSI), Wraysbury Gravel Pit SSSI, Syon Park SSSI and Fray's Farm Meadows SSSI. It is concluded, however, that due to the limited extent of the proposed development, coupled with the spatial separation and lack of habitat linkages, the proposals are unlikely to impact on designated sites.

4.30 As part of the survey of the site, the following habitat types were observed: bare ground, amenity grassland, hardstanding, plantation woodland, species-poor hedgerows, tree lines, individual trees, and introduced planting. None of the habitats on site quality as Habitats of Principal Importance, with the majority of the habitats considered to have low value. Up to 21 trees are proposed for removal to facilitate the proposed development and it is therefore noted that these should be replaced on a like-for-like basis with native species. Retained boundary and woodland habitats should also be protected during the construction phase to prevent accidental encroachment, and fine-mesh dust netting should be installed prior to the commencement of construction to mitigate the potential adverse impacts of dust. Further to this, retained trees should be protected in accordance with the British Standard (BS) '5837:2012 Trees in Relation to Design, Demolition and Construction'.

4.31 With respect to protected species, the habitats present on the site are not considered suitable to support populations of dormouse, great crested newt, reptiles or notable species of invertebrates. No suitable foraging, commuting or sett building opportunities are present on the site for badgers, however it is noted that suitable habitat is present to the north of the site within the golf club. No evidence of badger activity was identified during the site visit, and it is therefore considered that the presence of this species on-site is limited. It is noted, however, that should any works be required to take place within 30m of the habitats to the north of the site boundary, updated badger surveys may be required. Similarly, whilst the site itself does not present opportunities for foraging, roosting or commuting bats due to high levels of lighting and a lack of planting, and despite the presence of suitable habitats within the golf club to the north of the site, it is considered that the proposed development will not have a significant impact on this species. No suitable habitat was identified on-site for breeding or foraging birds nor for foraging and commuting hedgehogs, therefore it is concluded that the proposed development will not adversely impact on these species. It is noted, however, that works to areas that may contain bird nests be conducted outside the core bird breeding period (February to August inclusive). Should this be unavoidable, works should be undertaken under guidance from a suitably experienced ecologist.

4.32 Whilst the existing habitats on the site are considered to be low ecological value, it is recommended that a number of ecological enhancements are delivered as part of the proposed development, as follows:

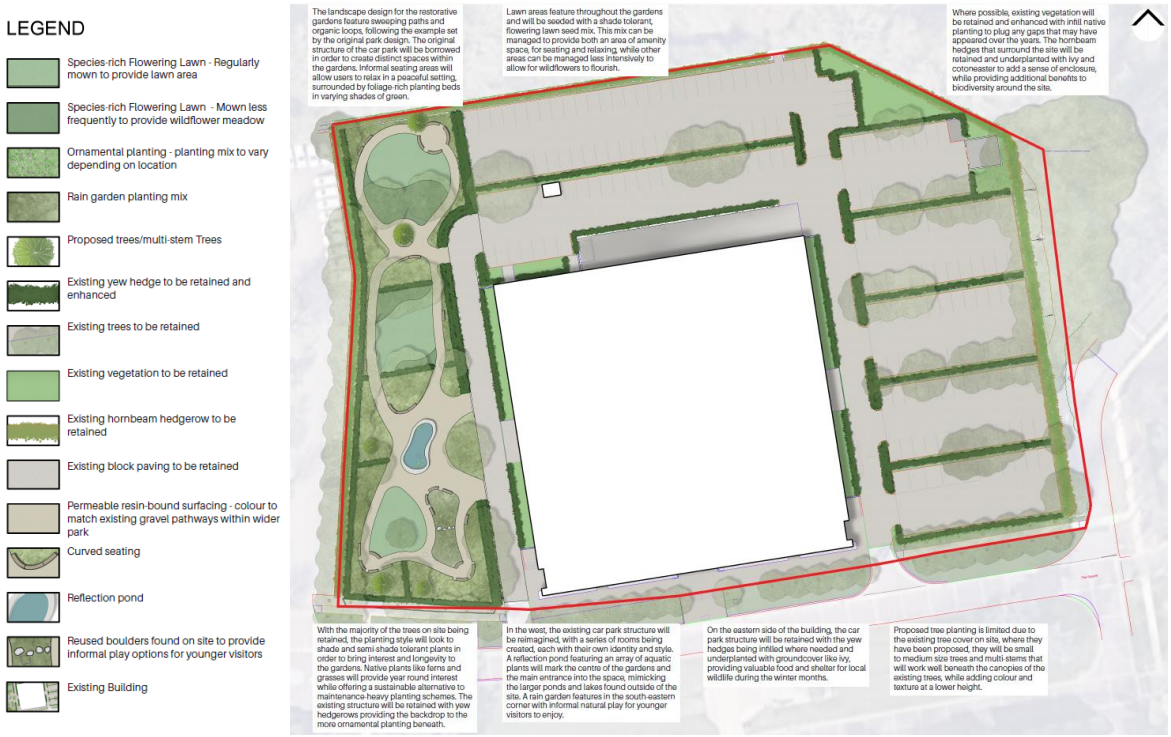
- The installation of a range of tree mounted bird boxes would provide opportunities to nesting birds within the site. Where boxes are to be installed, open fronted and hole fronted nesting boxes should be considered, and boxes should be installed on sheltered aspects, close to vegetation;

- Installation of bat boxes on retained boundary trees would provide opportunities for roosting bats. Where boxes are to be installed, they should be places at a height of more than 3m on sunny, sheltered aspects, and away from direct illumination by artificial lighting; and

- The incorporation of wild-life friendly planting within the grounds, including for either native plant species or those known to benefit wildlife, including those on the Royal Horticultural Society's Plants for Pollinators Lists, would be of benefit to a range of wildlife, including invertebrates, birds and bats.

4.33 The proposed Landscape Strategy Plan, prepared by Iceni Projects, is shown in Figure 4.3 below.

Figure 4.3 Proposed Landscape & Planting Concept Plan

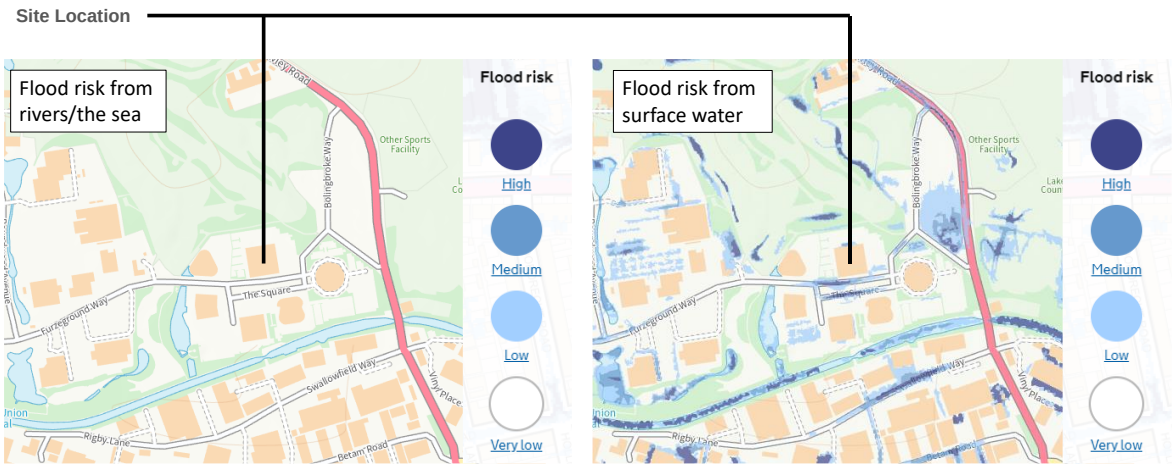


4.34 The incorporation of the proposed Landscape Strategy Plan, shown above, will deliver a wider range of new planting, including trees, ornamental species, grass and wildflower species. It has been calculated that, through the delivery of the Landscape Strategy proposed, an Urban Greening Factor (UGF) of 0.28 will be achieved.

Reducing Flood Risk and Surface Water Runoff

4.35 As detailed within the Flood Risk Assessment & Surface Water Drainage Strategy, prepared by Aegaea, and confirmed in Figure 4.4 below, the site is located wholly within Flood Zone 1, indicating a very low risk from tidal and fluvial sources. Furthermore, as shown below, the majority of the site is at very low risk of flooding from surface water sources, although there are isolated areas of low risk located north of the existing building, as well as areas of high risk on the adjacent road, The Square, to the south. It is considered that the overall risk of flooding from surface water sources at the site is low, particularly when accounting for the incorporation of the proposed surface water management strategy. It is also confirmed that the site is not at risk of flooding from groundwater, sewer or artificial (reservoir) sources.

Figure 4.4 Extract from the Environment Agency's online flood map



4.36 As detailed within the Flood Risk Assessment & Surface Water Drainage Strategy, prepared by Aegaea, the proposed surface water drainage strategy has been designed to attenuate and restrict runoff to a rate of 4.65 l/s. Below-ground attenuation crates are to be incorporated in the south-east corner of the site, within the existing car parking area that is to be retained, and within the western portion of the site that is to be redeveloped to include for soft landscaping. These crates will be incorporated to manage surface water run-off at source as part of the proposed sustainable drainage system (SuDS). The below-ground storage void system will connect to an existing Thames Water surface water sewer located in the south-western corner of the site.

4.37 The proposed surface water drainage strategy provides a significant improvement to the existing situation, firstly by reducing the runoff rate to 4.65 l/s, but also reducing the volume of water entering the adopted sewer network.

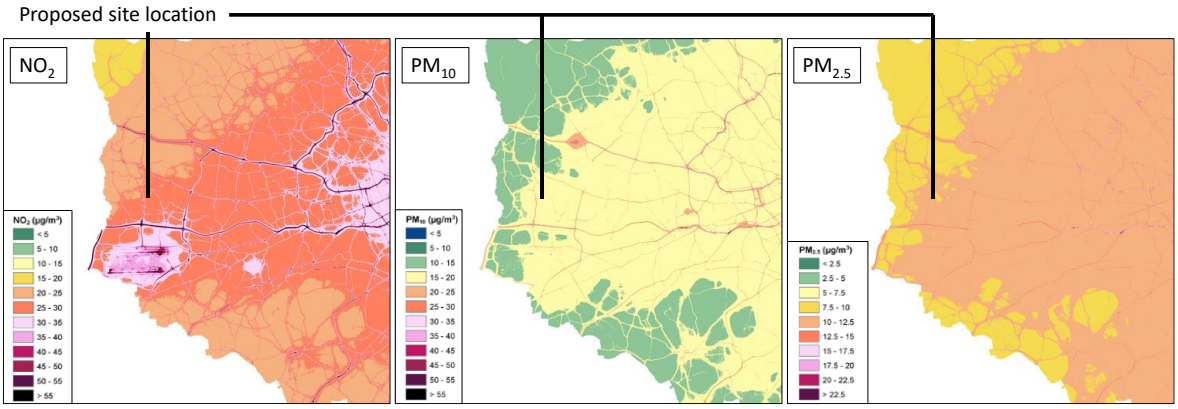
Air Pollution

4.38 The Environment Act 1995 requires all Local Authorities to review air quality within the districts. If it appears that any air quality 'Objective' prescribed in the regulations, and in the National Air Quality Strategy, is not likely to be achieved, then the local authority must designate the affected area as an Air Quality Management Area (AQMA).

4.39 The site location, and the area from the southern boundary of the London Borough of Hillingdon to the border defined by the A40 corridor, is specified as an AQMA due to excessive levels of nitrogen dioxide (NO_2) resulting from road transport.

4.40 Figure 4.5 below, taken from the London Air Annual Pollution Maps, shows the levels of NO_2, PM_{10} and $PM_{2.5}$ measured at the site in 2019. The images below indicate that the levels of PM_{10} and $PM_{2.5}$ present at the site in 2019 would have been below both the National Air Quality Objective (NAQO) and World Health Organisation (WHO) guidelines, however the level of NO_2 would likely have been above the levels recommended within both guidelines.

Figure 4.5 Maps indicating annual levels of NO_2 (left), PM_{10} (middle) and $PM_{2.5}$ (right) exposure



4.41 An Air Quality Assessment of the proposed development has been undertaken by Hoare Lea, which confirms that the site is located with the London Borough of Hillingdon's declared AQMA. As part of this assessment, a construction dust assessment has been undertaken in accordance with Greater London Authority (GLA) and Institute of Air Quality Management (IAQM) guidance on the assessment of dust from demolition and construction. It is anticipated that the construction phase of the proposed development will not result in a significant increase in the movement of construction-related vehicles, and that the quantum will remain below the threshold outlined in the Environmental Protection UK (EPUK) and IAQM planning guidance. It therefore can be concluded that the proposed development will not have a significant impact on local roadside air quality as a result of construction traffic emissions. As it is anticipated works undertaken during the construction phase of the proposed development will result in the generation of dust and ambient fine particulate matter, a number of mitigation measures have been recommended for inclusion in an Air Quality Dust Management Plan (AQDMP), in line with the best-practice measures outlined in GLA guidance. These measures include the switching off of engines when stationary, the avoidance of diesel- or petrol-powered generators, and the covering of all loads entering and leaving the site. With the application of the recommended mitigation measures, it is anticipated that any residual effects on air quality associated with the construction phase of the proposed development will be not significant.

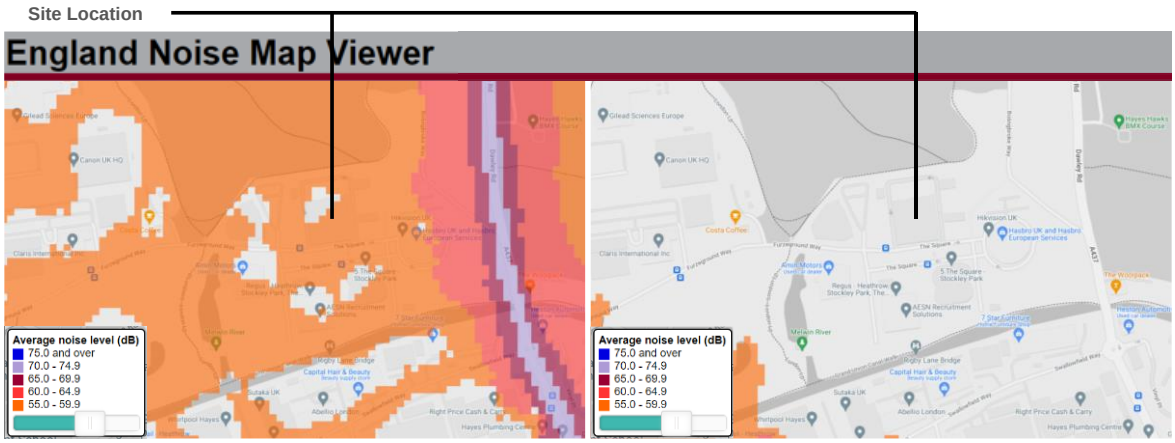
4.42 When considering the potential number of trips generated by the proposed development, the Air Quality Assessment concludes that the quantum of traffic expected to be associated with the operation of the proposed development will fall below the relevant EPUK and IAQM guidance criteria, and thus the impact of road traffic associated with the scheme is considered to be not significant. The proposed energy strategy for the scheme will seek to utilise electric-only, zero combustion systems. It is noted that life safety generators may be provided for emergency back-up use, but that these systems would be tested for fewer than 18 hours per year and would be exhausted at the roof level. Therefore, as no combustion sources are to be employed for primary energy supply, no local air quality impacts are anticipated with respect to the proposed energy plant. An Air Quality Neutral assessment has also been undertaken, demonstrating that the proposed development will be air

quality neutral with respect to both building and transport emissions, in line with the relevant guidance, meaning no additional mitigation is required. Finally, a qualitative Site Suitability Assessment has been undertaken, demonstrating that the pollutant levels present at the site are in compliance with the relevant Air Quality Objectives. The site is therefore considered to be suitable for post-operative care, without the use of additional mitigation measures.

Noise

4.43 As shown in the maps below, the development located within close proximity to transport noise sources. The closest road noise source is Dawley Road (A437), which is located to the east of the site. However, the site is not located within close enough proximity to any rail lines for noise from this source to impact on the occupants in the future, as demonstrated on the map below (right). It is noted that the proximity of the site to London Heathrow Airport will also results in increased exposure to airport and aeroplane noise sources.

Table 4.1 Figure 4.6 Noise map showing road noise (left) and rail noise (right)



4.44 A Noise Impact Assessment has been undertaken by Hoare Lea. The results of the sound survey undertaken at the site indicate that the average background noise levels at the site are approximately 51 decibels (dB) during the day, and 50 dB during the night. For the proposed development, the typical lowest internal requirement for external noise break-in is 40 dB during the day, and 35 dB during nighttime hours. It is noted that, where road traffic and general urban activities form the main sources of noise, standard thermal glazing provides sufficient sound reduction to achieve the internal requirements of the proposed development. It is also noted that it will be acceptable to rely on partially open windows to deliver natural ventilation during the day, although there is potential that the criteria for bedrooms may be exceeded during the night with windows open. It is noted that an alternative means of ventilation may therefore be required to provide appropriate levels of background ventilation during times when windows must be kept shut.

4.45 Based on the results of the survey undertaken to support the Noise Impact Assessment, it is concluded that all plant, equipment and machinery associated with the proposed development should

be controlled to ensure the overall sound levels 1m from the façade of the building do not exceed 40 dB during the day, and 35 dB during the night. This will ensure compliance with the requirements of British Standard 4142.

Land Contamination

4.46 A ground contamination survey has not been undertaken, due to the understanding that the site has been used predominantly for office uses in recent years. Further to this, due to the intention to retain the existing building, and the limited external works that would be undertaken as part of the proposed development, it is considered that the risk of future site workers, occupiers or visitors being exposed to contaminated land is minimal.

Light Pollution

4.47 As outlined in the Preliminary Ecological Appraisal (PEA), prepared by Greenspace Ecological Solutions, to avoid a detrimental impact on bats and other nocturnal species potentially using the site, there should be no increased light spillage to suitable habitats offering opportunities for commuting and foraging. To achieve this, it is recommended that the measures outlined within the Institution of Lighting Professionals and Bat Conservation Trust be implemented within the lighting scheme. These measures included, but are not limited to:

- Installation of lights only where necessary;
- Use of LED luminaires where possible, due to their lower intensity and sharp cut-off;
- Minimisation of light spill through careful positioning of luminaires and consideration of column heights; and
- Use of motion-sensors and short timers for external security lighting

Water Pollution

4.48 The implementation of the proposed surface water management strategy, prepared by Aegaea, will include appropriate pollution control measures to minimise the risk of pollution entering the ground from surface water runoff from the development. An appropriate SuDS treatment train, consisting of below-ground attenuation tanks, has been incorporated within the design to treat surface water before it is discharged to the public sewer network.

4.49 Additional measures will also be adopted during construction to minimise the risk of ground and surface water pollution, including::

- Oil separators;
- Clear marking and signage of drainage stems;

- Full bunding of on-site fuel or oil delivery areas;
- Bunding of areas to be used for cleaning activities; and
- Best practice measures, implemented as part of a Construction Environmental Management Plan (CEMP), to mitigate the impacts of construction-related dust and emissions.

5. ENERGY STRATEGY

5.1 With reference to the policy requirements, guidance and industry best practice detailed in Section 3, an energy and carbon dioxide (CO_2) emissions strategy has been defined for the proposed development. The proposed energy performance of the scheme has been analysed and evaluated to target a high level of CO_2 emissions performance when assessed against Part L:2021 of the Building Regulations and associated policies, accounting for economic, technical and functional feasibility.

5.2 As part of the proposed development, it is intended that the existing building will be retained and repurposed to provide a post-operative care facility. Part L of the Building Regulations outlines the standards to be met where an existing building is to be incorporated within a proposed development. The proposed strategy will demonstrate the achievement of the target U-values set out within Part L for existing buildings. The strategy will also detail the targets related to the fixed building services that are to be provided within the development, as set out within Part L of the Building Regulations.

5.3 The following section includes a breakdown of potential measures proposed at each level of the Energy Hierarchy (below), including a renewable energy generation options study. The specifications for the retained building elements are also detailed, in addition to the proposed fixed building services.

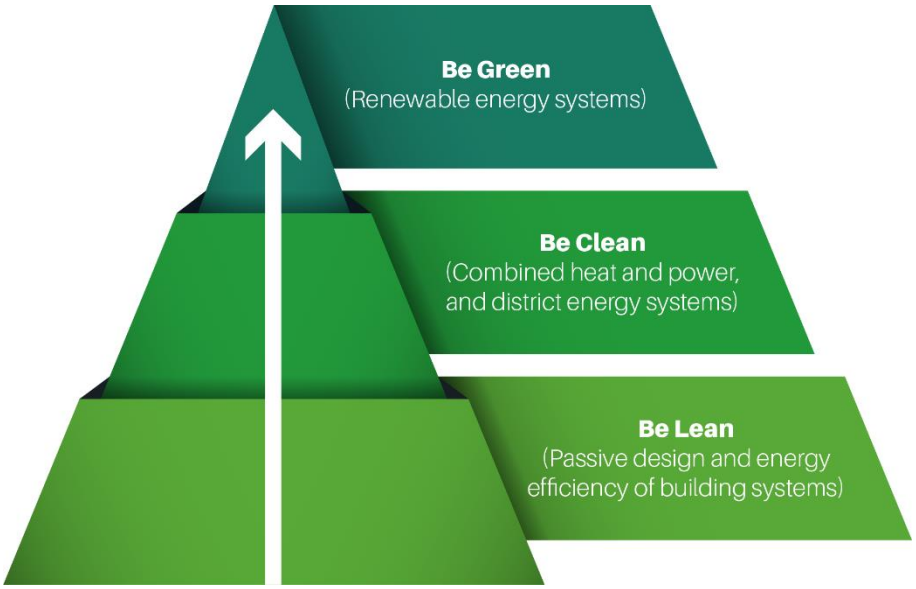
The Energy Hierarchy

5.4 The proposed energy strategy is based upon the principles of the Energy Hierarchy on the basis that it is preferable to reduce carbon dioxide emissions through reduced energy consumption above decarbonisation through alternative energy sources.

5.5 The tiers of the Energy Hierarchy are:

- Be Lean Use less energy
- Be Clean Supply energy efficiently
- Be Green Use renewable energy

Figure 5.1 The Energy Hierarchy



Establishing the CO_2 Baseline for the Existing Building

5.6 As detailed within the GLA's Energy Planning Guidance, the CO_2 emissions baseline for the existing building envelope should be calculated in line with the following notional specifications:

Table 5.1 Notional specifications for retained thermal elements

Building Fabric Element	Notional U-values (W/m^2K)
External wall (cavity insulation)	0.55
External wall (internal or external insulation)	0.30
Roof	0.16
Floor	0.25
Windows	1.60 (including frame)

5.7 The g-value of the windows should be set at 0.63, the air permeability and thermal bridging parameters should both be set at the default value. Ventilation systems should match those intended for incorporation within the proposed scheme, whilst heating and hot water systems should align with the efficiencies set out within the Building Regulations. Finally, no cooling systems should be included for, and all lighting should be specified as low energy systems, with an efficacy of 75 light source lumens per circuit-watt.

5.8 It is intended that this approach be applied to the proposed development which, as stated above, seeks to retain and repurpose the existing building to deliver post-operative care facilities.

5.9 The BRUKL worksheets showing the calculation of the baseline are provided in Appendix A2.

'Be Lean' (Use Less Energy)

5.10 Within the first stage of the energy hierarchy, it is proposed, where technically feasible, to incorporate high levels of passive and energy efficient design measures in order to reduce the development's energy consumption and associated CO_2 emissions, utilising a 'fabric first' approach to reduce energy demand.

5.11 Passive design utilises daylight, solar energy, shading and stack or wind driven ventilation to illuminate, heat, shade where necessary and ventilate/cool the building, thus requiring less (mechanical) energy to achieve the performance standards for health and wellbeing of the future site-users.

5.12 Site characteristics relating to local climate, surroundings, scale and size of the development therefore passively influence the potential energy requirement and savings that can be achieved through the consideration of these aspects. The parameters that most influence the potential to utilise sunlight and solar gains are the orientation and layout of buildings, however these are typically driven by various factors other than energy efficiency or bioclimatic design considerations (e.g. aesthetics, function, etc.).

5.13 The massing and orientation of the proposals are constrained by the overall masterplan and configuration of the existing building in terms of delivering the required density, preventing overlooking and ensuring daylight and sunlight provision. Despite this, the passive design of the scheme includes a number of specific energy efficiency features. It is also intended that the glazed façade of the existing building be retained, which will aid in providing natural daylight and solar gains to the spaces. This will reduce the mechanical energy required for lighting and heating in these spaces.

5.14 Within Part L of the Building Regulations, target U-values for retained thermal elements are outlined. U-values are a measure of the rate of heat transfer through a building element over a given area, under standardised conditions. They measure the rate at which heat is lost or gained through the fabric.

5.15 It is required under Part L:2021 that retained thermal elements with U-values worse than those displayed in column (a) of Table 5.2 below should be upgraded to achieve the values outlined in column (b), where technically and functionally feasible.

Table 5.2 Target U-values for retained thermal elements

Building Fabric Element	(a) Part L:2021 threshold U-values (W/m^2K)	(b) Part L:2021 improved U-values (W/m^2K)	(c) Targeted U-values (W/m^2K)
Exposed wall	0.70	0.30	0.26
Ground / exposed floor	0.70	0.25	0.18
Roof	0.35	0.16	0.16

5.16 However, through the incorporation of increased levels of insulation, it is intended that the U-values set out within column (c) of the table below will be targeted. Details of how this will be achieved will be provided where relevant and required following further detailed design.

5.17 The redevelopment of the existing building will also seek to improve its air tightness, with a level equal to or below 5 $m^3/h/m^2$ to be targeted, meaning that air infiltration between the internal and the external environment will be largely controlled, and space heating/cooling demand further reduced.

5.18 High efficiency plant, equipment and controls are proposed to limit the energy consumed in order to provide the required level of indoor environmental performance and control. Performance efficiency values were tested and improved in energy models to benchmark the resulting predicted CO_2 reduction.

- Low energy LED lighting will be installed throughout the scheme. Lighting with an efficacy of 110 lumens/W has been specified. The use of presence detection controls and daylight dimming to reduce operational lighting energy consumption will also be considered. It should be noted that this is subject to confirmation following further detailed design.

- In order to meet the requirements of the GLA's Energy Planning Guidance document under the 'Be Lean' scenario, space and water heating has been specified as gas-fired boilers with an efficiency of 93% for the proposed residential uses.

- Whilst opportunities to employ passive means of ventilation will be prioritised, where necessary, mechanical ventilation with heat recovery (MVHR), with a low specific fan power will be employed. This, in addition to the employment of a controls system, will ensure the systems run efficiently, and will therefore minimise the waste of energy.

- The requirement for (comfort) cooling will be minimised as far as practically possible, however it is noted that there may be a need to provide this where heat dissipation from equipment dictates the need for cooling. Comfort cooling will be specified on a room-by-room basis, with either air source heat pump or multi-function heat recovery (hybrid) chiller systems to be employed. It is noted that the use of heat recovery chiller technology will enable the flexibility and capability of independent and simultaneous heating and cooling, and will reduce the need for two separate air source heat pump systems to provide heating and cooling. At this stage, it is expected that systems with an efficiency of at least 4.5 be specified, however this is subject to confirmation during detailed design.

- Where appropriate, local user controls will be provided to improve control and flexibility for those using individual spaces.

- Variable frequency drivers will be utilised, where practical, to improve the energy efficiency of plant and equipment.

- Equipment will be zoned to allow for plant to be turned off or placed into out-of-hours setback in appropriate unoccupied spaces, aiding to reduce energy consumption.

- Building Energy Management Systems (BEMS) will be employed.

- Energy usage will be metered to ensure that charging for energy is linked to usage, with smart meters to be utilised.

- User guidance, training and support will be provided to building occupiers to increase awareness and to ensure the proposed systems are operated as intended.

5.19 Energy modelling of the proposed scheme has been undertaken using DesignBuilder SBEM accredited software. The spaces assessed are highlighted in Figures 2.6 to 2.11 above.

5.20 Based on the energy analysis of the proposed spaces, the total energy demand for the development is shown below.

Table 5.3 Annual energy demand

Energy Demand (kWh/year)					
Space heating	Hot Water	Lighting	Auxiliary	Cooling	Unregulated loads
38,361	1,833,790	171,959	154,774	110,759	426,628

5.21 The carbon dioxide emissions for the proposed development, under the ‘Be Lean’ tier of the Energy Hierarchy, are shown in Figure 5.2 below. BRUKL worksheets showing the ‘Be Lean’ performance of the proposed development are provided in Appendix A3.

Figure 5.2 Non-domestic carbon dioxide emissions (Be Lean)

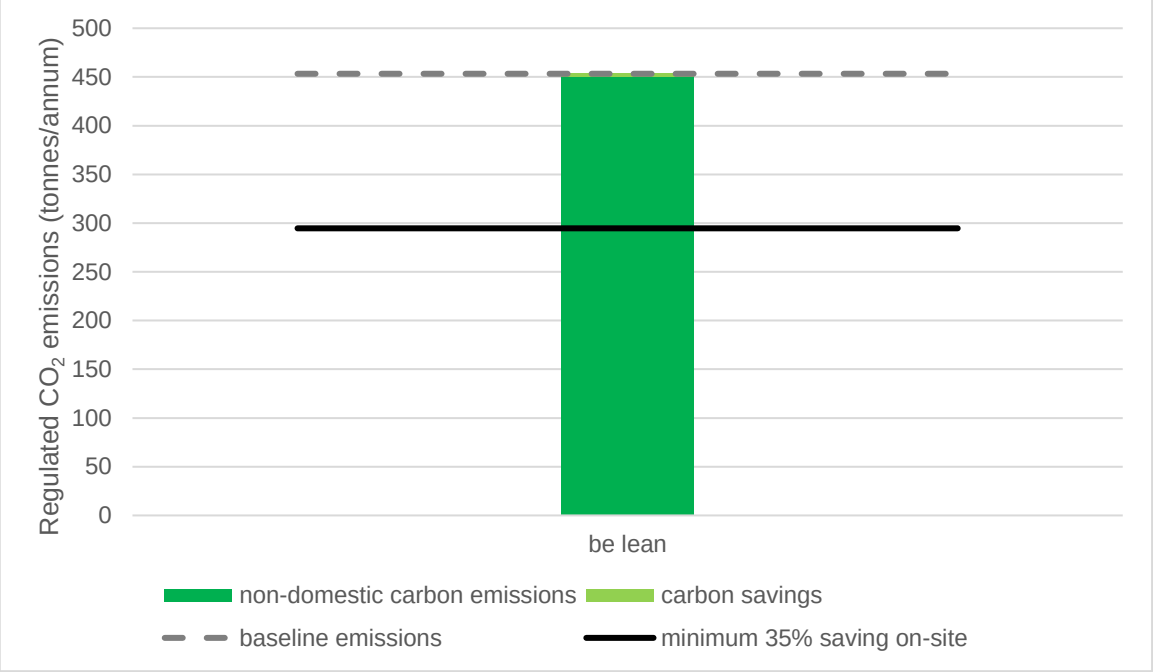


Table 5.4 Non-domestic carbon dioxide emissions (Be Lean)

TER: Baseline: Part L:2021 Emissions (tonnes CO_2 per annum)	BER: Proposed 'Be Lean' Emissions (tonnes CO_2 per annum)	Emissions Savings (tonnes CO_2 per annum)	Emissions Savings (%)
453.3	449.9	3.4	1.0%

5.22 The above analysis shows that the proposed development will achieve an approximate 1% saving through energy efficiency measures alone. As detailed above, part of the proposed development is to be delivered with the existing building that is to be retained on-site. The U-values of the building elements associated with these spaces are expected to exceed the backstop U-values set out for new-built non-domestic buildings within Part L:2021.

5.23 It is considered that, when accounting for the fact that part of the proposals will be provided within an existing building, the carbon dioxide emissions associated with the proposed development under the 'Be Lean' scenario are acceptable.

'Be Clean' (Supply Energy Efficiently)

5.24 The potential for the proposed development to incorporate a low carbon heating/cooling system has been reviewed for the scheme, in line with the hierarchy presented in the London Plan policy SI2, copied below:

1. Connection to existing heating or cooling networks;

2. Site wide CHP network; and

3. Communal heating and cooling.

5.25 The London Heat Map is a tool provided by the Mayor of London to identify opportunities for decentralised energy projects in London. It builds on the 2005 London Community Heating Development Study.

5.26 The image below is an extract from the London Heat Map, showing the area in the vicinity of the site. It illustrates;

- Heat demand (areas of heat demand are shown in red, with areas with a high density of heat demand appearing more opaque, and areas of zero heat demand appearing transparent);
- Existing heat networks (shown as red lines);
- Proposed heat networks (shown as purple lines);
- Heatmap study areas (shown as transparent white circles);
- Potential Heat Network Project Areas (shown as semi-transparent blue, yellow and red areas); and
- Potential heat supply sites (shown as purple dots).

Figure 5.3 Extract from the London Heat Map

5.27 The extract above indicates that, despite its location within an established business estate, the proposed development site is located within an area of low heat density. There are no existing district heat networks located within the surrounding area, nor are there any proposed district heat networks. There are no identified potential heat sources within close proximity to the proposed development site, and it is not located within a Heatmap Study Area. The site is also not located within a Potential Heat Network Project Area, suggesting that the use of a dedicated air source heat pump system (ASHP) for the scheme would realise increased carbon dioxide emissions savings when compared to a potential connection to a heat network. At this stage, it is therefore not intended that the proposed development be connected to a local heat network, however where feasible, the proposals will be designed to allow for future connection, should a heat network come forward within the surrounding area.

5.28 Whilst the connection of the proposed development to a district heat or energy network is not considered feasible at this time, it is noted that, where viable and appropriate, the proposals will be future-proofed to enable a connection to a district heat or energy network, should one come forward. This will be explored further during the detailed design stage.

5.29 The use of CHP is considered to be unviable for the proposed development site. CHP technology is appropriate for building uses with large hot water demands due to the requirements for CHP to be kept running to meet a base load. As heating is not required during summer months, base loads are driven by hot water demand. Due to the planned use of the proposed development for flexible industrial and office uses, hot water demand for the development is low and as such CHP does not represent a feasible technology for the proposed development.

5.30 It is instead proposed that the space and water heating demand of the proposed development be served by either air source heat pump (ASHP) systems or a multi-function heat recovery (hybrid) chiller system. No gas-fired plant will be employed to serve the proposed development and it is noted that, through the use of all-electric systems, the carbon emissions associated with the development will decrease in line with the decarbonisation of the electricity grid. The use of the proposed all-electric systems has been included for within the “Be Green” modelling of the proposed development, the results for which are presented in the next section.

‘Be Green’ (Utilise Renewable Technologies)

5.31 The proposed development has given consideration to renewable energy technologies that may be applicable to deliver the required level of carbon dioxide savings over the Part L:2021 baseline, and the likely local effects on the environment.

5.32 A full review of potentially applicable renewable technologies has been carried out, considering both the effectiveness and viability of the different technologies. Full details of the assessment and outcomes are provided in Appendix A4.

5.33 Given the site location, lack of local existing or proposed heat networks, it is proposed that either air source heat pump (ASHP) systems or a multi-function heat recovery (hybrid) chiller system is employed to serve the space and water heating and the space cooling demands of the of the proposed development. At this stage, it is expected that a system with a heating coefficient of performance of at least 3.30, and a seasonal coefficient of performance of at least 4.5 will be specified. Whilst the specified systems operate quietly, as the design progresses, acoustic measures to further limit the noise generated by the outside unit of the systems during operation will be considered.

5.34 At this stage, it is expected that the proposed development will achieve the minimum 35% carbon dioxide emissions reduction over the Part L:2021 baseline through fabric efficiency measures and the specification of either air source heat pump (ASHP) systems or a multi-function heat recovery (hybrid) chiller system alone. In addition, due to the location of the proposed development site in proximity to the Grade II listed Registered Park and Garden Stockley Park, it is considered that the incorporation of rooftop photovoltaic (PV) panels would cause harm to the heritage assets located within the surroundings of the proposed development. The incorporation of PV panels is therefore not included for at this stage. However, it is noted that further carbon dioxide emissions savings may be realised through the incorporation of this technology, and it is recommended that its employment be considered during the continued detailed design of the proposals. There is sufficient roof space to house PV panels, and should the intention be to incorporate this technology to deliver further carbon dioxide savings and generate zero-carbon electricity on-site, the details of their location, size and output will be provided as part of a Reserved Matters Application, where required.

5.35 The carbon dioxide emissions for the proposed development, under the ‘Be Green’ tier of the Energy Hierarchy, are shown below. BRUKL worksheets showing the ‘Be Green’ performance of the proposed development are provided in Appendix A5.

Figure 5.5 Non-domestic carbon dioxide emissions (Be Green)

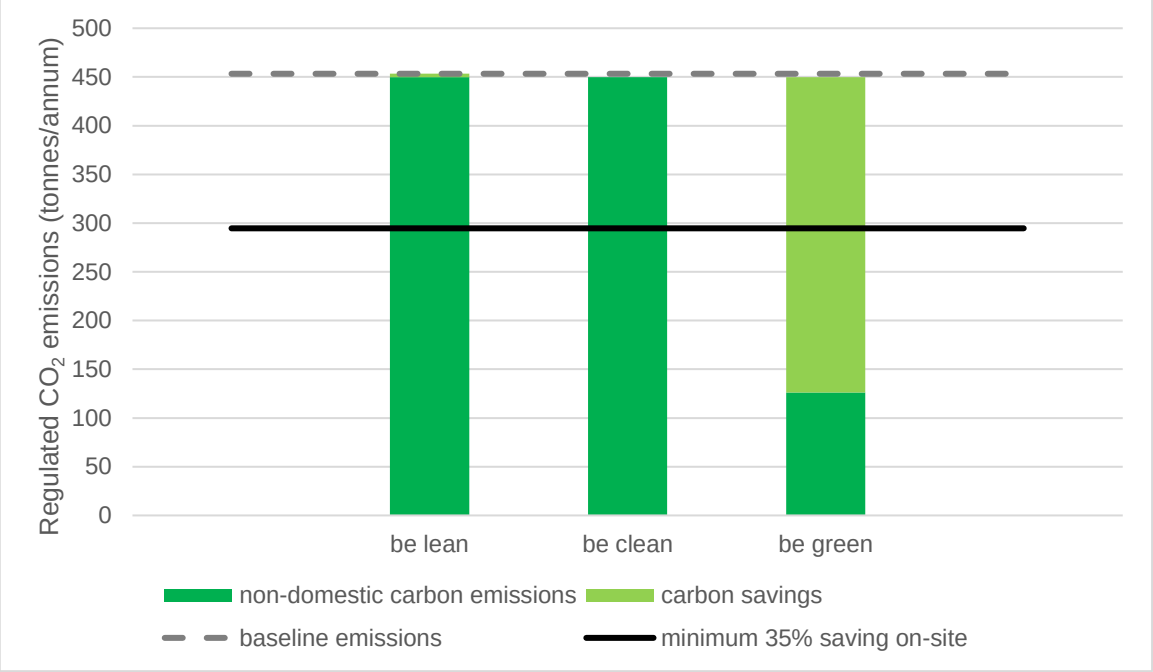


Table 5.5 Non-domestic carbon dioxide emissions (Be Green)

TER: Baseline: Part L:2021 Emissions (tonnes CO_2 per annum)	BER: Proposed 'Be Green' Emissions (tonnes CO_2 per annum)	Emissions Savings (tonnes CO_2 per annum)	Emissions Savings (%)
453.3	126.3	327.1	72.2%

5.36 The above analysis shows that the proposed development achieves a carbon dioxide emissions saving of approximately 72% through energy efficiency measures and renewable technologies, under the 'Be Green' scenario.

5.37 The site-wide carbon dioxide emissions and savings are provided in the table below.

Table 5.6 Site-wide carbon dioxide emissions after each stage of the Energy Hierarchy

	Site-wide carbon dioxide emissions (Tonnes CO_2 per annum)
Baseline: Part L 2021 of the Building Regulations Compliant Development	453.3
After energy demand reduction	449.9
After renewable energy	126.3

Table 5.7 Site-wide carbon dioxide savings from each stage of the Energy Hierarchy

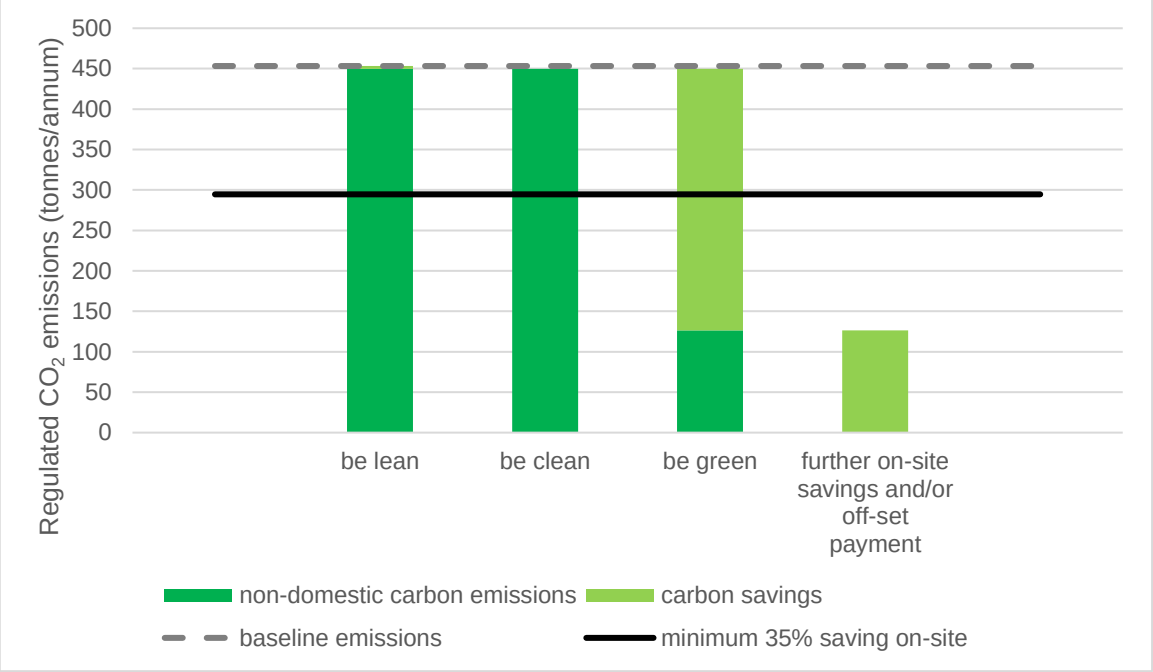
	Regulated carbon dioxide savings	
	Tonnes CO_2 per annum	**%**
Savings from energy demand reduction	3.4	1.0%
Savings from renewable energy	323.6	71.4%
Cumulative on-site savings	327.1	72.2%

Carbon Offsetting

5.38 As per the requirements of London Plan policy SI2, new build developments are expected to meet a zero-carbon target. Where a development is unable to meet the zero-carbon target through on-site means alone, the remaining regulated carbon dioxide emissions, to 100%, are to be offset through a cash-in-lieu contribution to local authorities to be ringfenced to secure delivery of carbon dioxide savings elsewhere.

5.39 Based on the information presented in Tables 5.6 and 5.7 above, a total of 126.3 tonnes of residual carbon dioxide are required to be offset per year from the proposed development over a period of 30 years. This totals 3,788 tonnes of carbon dioxide that will require offsetting from the proposed development over a period of 30 years. As the London Borough of Hillingdon do not have an established price for carbon dioxide, a figure of £95 per tonne over a 30-year period has been used to calculate the offsetting cost. The 3,788 tonnes therefore result in an offset cost of £359,901.

Figure 5.6 Carbon dioxide emissions after offsetting



'Be Seen' (Monitor and Record Energy Usage)

5.40 Under the 'Be Seen' tier of the Energy Hierarchy, it is required that energy usage within the proposed development be monitored and reported in operation.

5.41 Effective energy metering will be employed, in line with the 'Be Seen' requirements, and this will be enabled by the provision of suitable infrastructure within the buildings' services systems.

5.42 Where required, electrical meters will be provided on the proposed air source heat pump (ASHP) system serving the scheme, to provide data on plant energy consumption throughout the year. Where necessary, areas of high energy load will be sub-metered to monitor energy consumption in greater granularity and to facilitate reporting. It is intended that the main sub-systems, such as lighting and small power, will be monitored separately and their usage accounted for separately. This will enable energy intensity and carbon emissions to be monitored and annually reported. Where required, the applicant will complete the GLA's suggested 'Be Seen' energy reporting protocols via the appropriate web portals.

6. SUMMARY

6.1 This Sustainability and Energy Statement provides an overview as to how the proposed redevelopment of 3 The Square, Stockley Park contributes to sustainable development in the context of the strategic, design and construction considerations.

6.2 Consideration has been given to the London Borough of Hillingdon Local Plan Part 1: Strategic Policies and Part 2: Development Plan Policies in the formulation of this strategy. The overall development has been assessed using the guidance outlined in strategic objectives 8, 10, 11 and 13, and policies EM1 (Climate Change Adaptation and Mitigation) and DMEI2 (Reducing Carbon Emissions) of the Local Plan, providing a holistic sustainability approach for the proposals.

6.3 By designing to rigorous energy standards and employing electric-only systems, including air source heat pumps (ASHPs), the application will respond directly to the Climate Emergency declared by the Council in January 2020. These measures combine to provide an approximate carbon dioxide emissions saving of 72% compared to the Part L:2021 baseline, significantly exceeding the requirements of London Borough of Hillingdon and the Greater London Authority (GLA).

6.4 Sections 4 and 5 of this report demonstrate that the siting and design of the proposals support relevant policy relating to sustainable development. This shows that the proposed development will:

- make efficient use of land, retaining and converting an existing building, and developing brownfield land;
- promote the use of sustainable modes of transport;
- minimise internal water consumption through the incorporation of water-efficient fittings and services;
- incorporate low-impact materials, according to the BRE Green Guide to Specification;
- minimise waste production during construction and maximise the proportion of waste to be diverted from landfill;
- ensure that the risk of overheating is mitigated;
- incorporate measures to improve site biodiversity, including biodiverse planting;
- provide access to areas of green space in the form of a central podium landscaped courtyard;
- not increase the risk of surface water flooding onsite;

- ensure air, noise, land, light and water pollution are minimised as far as possible;
- minimise energy demand through the specification of low U-values, low air permeability and energy efficient systems and appliances; and
- utilise electric-only systems, such as air source heat pump (ASHP) systems or a multi-function heat recovery (hybrid) chiller system to serve the space heating and cooling demands and water heating demands of the proposed development.

6.5 By designing to rigorous energy standards, and omitting the use of fossil fuels for heating and cooling within the apart-hotel portion of the scheme, the proposed development will achieve an approximate minimum 72% reduction in CO_2 emissions, following the Energy Hierarchy methodology. The remaining 126 tonnes of CO_2 per annum of non-domestic emissions from the development will be offset through a cash-in-lieu contribution

Figure 6.1 Carbon dioxide emissions after each stage of the Energy Hierarchy

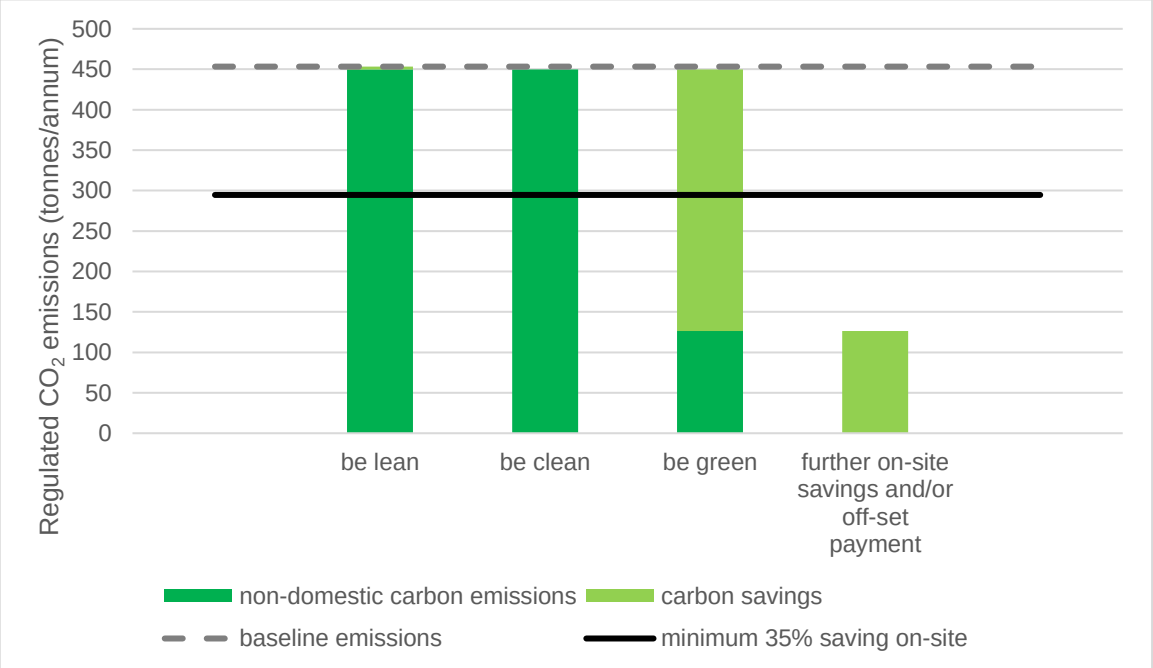


Table 6.1 Carbon dioxide emissions after each stage of the Energy Hierarchy

	Site-wide carbon dioxide emissions (Tonnes CO_2 per annum)
Baseline: Part L 2021 of the Building Regulations Compliant Development	453.3
After energy demand reduction	449.9

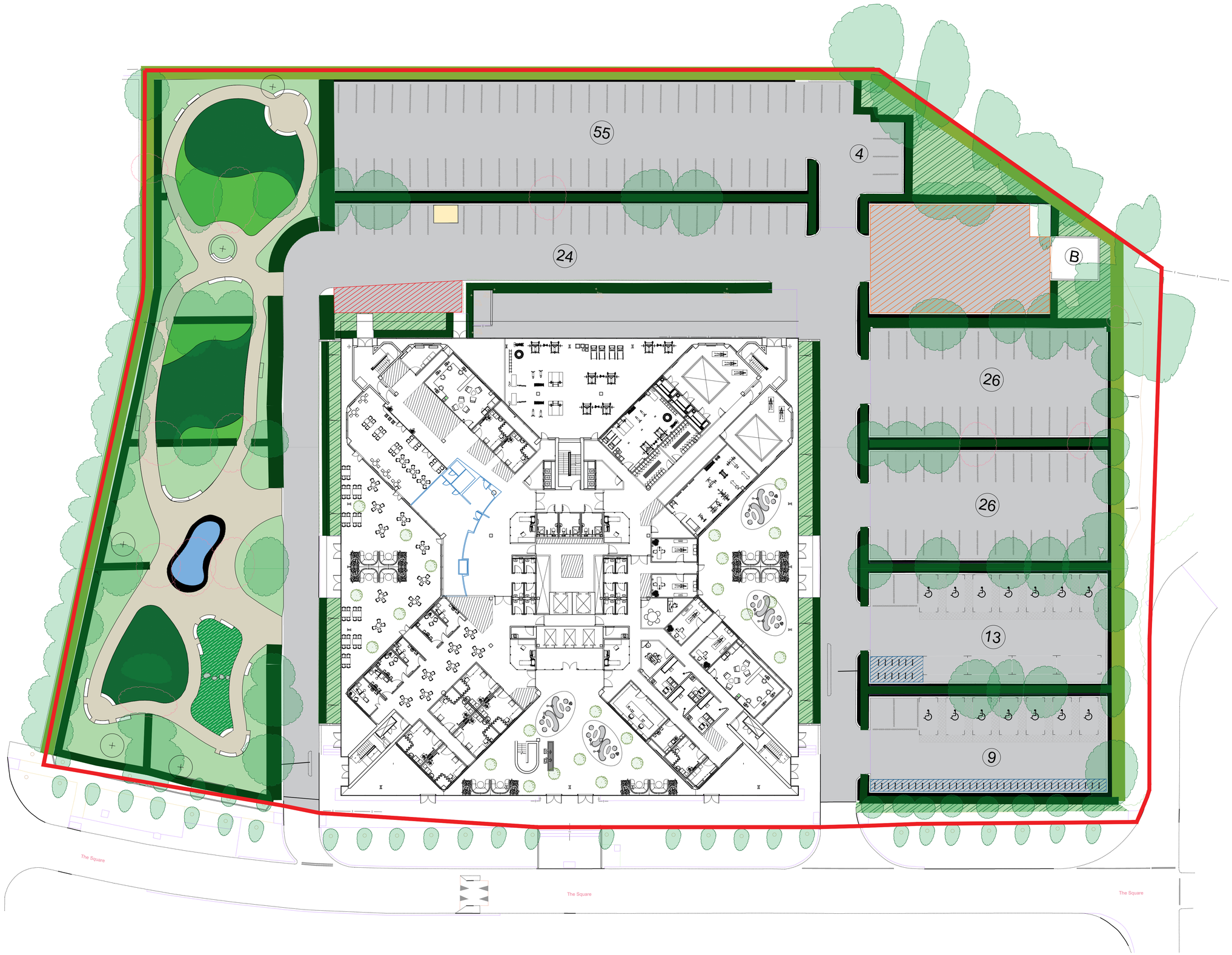
After renewable energy	126.3

Table 6.2 Regulated carbon dioxide savings from each stage of the Energy Hierarchy

	Regulated carbon dioxide savings	
	Tonnes CO_2 per annum	**%**
Savings from energy demand reduction	3.4	1.0%
Savings from renewable energy	323.6	71.4%
Cumulative on-site savings	327.1	72.2%
Annual savings from offset payment	126.3	-
	Tonnes CO_2	
Cumulative savings for offset payment	3,788	-
Cash-in-lieu contribution	£359,901	-

6.6 Overall, the proposals for the scheme are in line with the principles of sustainable development as well as the policy requirements of the NPPF, the London Plan and the London Borough of Hillingdon, and will provide a development that promotes these principles in operation.

A1. SITE PLAN



01 Existing Site Plan
1:250 @ A1

Disclaimer:

© All information shown is subject to survey, drawings and information within is for diagramatic visualization and should not be used for construction purposes. Measure all dimensions on site for verification of data

Notes:

- Site Boundary Line (13,700sqm/3.38 acres)
- Proposed External works to form Restorative garden
- Proposed External works to form Pedestrian Pavillion
- Proposed Ambulance Bay
- Proposed Cycle Parking - 46 Sheffield Stands
- Proposed Vehicle Delivery Set down + Refuse Delivery set down
- B - Proposed Vehicle Delivery Set down + Refuse Delivery set down
- Total Parking = 157
  Net loss of Parking = 124

Rev:	Notes:	Date:	Dwn:	Iss:
02	Issued for draft DAS	25.01.2024	RS	HA
01	First Issue	06.06.2023	JA	HA

0 5 10 15 20 25

N

Client:
COLUMBIA THREADNEEDLE INVESTMENTS

hale
ARCHITECTURE
22c Leathermarket Street, London, SE1 3HP

Project:
3 The Square, Stockley Park

Drawing Title:
Proposed General Arrangement Site Plan

Project No:	Scale @ A1/A3:	Revision:
21087	1:250/1:500	02

Drawing No:
21087-HALE-XX-00-DR-A-1002

A2. BRUKL REPORTS – BASELINE SCENARIO

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

The Square Stockley Park

As designed

Date: Fri Dec 15 10:46:50 2023

Administrative information

Building Details

Address: 3 The Square,, Stockley Park, Hayes, Uxbridge, UB11 1ET

Certifier details

Name: Paul Dodds

Telephone number: 01325 310404

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.1.4

BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 1009.17

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	31.31	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	40.89	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	175.54	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	237.42	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.26	0.26	Storey 0 - Ground Floor - Consulting 7_P_7
Floors	0.18	0.18	0.25	Storey 0 - Ground Floor - Consulting 15_S_4
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	Storey 3 - Third Floor - Lockers 1_R_4
Windows** and roof windows	1.6	-	-	No external windows/roof-windows
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

* 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. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	5

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- Project HVAC - Gas boiler rads 2

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

2- Project HVAC - Gas boiler rads 3

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

3- Project HVAC - Gas boiler rads 1

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

1- Project DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	0.015
Standard value	N/A	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	**System type in the Approved Documents**
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

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	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
Storey 0 - Ground Floor - Spa 1	-	-	-	-	1.8	-	-	-	-	0.75	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 0 - Ground Floor - Spa 2	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa 3	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa 4	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Cleaner 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Consulting 5	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Consulting 6	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Toilet 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 3	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Kitchen	-	-	-	-	1.5	-	-	-	1.5	0.75	N/A
Storey 0 - Ground Floor - Toilet 4	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 5	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 6	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 7	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 8	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 9	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 10	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Lockers 2	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting 38	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting 39	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Toilet 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 3	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 4	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 5	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 6	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 7	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 8	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 9	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 10	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 11	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Shower 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Shower	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Toilet	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Consulting 48	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 2 - Second Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 2 - Second Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 3 - Third Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 3 - Third Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 3 - Third Floor - Shower 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 3 - Third Floor - Shower	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Shower 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Shower	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Cleaner 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Cleaner	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Consulting 9	-	-	1.6	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Storey 0 - Ground Floor - Consulting 7	75	-	-
Storey 0 - Ground Floor - Consulting 10	75	-	-
Storey 0 - Ground Floor - Consulting 11	75	-	-
Storey 0 - Ground Floor - Consulting 12	75	-	-
Storey 0 - Ground Floor - Consulting 13	75	-	-
Storey 0 - Ground Floor - Consulting 14	75	-	-
Storey 0 - Ground Floor - Consulting 15	75	-	-
Storey 0 - Ground Floor - Consulting 16	75	-	-
Storey 0 - Ground Floor - Consulting 17	75	-	-
Storey 0 - Ground Floor - Consulting 20	75	-	-
Storey 0 - Ground Floor - Consulting 23	75	-	-
Storey 0 - Ground Floor - Consulting 24	75	-	-
Storey 0 - Ground Floor - Consulting 26	75	-	-
Storey 0 - Ground Floor - Consulting 27	75	-	-
Storey 0 - Ground Floor - Consulting 30	75	-	-
Storey 0 - Ground Floor - Consulting	75	-	-
Storey 1 -First Floor - Consulting 1	75	-	-
Storey 1 -First Floor - Consulting 3	75	-	-
Storey 1 -First Floor - Consulting 6	75	-	-
Storey 1 -First Floor - Consulting	75	-	-
Storey 1 -First Floor - Consulting 7	75	-	-
Storey 1 -First Floor - Consulting 11	75	-	-
Storey 1 -First Floor - Consulting 16	75	-	-
Storey 1 -First Floor - Consulting 18	75	-	-
Storey 1 -First Floor - Consulting 19	75	-	-
Storey 1 -First Floor - Consulting 20	75	-	-
Storey 1 -First Floor - Consulting 23	75	-	-
Storey 1 -First Floor - Consulting 26	75	-	-
Storey 1 -First Floor - Consulting 29	75	-	-
Storey 1 -First Floor - Consulting 14	75	-	-
Storey 1 -First Floor - Consulting 15	75	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 1 -First Floor - Consulting 13	75	-	-
Storey 1 -First Floor - Consulting 30	75	-	-
Storey 1 -First Floor - Consulting 31	75	-	-
Storey 1 -First Floor - Consulting 33	75	-	-
Storey 1 -First Floor - Consulting 40	75	-	-
Storey 1 -First Floor - Consulting 42	75	-	-
Storey 1 -First Floor - Consulting 44	75	-	-
Storey 1 -First Floor - Consulting 45	75	-	-
Storey 1 -First Floor - Consulting 49	75	-	-
Storey 0 - Ground Floor - Spa 1	75	-	-
Storey 0 - Ground Floor - Spa 2	75	-	-
Storey 0 - Ground Floor - Spa 3	75	-	-
Storey 0 - Ground Floor - Spa 4	75	-	-
Storey 0 - Ground Floor - Spa	75	-	-
Storey 0 - Ground Floor - Cleaner 2	75	-	-
Storey 0 - Ground Floor - Consulting 5	75	-	-
Storey 0 - Ground Floor - Consulting 6	75	-	-
Storey 0 - Ground Floor - Toilet 1	75	-	-
Storey 0 - Ground Floor - Toilet 2	75	-	-
Storey 0 - Ground Floor - Toilet 3	75	-	-
Storey 0 - Ground Floor - Kitchen	75	-	-
Storey 0 - Ground Floor - Toilet 4	75	-	-
Storey 0 - Ground Floor - Toilet 5	75	-	-
Storey 0 - Ground Floor - Toilet 6	75	-	-
Storey 0 - Ground Floor - Toilet 7	75	-	-
Storey 0 - Ground Floor - Toilet 8	75	-	-
Storey 0 - Ground Floor - Toilet 9	75	-	-
Storey 0 - Ground Floor - Toilet 10	75	-	-
Storey 0 - Ground Floor - Toilet	75	-	-
Storey 1 -First Floor - Lockers 1	75	-	-
Storey 1 -First Floor - Lockers 2	75	-	-
Storey 1 -First Floor - Consulting 38	75	-	-
Storey 1 -First Floor - Consulting 39	75	-	-
Storey 1 -First Floor - Toilet 1	75	-	-
Storey 1 -First Floor - Toilet 2	75	-	-
Storey 1 -First Floor - Toilet 3	75	-	-
Storey 1 -First Floor - Toilet 4	75	-	-
Storey 1 -First Floor - Toilet 5	75	-	-
Storey 1 -First Floor - Toilet 6	75	-	-
Storey 1 -First Floor - Toilet 7	75	-	-
Storey 1 -First Floor - Toilet 8	75	-	-
Storey 1 -First Floor - Toilet 9	75	-	-
Storey 1 -First Floor - Toilet 10	75	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 1 -First Floor - Toilet 11	75	-	-
Storey 1 -First Floor - Shower 1	75	-	-
Storey 1 -First Floor - Shower	75	-	-
Storey 1 -First Floor - Lockers	75	-	-
Storey 1 -First Floor - Toilet	75	-	-
Storey 1 -First Floor - Consulting 48	75	-	-
Storey 1 -First Floor - Consulting	75	-	-
Storey 2 - Second Floor - Lockers 1	75	-	-
Storey 2 - Second Floor - Lockers	75	-	-
Storey 3 - Third Floor - Lockers 1	75	-	-
Storey 3 - Third Floor - Lockers	75	-	-
Storey 3 - Third Floor - Shower 1	75	-	-
Storey 3 - Third Floor - Shower	75	-	-
Storey 0 - Ground Floor - Gym 1	75	-	-
Storey 0 - Ground Floor - Gym	75	-	-
Storey 0 - Ground Floor - Consulting 1	75	-	-
Storey 0 - Ground Floor - Consulting 2	75	-	-
Storey 0 - Ground Floor - Consulting 3	75	-	-
Storey 0 - Ground Floor - Consulting 4	75	-	-
Storey 0 - Ground Floor - Office 1	75	-	-
Storey 0 - Ground Floor - Consulting 8	75	-	-
Storey 0 - Ground Floor - Consulting 9	75	-	-
Storey 0 - Ground Floor - Consulting 18	75	-	-
Storey 0 - Ground Floor - Consulting 19	75	-	-
Storey 0 - Ground Floor - Consulting 21	75	-	-
Storey 0 - Ground Floor - Consulting 22	75	-	-
Storey 0 - Ground Floor - Consulting 25	75	-	-
Storey 0 - Ground Floor - Consulting 28	75	-	-
Storey 0 - Ground Floor - Shower 1	75	-	-
Storey 0 - Ground Floor - Shower	75	-	-
Storey 0 - Ground Floor - Consulting 29	75	-	-
Storey 0 - Ground Floor - Lobby	75	-	-
Storey 0 - Ground Floor - Canteen	75	-	-
Storey 0 - Ground Floor - Server 1	75	-	-
Storey 0 - Ground Floor - Server	75	-	-
Storey 0 - Ground Floor - Lockers 1	75	-	-
Storey 0 - Ground Floor - Lockers	75	-	-
Storey 0 - Ground Floor - Office 2	75	-	-
Storey 0 - Ground Floor - Office	75	-	-
Storey 1 -First Floor - Consulting 2	75	-	-
Storey 1 -First Floor - Consulting 4	75	-	-
Storey 1 -First Floor - Consulting 5	75	-	-
Storey 1 -First Floor - Consulting 8	75	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 1 -First Floor - Consulting 10	75	-	-
Storey 1 -First Floor - Consulting 12	75	-	-
Storey 1 -First Floor - Consulting 17	75	-	-
Storey 1 -First Floor - Office 1	75	-	-
Storey 1 -First Floor - Office 2	75	-	-
Storey 1 -First Floor - Consulting 24	75	-	-
Storey 1 -First Floor - Consulting 25	75	-	-
Storey 1 -First Floor - Consulting 27	75	-	-
Storey 1 -First Floor - Office 3	75	-	-
Storey 1 -First Floor - Consulting 34	75	-	-
Storey 1 -First Floor - Consulting 35	75	-	-
Storey 1 -First Floor - Consulting 36	75	-	-
Storey 1 -First Floor - Consulting 21	75	-	-
Storey 1 -First Floor - Consulting 22	75	-	-
Storey 1 -First Floor - Consulting 37	75	-	-
Storey 1 -First Floor - Consulting 41	75	-	-
Storey 1 -First Floor - Store 1	75	-	-
Storey 1 -First Floor - Consulting 28	75	-	-
Storey 1 -First Floor - Consulting 32	75	-	-
Storey 1 -First Floor - Store 2	75	-	-
Storey 1 -First Floor - Store	75	-	-
Storey 1 -First Floor - Store 3	75	-	-
Storey 1 -First Floor - Consulting 43	75	-	-
Storey 1 -First Floor - Server	75	-	-
Storey 1 -First Floor - Server	75	-	-
Storey 1 -First Floor - Consulting 46	75	-	-
Storey 1 -First Floor - Consulting 47	75	-	-
Storey 1 -First Floor - Office 4	75	-	-
Storey 1 -First Floor - Office 5	75	-	-
Storey 1 -First Floor - Office	75	-	-
Storey 1 -First Floor - Store	75	-	-
Storey 2 - Second Floor - Bedroom 1	75	-	-
Storey 2 - Second Floor - Bedroom 2	75	-	-
Storey 2 - Second Floor - Bedroom 3	75	-	-
Storey 2 - Second Floor - Bedroom 4	75	-	-
Storey 2 - Second Floor - Bedroom 5	75	-	-
Storey 2 - Second Floor - Bedroom 6	75	-	-
Storey 2 - Second Floor - Bedrooms 1	75	-	-
Storey 2 - Second Floor - Bedroom 7	75	-	-
Storey 2 - Second Floor - Consulting 22	75	-	-
Storey 2 - Second Floor - Office 1	75	-	-
Storey 2 - Second Floor - Office 4	75	-	-
Storey 2 - Second Floor - Office 5	75	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 2 - Second Floor - Office 2	75	-	-
Storey 2 - Second Floor - Bedroom 8	75	-	-
Storey 2 - Second Floor - Bedrooms	75	-	-
Storey 2 - Second Floor - Office 3	75	-	-
Storey 2 - Second Floor - Office 6	75	-	-
Storey 2 - Second Floor - Bedroom	75	-	-
Storey 2 - Second Floor - Server	75	-	-
Storey 2 - Second Floor - Office 7	75	-	-
Storey 2 - Second Floor - Office	75	-	-
Storey 3 - Third Floor - Bedroom 1	75	-	-
Storey 3 - Third Floor - Bedroom 2	75	-	-
Storey 3 - Third Floor - Bedroom 3	75	-	-
Storey 3 - Third Floor - Bedroom 4	75	-	-
Storey 3 - Third Floor - Bedroom 5	75	-	-
Storey 3 - Third Floor - Bedroom 6	75	-	-
Storey 3 - Third Floor - Bedrooms 1	75	-	-
Storey 3 - Third Floor - Bedroom 7	75	-	-
Storey 3 - Third Floor - Consulting	75	-	-
Storey 3 - Third Floor - Consulting 22	75	-	-
Storey 3 - Third Floor - Office 1	75	-	-
Storey 3 - Third Floor - Office 4	75	-	-
Storey 3 - Third Floor - Office 5	75	-	-
Storey 3 - Third Floor - Office 2	75	-	-
Storey 3 - Third Floor - Bedroom 8	75	-	-
Storey 3 - Third Floor - Bedrooms	75	-	-
Storey 3 - Third Floor - Office 3	75	-	-
Storey 3 - Third Floor - Office 6	75	-	-
Storey 3 - Third Floor - Bedroom	75	-	-
Storey 3 - Third Floor - Server	75	-	-
Storey 3 - Third Floor - Server	75	-	-
Storey 3 - Third Floor - Consulting 28	75	-	-
Storey 3 - Third Floor - Consulting 29	75	-	-
Storey 3 - Third Floor - Office 7	75	-	-
Storey 3 - Third Floor - Office	75	-	-
Storey 0 - Ground Floor - Outer Circulation 1	75	-	-
Storey 0 - Ground Floor - General Circulation 1	75	-	-
Storey 0 - Ground Floor - Riser 1	75	-	-
Storey 0 - Ground Floor - Stair 1	75	-	-
Storey 0 - Ground Floor - Outer circulation	75	-	-
Storey 0 - Ground Floor - Lobby 1	75	-	-
Storey 0 - Ground Floor - Lobby 2	75	-	-
Storey 0 - Ground Floor - Stair 2	75	-	-
Storey 0 - Ground Floor - Riser	75	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 0 - Ground Floor - Lifts 1	75	-	-
Storey 0 - Ground Floor - Cleaner 1	75	-	-
Storey 0 - Ground Floor - Cleaner	75	-	-
Storey 0 - Ground Floor - Lifts	75	-	-
Storey 0 - Ground Floor - Stair	75	-	-
Storey 0 - Ground Floor - Corridor 1	75	-	-
Storey 0 - Ground Floor - Corridor	75	-	-
Storey 1 -First Floor - General Circulation	75	-	-
Storey 1 -First Floor - Consulting 9	75	-	-
Storey 1 -First Floor - Riser 1	75	-	-
Storey 1 -First Floor - Lobby 1	75	-	-
Storey 1 -First Floor - Lobby 2	75	-	-
Storey 1 -First Floor - Riser	75	-	-
Storey 1 -First Floor - Corridor	75	-	-
Storey 1 -First Floor - Stair	75	-	-
Storey 1 -First Floor - Store 4	75	-	-
Storey 1 -First Floor - Store 5	75	-	-
Storey 1 -First Floor - Lifts 1	75	-	-
Storey 2 - Second Floor - General Circulation 2	75	-	-
Storey 2 - Second Floor - Lobby 1	75	-	-
Storey 3 - Third Floor - General Circulation 2	75	-	-
Storey 3 - Third Floor - Riser 1	75	-	-
Storey 3 - Third Floor - Stair 1	75	-	-
Storey 3 - Third Floor - Lobby 1	75	-	-
Storey 3 - Third Floor - Lobby 2	75	-	-
Storey 3 - Third Floor - Stair 2	75	-	-
Storey 3 - Third Floor - Riser	75	-	-
Storey 3 - Third Floor - Stair	75	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 0 - Ground Floor - Consulting 7	N/A	N/A
Storey 0 - Ground Floor - Consulting 10	N/A	N/A
Storey 0 - Ground Floor - Consulting 11	N/A	N/A
Storey 0 - Ground Floor - Consulting 12	N/A	N/A
Storey 0 - Ground Floor - Consulting 13	N/A	N/A
Storey 0 - Ground Floor - Consulting 14	N/A	N/A
Storey 0 - Ground Floor - Consulting 15	N/A	N/A
Storey 0 - Ground Floor - Consulting 16	N/A	N/A
Storey 0 - Ground Floor - Consulting 17	N/A	N/A
Storey 0 - Ground Floor - Consulting 20	N/A	N/A
Storey 0 - Ground Floor - Consulting 23	N/A	N/A
Storey 0 - Ground Floor - Consulting 24	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 0 - Ground Floor - Consulting 26	N/A	N/A
Storey 0 - Ground Floor - Consulting 27	N/A	N/A
Storey 0 - Ground Floor - Consulting 30	N/A	N/A
Storey 0 - Ground Floor - Consulting	N/A	N/A
Storey 1 -First Floor - Consulting 14	N/A	N/A
Storey 1 -First Floor - Consulting 15	N/A	N/A
Storey 1 -First Floor - Consulting 13	N/A	N/A
Storey 0 - Ground Floor - Spa 1	N/A	N/A
Storey 0 - Ground Floor - Spa 2	N/A	N/A
Storey 0 - Ground Floor - Spa 3	N/A	N/A
Storey 0 - Ground Floor - Spa 4	N/A	N/A
Storey 0 - Ground Floor - Spa	N/A	N/A
Storey 0 - Ground Floor - Consulting 5	N/A	N/A
Storey 0 - Ground Floor - Consulting 6	N/A	N/A
Storey 0 - Ground Floor - Gym 1	N/A	N/A
Storey 0 - Ground Floor - Gym	N/A	N/A
Storey 0 - Ground Floor - Consulting 1	N/A	N/A
Storey 0 - Ground Floor - Consulting 2	N/A	N/A
Storey 0 - Ground Floor - Consulting 3	N/A	N/A
Storey 0 - Ground Floor - Consulting 4	N/A	N/A
Storey 0 - Ground Floor - Office 1	N/A	N/A
Storey 0 - Ground Floor - Consulting 8	N/A	N/A
Storey 0 - Ground Floor - Consulting 9	N/A	N/A
Storey 0 - Ground Floor - Consulting 18	N/A	N/A
Storey 0 - Ground Floor - Consulting 19	N/A	N/A
Storey 0 - Ground Floor - Consulting 21	N/A	N/A
Storey 0 - Ground Floor - Consulting 22	N/A	N/A
Storey 0 - Ground Floor - Consulting 25	N/A	N/A
Storey 0 - Ground Floor - Consulting 28	N/A	N/A
Storey 0 - Ground Floor - Consulting 29	N/A	N/A
Storey 0 - Ground Floor - Canteen	N/A	N/A
Storey 0 - Ground Floor - Server 1	N/A	N/A
Storey 0 - Ground Floor - Server	N/A	N/A
Storey 0 - Ground Floor - Office 2	N/A	N/A
Storey 0 - Ground Floor - Office	N/A	N/A
Storey 1 -First Floor - Consulting 21	N/A	N/A
Storey 1 -First Floor - Consulting 22	N/A	N/A
Storey 1 -First Floor - Consulting 28	N/A	N/A
Storey 1 -First Floor - Consulting 32	N/A	N/A
Storey 1 -First Floor - Server	N/A	N/A
Storey 1 -First Floor - Server	N/A	N/A
Storey 2 - Second Floor - Bedroom 1	N/A	N/A
Storey 2 - Second Floor - Bedroom 2	N/A	N/A
Storey 2 - Second Floor - Bedroom 3	N/A	N/A
Storey 2 - Second Floor - Bedroom 4	N/A	N/A
Storey 2 - Second Floor - Bedroom 5	N/A	N/A
Storey 2 - Second Floor - Bedroom 6	N/A	N/A
Storey 2 - Second Floor - Bedrooms 1	N/A	N/A
Storey 2 - Second Floor - Bedroom 7	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 2 - Second Floor - Consulting 22	N/A	N/A
Storey 2 - Second Floor - Office 1	N/A	N/A
Storey 2 - Second Floor - Office 4	N/A	N/A
Storey 2 - Second Floor - Office 5	N/A	N/A
Storey 2 - Second Floor - Office 2	N/A	N/A
Storey 2 - Second Floor - Bedroom 8	N/A	N/A
Storey 2 - Second Floor - Bedrooms	N/A	N/A
Storey 2 - Second Floor - Office 3	N/A	N/A
Storey 2 - Second Floor - Office 6	N/A	N/A
Storey 2 - Second Floor - Bedroom	N/A	N/A
Storey 2 - Second Floor - Server	N/A	N/A
Storey 2 - Second Floor - Office 7	N/A	N/A
Storey 2 - Second Floor - Office	N/A	N/A
Storey 3 - Third Floor - Bedroom 1	N/A	N/A
Storey 3 - Third Floor - Bedroom 2	N/A	N/A
Storey 3 - Third Floor - Bedroom 3	N/A	N/A
Storey 3 - Third Floor - Bedroom 4	N/A	N/A
Storey 3 - Third Floor - Bedroom 5	N/A	N/A
Storey 3 - Third Floor - Bedroom 6	N/A	N/A
Storey 3 - Third Floor - Bedrooms 1	N/A	N/A
Storey 3 - Third Floor - Bedroom 7	N/A	N/A
Storey 3 - Third Floor - Consulting	N/A	N/A
Storey 3 - Third Floor - Consulting 22	N/A	N/A
Storey 3 - Third Floor - Office 1	N/A	N/A
Storey 3 - Third Floor - Office 4	N/A	N/A
Storey 3 - Third Floor - Office 5	N/A	N/A
Storey 3 - Third Floor - Office 2	N/A	N/A
Storey 3 - Third Floor - Bedroom 8	N/A	N/A
Storey 3 - Third Floor - Bedrooms	N/A	N/A
Storey 3 - Third Floor - Office 3	N/A	N/A
Storey 3 - Third Floor - Office 6	N/A	N/A
Storey 3 - Third Floor - Bedroom	N/A	N/A
Storey 3 - Third Floor - Server	N/A	N/A
Storey 3 - Third Floor - Server	N/A	N/A
Storey 3 - Third Floor - Consulting 28	N/A	N/A
Storey 3 - Third Floor - Consulting 29	N/A	N/A
Storey 3 - Third Floor - Office 7	N/A	N/A
Storey 3 - Third Floor - Office	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	11087	11087
External area [m^2]	32259.5	32259.5
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	13353.2	7339.01
Average U-value [W/m^2K]	0.41	0.23
Alpha value* [%]	4.24	7.29

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
100	**Residential Institutions: Hospitals and Care Homes**
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	18.88	18.26
Cooling	0	0
Auxiliary	5.05	2.29
Lighting	19.18	9.19
Hot water	160.23	125.96
Equipment*	38.48	38.48
TOTAL**	**203.34**	**155.71**

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

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	3.04
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*3.04*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	404.74	251.13
Primary energy [kWh_{PE}/m^2]	237.42	175.54
Total emissions [kg/m^2]	40.89	31.31

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	71.5	151.4	23.2	0	2.7	0.86	0	0.96	0
	Notional	65.1	203.3	21	0	1.3	0.86	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	98.3	416.8	31.9	0	41.5	0.86	0	0.96	0
	Notional	83.3	376	26.9	0	17.9	0.86	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	113.9	105.5	36.9	0	4.7	0.86	0	0.96	0
	Notional	113	140.8	36.5	0	2.2	0.86	0	----	----
[ST] No Heating or Cooling										
	Actual	142.1	446.5	0	0	0.5	0	0	0	0
	Notional	99.7	119	0	0	0.2	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

A3. BRUKL REPORTS – BE LEAN

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

The Square Stockley Park

As designed

Date: Mon Oct 30 16:17:49 2023

Administrative information

Building Details

Address: 3 The Square,, Stockley Park, Hayes, Uxbridge, UB11 1ET

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.1.4

BRUKL compliance module version: v6.1.e.0

Certifier details

Name: Paul Dodds

Telephone number: 01325 310404

Address: , ,

Foundation area [m^2]: 1009.17

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	29.47	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	40.58	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	176.14	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	249.07	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.26	0.26	Storey 0 - Ground Floor - Consulting 7_P_7
Floors	0.18	0.18	0.34	Storey 0 - Ground Floor - Consulting 15_S_4
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	Storey 3 - Third Floor - Lockers 1_R_4
Windows** and roof windows	1.6	-	-	No external windows/roof-windows
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

* 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. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	5

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- Project HVAC - Zone Heating & Cooling Coils

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.93	2	-	1.8	0.75
Standard value	0.93*	4.5**	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.

** Standard shown is for air-cooled chillers >=400 kW. For chillers <400 kW, limiting SEER is 4.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

2- Project HVAC - Electric Panel Heater

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

3- Project HVAC - 4 Pipe FCU

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.93	4.5	-	0.2	0.75
Standard value	0.93*	4.5**	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.

** Standard shown is for air-cooled chillers >=400 kW. For chillers <400 kW, limiting SEER is 4.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- Project DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	0.015
Standard value	N/A	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	**System type in the Approved Documents**
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 0 - Ground Floor - Spa 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa 2	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa 3	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa 4	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Cleaner 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Consulting 5	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Consulting 6	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Toilet 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 3	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Kitchen	-	-	-	-	1.5	-	-	-	1.5	0.75	N/A
Storey 0 - Ground Floor - Toilet 4	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 5	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 6	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 7	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 8	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 9	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 10	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Lockers 2	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting 38	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting 39	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Toilet 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 3	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 4	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 5	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 6	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 7	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 8	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 9	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 10	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 11	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Shower 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Shower	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Toilet	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Consulting 48	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 2 - Second Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 2 - Second Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 3 - Third Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 3 - Third Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 3 - Third Floor - Shower 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 3 - Third Floor - Shower	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Gym 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Gym	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Office 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 8	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 9	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 18	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 19	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 21	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 22	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 25	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 28	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Shower 1	-	-	1.6	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Shower	-	-	1.6	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 29	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Lobby	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Canteen	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Server 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Lockers 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Lockers	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Office	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 8	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 10	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 12	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 17	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 24	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 25	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 27	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 3	-	-	-	-	-	-	-	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 1 -First Floor - Consulting 34	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 35	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 36	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 21	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 22	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 37	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 41	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 28	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 32	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 43	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 46	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 47	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 6	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedrooms 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 7	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Consulting 2	2	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 8	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedrooms	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 6	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 7	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - 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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 3 - Third Floor - Bedroom 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 6	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedrooms 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 7	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Consulting	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Consulting 22	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 8	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedrooms	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 6	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Consulting 28	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Consulting 29	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 7	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Cleaner 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Cleaner	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Consulting 9	-	-	1.6	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Storey 0 - Ground Floor - Consulting 7	110	-	-
Storey 0 - Ground Floor - Consulting 10	110	-	-
Storey 0 - Ground Floor - Consulting 11	110	-	-
Storey 0 - Ground Floor - Consulting 12	110	-	-
Storey 0 - Ground Floor - Consulting 13	110	-	-
Storey 0 - Ground Floor - Consulting 14	110	-	-
Storey 0 - Ground Floor - Consulting 15	110	-	-
Storey 0 - Ground Floor - Consulting 16	110	-	-
Storey 0 - Ground Floor - Consulting 17	110	-	-
Storey 0 - Ground Floor - Consulting 20	110	-	-
Storey 0 - Ground Floor - Consulting 23	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 0 - Ground Floor - Consulting 24	110	-	-
Storey 0 - Ground Floor - Consulting 26	110	-	-
Storey 0 - Ground Floor - Consulting 27	110	-	-
Storey 0 - Ground Floor - Consulting 30	110	-	-
Storey 0 - Ground Floor - Consulting	110	-	-
Storey 1 -First Floor - Consulting 1	110	-	-
Storey 1 -First Floor - Consulting 3	110	-	-
Storey 1 -First Floor - Consulting 6	110	-	-
Storey 1 -First Floor - Consulting	110	-	-
Storey 1 -First Floor - Consulting 7	110	-	-
Storey 1 -First Floor - Consulting 11	110	-	-
Storey 1 -First Floor - Consulting 16	110	-	-
Storey 1 -First Floor - Consulting 18	110	-	-
Storey 1 -First Floor - Consulting 19	110	-	-
Storey 1 -First Floor - Consulting 20	110	-	-
Storey 1 -First Floor - Consulting 23	110	-	-
Storey 1 -First Floor - Consulting 26	110	-	-
Storey 1 -First Floor - Consulting 29	110	-	-
Storey 1 -First Floor - Consulting 14	110	-	-
Storey 1 -First Floor - Consulting 15	110	-	-
Storey 1 -First Floor - Consulting 13	110	-	-
Storey 1 -First Floor - Consulting 30	110	-	-
Storey 1 -First Floor - Consulting 31	110	-	-
Storey 1 -First Floor - Consulting 33	110	-	-
Storey 1 -First Floor - Consulting 40	110	-	-
Storey 1 -First Floor - Consulting 42	110	-	-
Storey 1 -First Floor - Consulting 44	110	-	-
Storey 1 -First Floor - Consulting 45	110	-	-
Storey 1 -First Floor - Consulting 49	110	-	-
Storey 0 - Ground Floor - Spa 1	110	-	-
Storey 0 - Ground Floor - Spa 2	110	-	-
Storey 0 - Ground Floor - Spa 3	110	-	-
Storey 0 - Ground Floor - Spa 4	110	-	-
Storey 0 - Ground Floor - Spa	110	-	-
Storey 0 - Ground Floor - Cleaner 2	110	-	-
Storey 0 - Ground Floor - Consulting 5	110	-	-
Storey 0 - Ground Floor - Consulting 6	110	-	-
Storey 0 - Ground Floor - Toilet 1	110	-	-
Storey 0 - Ground Floor - Toilet 2	110	-	-
Storey 0 - Ground Floor - Toilet 3	110	-	-
Storey 0 - Ground Floor - Kitchen	110	-	-
Storey 0 - Ground Floor - Toilet 4	110	-	-
Storey 0 - Ground Floor - Toilet 5	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 0 - Ground Floor - Toilet 6	110	-	-
Storey 0 - Ground Floor - Toilet 7	110	-	-
Storey 0 - Ground Floor - Toilet 8	110	-	-
Storey 0 - Ground Floor - Toilet 9	110	-	-
Storey 0 - Ground Floor - Toilet 10	110	-	-
Storey 0 - Ground Floor - Toilet	110	-	-
Storey 1 -First Floor - Lockers 1	110	-	-
Storey 1 -First Floor - Lockers 2	110	-	-
Storey 1 -First Floor - Consulting 38	110	-	-
Storey 1 -First Floor - Consulting 39	110	-	-
Storey 1 -First Floor - Toilet 1	110	-	-
Storey 1 -First Floor - Toilet 2	110	-	-
Storey 1 -First Floor - Toilet 3	110	-	-
Storey 1 -First Floor - Toilet 4	110	-	-
Storey 1 -First Floor - Toilet 5	110	-	-
Storey 1 -First Floor - Toilet 6	110	-	-
Storey 1 -First Floor - Toilet 7	110	-	-
Storey 1 -First Floor - Toilet 8	110	-	-
Storey 1 -First Floor - Toilet 9	110	-	-
Storey 1 -First Floor - Toilet 10	110	-	-
Storey 1 -First Floor - Toilet 11	110	-	-
Storey 1 -First Floor - Shower 1	110	-	-
Storey 1 -First Floor - Shower	110	-	-
Storey 1 -First Floor - Lockers	110	-	-
Storey 1 -First Floor - Toilet	110	-	-
Storey 1 -First Floor - Consulting 48	110	-	-
Storey 1 -First Floor - Consulting	110	-	-
Storey 2 - Second Floor - Lockers 1	110	-	-
Storey 2 - Second Floor - Lockers	110	-	-
Storey 3 - Third Floor - Lockers 1	110	-	-
Storey 3 - Third Floor - Lockers	110	-	-
Storey 3 - Third Floor - Shower 1	110	-	-
Storey 3 - Third Floor - Shower	110	-	-
Storey 0 - Ground Floor - Gym 1	110	-	-
Storey 0 - Ground Floor - Gym	110	-	-
Storey 0 - Ground Floor - Consulting 1	110	-	-
Storey 0 - Ground Floor - Consulting 2	110	-	-
Storey 0 - Ground Floor - Consulting 3	110	-	-
Storey 0 - Ground Floor - Consulting 4	110	-	-
Storey 0 - Ground Floor - Office 1	110	-	-
Storey 0 - Ground Floor - Consulting 8	110	-	-
Storey 0 - Ground Floor - Consulting 9	110	-	-
Storey 0 - Ground Floor - Consulting 18	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 0 - Ground Floor - Consulting 19	110	-	-
Storey 0 - Ground Floor - Consulting 21	110	-	-
Storey 0 - Ground Floor - Consulting 22	110	-	-
Storey 0 - Ground Floor - Consulting 25	110	-	-
Storey 0 - Ground Floor - Consulting 28	110	-	-
Storey 0 - Ground Floor - Shower 1	110	-	-
Storey 0 - Ground Floor - Shower	110	-	-
Storey 0 - Ground Floor - Consulting 29	110	-	-
Storey 0 - Ground Floor - Lobby	110	-	-
Storey 0 - Ground Floor - Canteen	110	-	-
Storey 0 - Ground Floor - Server 1	110	-	-
Storey 0 - Ground Floor - Server	110	-	-
Storey 0 - Ground Floor - Lockers 1	110	-	-
Storey 0 - Ground Floor - Lockers	110	-	-
Storey 0 - Ground Floor - Office 2	110	-	-
Storey 0 - Ground Floor - Office	110	-	-
Storey 1 -First Floor - Consulting 2	110	-	-
Storey 1 -First Floor - Consulting 4	110	-	-
Storey 1 -First Floor - Consulting 5	110	-	-
Storey 1 -First Floor - Consulting 8	110	-	-
Storey 1 -First Floor - Consulting 10	110	-	-
Storey 1 -First Floor - Consulting 12	110	-	-
Storey 1 -First Floor - Consulting 17	110	-	-
Storey 1 -First Floor - Office 1	110	-	-
Storey 1 -First Floor - Office 2	110	-	-
Storey 1 -First Floor - Consulting 24	110	-	-
Storey 1 -First Floor - Consulting 25	110	-	-
Storey 1 -First Floor - Consulting 27	110	-	-
Storey 1 -First Floor - Office 3	110	-	-
Storey 1 -First Floor - Consulting 34	110	-	-
Storey 1 -First Floor - Consulting 35	110	-	-
Storey 1 -First Floor - Consulting 36	110	-	-
Storey 1 -First Floor - Consulting 21	110	-	-
Storey 1 -First Floor - Consulting 22	110	-	-
Storey 1 -First Floor - Consulting 37	110	-	-
Storey 1 -First Floor - Consulting 41	110	-	-
Storey 1 -First Floor - Store 1	110	-	-
Storey 1 -First Floor - Consulting 28	110	-	-
Storey 1 -First Floor - Consulting 32	110	-	-
Storey 1 -First Floor - Store 2	110	-	-
Storey 1 -First Floor - Store	110	-	-
Storey 1 -First Floor - Store 3	110	-	-
Storey 1 -First Floor - Consulting 43	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 1 -First Floor - Server	110	-	-
Storey 1 -First Floor - Server	110	-	-
Storey 1 -First Floor - Consulting 46	110	-	-
Storey 1 -First Floor - Consulting 47	110	-	-
Storey 1 -First Floor - Office 4	110	-	-
Storey 1 -First Floor - Office 5	110	-	-
Storey 1 -First Floor - Office	110	-	-
Storey 1 -First Floor - Store	110	-	-
Storey 2 - Second Floor - Bedroom 1	110	-	-
Storey 2 - Second Floor - Bedroom 2	110	-	-
Storey 2 - Second Floor - Bedroom 3	110	-	-
Storey 2 - Second Floor - Bedroom 4	110	-	-
Storey 2 - Second Floor - Bedroom 5	110	-	-
Storey 2 - Second Floor - Bedroom 6	110	-	-
Storey 2 - Second Floor - Bedrooms 1	110	-	-
Storey 2 - Second Floor - Bedroom 7	110	-	-
Storey 2 - Second Floor - Consulting 22	110	-	-
Storey 2 - Second Floor - Office 1	110	-	-
Storey 2 - Second Floor - Office 4	110	-	-
Storey 2 - Second Floor - Office 5	110	-	-
Storey 2 - Second Floor - Office 2	110	-	-
Storey 2 - Second Floor - Bedroom 8	110	-	-
Storey 2 - Second Floor - Bedrooms	110	-	-
Storey 2 - Second Floor - Office 3	110	-	-
Storey 2 - Second Floor - Office 6	110	-	-
Storey 2 - Second Floor - Bedroom	110	-	-
Storey 2 - Second Floor - Server	110	-	-
Storey 2 - Second Floor - Office 7	110	-	-
Storey 2 - Second Floor - Office	110	-	-
Storey 3 - Third Floor - Bedroom 1	110	-	-
Storey 3 - Third Floor - Bedroom 2	110	-	-
Storey 3 - Third Floor - Bedroom 3	110	-	-
Storey 3 - Third Floor - Bedroom 4	110	-	-
Storey 3 - Third Floor - Bedroom 5	110	-	-
Storey 3 - Third Floor - Bedroom 6	110	-	-
Storey 3 - Third Floor - Bedrooms 1	110	-	-
Storey 3 - Third Floor - Bedroom 7	110	-	-
Storey 3 - Third Floor - Consulting	110	-	-
Storey 3 - Third Floor - Consulting 22	110	-	-
Storey 3 - Third Floor - Office 1	110	-	-
Storey 3 - Third Floor - Office 4	110	-	-
Storey 3 - Third Floor - Office 5	110	-	-
Storey 3 - Third Floor - Office 2	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 3 - Third Floor - Bedroom 8	110	-	-
Storey 3 - Third Floor - Bedrooms	110	-	-
Storey 3 - Third Floor - Office 3	110	-	-
Storey 3 - Third Floor - Office 6	110	-	-
Storey 3 - Third Floor - Bedroom	110	-	-
Storey 3 - Third Floor - Server	110	-	-
Storey 3 - Third Floor - Server	110	-	-
Storey 3 - Third Floor - Consulting 28	110	-	-
Storey 3 - Third Floor - Consulting 29	110	-	-
Storey 3 - Third Floor - Office 7	110	-	-
Storey 3 - Third Floor - Office	110	-	-
Storey 0 - Ground Floor - Outer Circulation 1	110	-	-
Storey 0 - Ground Floor - General Circulation 1	110	-	-
Storey 0 - Ground Floor - Riser 1	110	-	-
Storey 0 - Ground Floor - Stair 1	110	-	-
Storey 0 - Ground Floor - Outer circulation	110	-	-
Storey 0 - Ground Floor - Lobby 1	110	-	-
Storey 0 - Ground Floor - Lobby 2	110	-	-
Storey 0 - Ground Floor - Stair 2	110	-	-
Storey 0 - Ground Floor - Riser	110	-	-
Storey 0 - Ground Floor - Lifts 1	110	-	-
Storey 0 - Ground Floor - Cleaner 1	110	-	-
Storey 0 - Ground Floor - Cleaner	110	-	-
Storey 0 - Ground Floor - Lifts	110	-	-
Storey 0 - Ground Floor - Stair	110	-	-
Storey 0 - Ground Floor - Corridor 1	110	-	-
Storey 0 - Ground Floor - Corridor	110	-	-
Storey 1 -First Floor - General Circulation	110	-	-
Storey 1 -First Floor - Consulting 9	110	-	-
Storey 1 -First Floor - Riser 1	110	-	-
Storey 1 -First Floor - Lobby 1	110	-	-
Storey 1 -First Floor - Lobby 2	110	-	-
Storey 1 -First Floor - Riser	110	-	-
Storey 1 -First Floor - Corridor	110	-	-
Storey 1 -First Floor - Stair	110	-	-
Storey 1 -First Floor - Store 4	110	-	-
Storey 1 -First Floor - Store 5	110	-	-
Storey 1 -First Floor - Lifts 1	110	-	-
Storey 2 - Second Floor - General Circulation 2	110	-	-
Storey 2 - Second Floor - Lobby 1	110	-	-
Storey 3 - Third Floor - General Circulation 2	110	-	-
Storey 3 - Third Floor - Riser 1	110	-	-
Storey 3 - Third Floor - Stair 1	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 3 - Third Floor - Lobby 1	110	-	-
Storey 3 - Third Floor - Lobby 2	110	-	-
Storey 3 - Third Floor - Stair 2	110	-	-
Storey 3 - Third Floor - Riser	110	-	-
Storey 3 - Third Floor - Stair	110	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 0 - Ground Floor - Consulting 7	N/A	N/A
Storey 0 - Ground Floor - Consulting 10	N/A	N/A
Storey 0 - Ground Floor - Consulting 11	N/A	N/A
Storey 0 - Ground Floor - Consulting 12	N/A	N/A
Storey 0 - Ground Floor - Consulting 13	N/A	N/A
Storey 0 - Ground Floor - Consulting 14	N/A	N/A
Storey 0 - Ground Floor - Consulting 15	N/A	N/A
Storey 0 - Ground Floor - Consulting 16	N/A	N/A
Storey 0 - Ground Floor - Consulting 17	N/A	N/A
Storey 0 - Ground Floor - Consulting 20	N/A	N/A
Storey 0 - Ground Floor - Consulting 23	N/A	N/A
Storey 0 - Ground Floor - Consulting 24	N/A	N/A
Storey 0 - Ground Floor - Consulting 26	N/A	N/A
Storey 0 - Ground Floor - Consulting 27	N/A	N/A
Storey 0 - Ground Floor - Consulting 30	N/A	N/A
Storey 0 - Ground Floor - Consulting	N/A	N/A
Storey 1 -First Floor - Consulting 1	N/A	N/A
Storey 1 -First Floor - Consulting 3	N/A	N/A
Storey 1 -First Floor - Consulting 6	N/A	N/A
Storey 1 -First Floor - Consulting	N/A	N/A
Storey 1 -First Floor - Consulting 7	N/A	N/A
Storey 1 -First Floor - Consulting 11	N/A	N/A
Storey 1 -First Floor - Consulting 16	N/A	N/A
Storey 1 -First Floor - Consulting 18	N/A	N/A
Storey 1 -First Floor - Consulting 19	N/A	N/A
Storey 1 -First Floor - Consulting 20	N/A	N/A
Storey 1 -First Floor - Consulting 23	N/A	N/A
Storey 1 -First Floor - Consulting 26	N/A	N/A
Storey 1 -First Floor - Consulting 29	N/A	N/A
Storey 1 -First Floor - Consulting 14	N/A	N/A
Storey 1 -First Floor - Consulting 15	N/A	N/A
Storey 1 -First Floor - Consulting 13	N/A	N/A
Storey 1 -First Floor - Consulting 30	N/A	N/A
Storey 1 -First Floor - Consulting 31	N/A	N/A
Storey 1 -First Floor - Consulting 33	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 1 -First Floor - Consulting 40	N/A	N/A
Storey 1 -First Floor - Consulting 42	N/A	N/A
Storey 1 -First Floor - Consulting 44	N/A	N/A
Storey 1 -First Floor - Consulting 45	N/A	N/A
Storey 1 -First Floor - Consulting 49	N/A	N/A
Storey 0 - Ground Floor - Spa 1	N/A	N/A
Storey 0 - Ground Floor - Spa 2	N/A	N/A
Storey 0 - Ground Floor - Spa 3	N/A	N/A
Storey 0 - Ground Floor - Spa 4	N/A	N/A
Storey 0 - Ground Floor - Spa	N/A	N/A
Storey 0 - Ground Floor - Consulting 5	N/A	N/A
Storey 0 - Ground Floor - Consulting 6	N/A	N/A
Storey 0 - Ground Floor - Gym 1	N/A	N/A
Storey 0 - Ground Floor - Gym	N/A	N/A
Storey 0 - Ground Floor - Consulting 1	N/A	N/A
Storey 0 - Ground Floor - Consulting 2	N/A	N/A
Storey 0 - Ground Floor - Consulting 3	N/A	N/A
Storey 0 - Ground Floor - Consulting 4	N/A	N/A
Storey 0 - Ground Floor - Office 1	N/A	N/A
Storey 0 - Ground Floor - Consulting 8	N/A	N/A
Storey 0 - Ground Floor - Consulting 9	N/A	N/A
Storey 0 - Ground Floor - Consulting 18	N/A	N/A
Storey 0 - Ground Floor - Consulting 19	N/A	N/A
Storey 0 - Ground Floor - Consulting 21	N/A	N/A
Storey 0 - Ground Floor - Consulting 22	N/A	N/A
Storey 0 - Ground Floor - Consulting 25	N/A	N/A
Storey 0 - Ground Floor - Consulting 28	N/A	N/A
Storey 0 - Ground Floor - Shower 1	N/A	N/A
Storey 0 - Ground Floor - Shower	N/A	N/A
Storey 0 - Ground Floor - Consulting 29	N/A	N/A
Storey 0 - Ground Floor - Lobby	N/A	N/A
Storey 0 - Ground Floor - Canteen	N/A	N/A
Storey 0 - Ground Floor - Server 1	N/A	N/A
Storey 0 - Ground Floor - Server	N/A	N/A
Storey 0 - Ground Floor - Lockers 1	N/A	N/A
Storey 0 - Ground Floor - Lockers	N/A	N/A
Storey 0 - Ground Floor - Office 2	N/A	N/A
Storey 0 - Ground Floor - Office	N/A	N/A
Storey 1 -First Floor - Consulting 2	N/A	N/A
Storey 1 -First Floor - Consulting 4	N/A	N/A
Storey 1 -First Floor - Consulting 5	N/A	N/A
Storey 1 -First Floor - Consulting 8	N/A	N/A
Storey 1 -First Floor - Consulting 10	N/A	N/A
Storey 1 -First Floor - Consulting 12	N/A	N/A
Storey 1 -First Floor - Consulting 17	N/A	N/A
Storey 1 -First Floor - Office 1	N/A	N/A
Storey 1 -First Floor - Office 2	N/A	N/A
Storey 1 -First Floor - Consulting 24	N/A	N/A
Storey 1 -First Floor - Consulting 25	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 1 -First Floor - Consulting 27	N/A	N/A
Storey 1 -First Floor - Office 3	N/A	N/A
Storey 1 -First Floor - Consulting 34	N/A	N/A
Storey 1 -First Floor - Consulting 35	N/A	N/A
Storey 1 -First Floor - Consulting 36	N/A	N/A
Storey 1 -First Floor - Consulting 21	N/A	N/A
Storey 1 -First Floor - Consulting 22	N/A	N/A
Storey 1 -First Floor - Consulting 37	N/A	N/A
Storey 1 -First Floor - Consulting 41	N/A	N/A
Storey 1 -First Floor - Store 1	N/A	N/A
Storey 1 -First Floor - Consulting 28	N/A	N/A
Storey 1 -First Floor - Consulting 32	N/A	N/A
Storey 1 -First Floor - Store 2	N/A	N/A
Storey 1 -First Floor - Store	N/A	N/A
Storey 1 -First Floor - Store 3	N/A	N/A
Storey 1 -First Floor - Consulting 43	N/A	N/A
Storey 1 -First Floor - Server	N/A	N/A
Storey 1 -First Floor - Server	N/A	N/A
Storey 1 -First Floor - Consulting 46	N/A	N/A
Storey 1 -First Floor - Consulting 47	N/A	N/A
Storey 1 -First Floor - Office 4	N/A	N/A
Storey 1 -First Floor - Office 5	N/A	N/A
Storey 1 -First Floor - Office	N/A	N/A
Storey 1 -First Floor - Store	N/A	N/A
Storey 2 - Second Floor - Bedroom 1	N/A	N/A
Storey 2 - Second Floor - Bedroom 2	N/A	N/A
Storey 2 - Second Floor - Bedroom 3	N/A	N/A
Storey 2 - Second Floor - Bedroom 4	N/A	N/A
Storey 2 - Second Floor - Bedroom 5	N/A	N/A
Storey 2 - Second Floor - Bedroom 6	N/A	N/A
Storey 2 - Second Floor - Bedrooms 1	N/A	N/A
Storey 2 - Second Floor - Bedroom 7	N/A	N/A
Storey 2 - Second Floor - Consulting 22	N/A	N/A
Storey 2 - Second Floor - Office 1	N/A	N/A
Storey 2 - Second Floor - Office 4	N/A	N/A
Storey 2 - Second Floor - Office 5	N/A	N/A
Storey 2 - Second Floor - Office 2	N/A	N/A
Storey 2 - Second Floor - Bedroom 8	N/A	N/A
Storey 2 - Second Floor - Bedrooms	N/A	N/A
Storey 2 - Second Floor - Office 3	N/A	N/A
Storey 2 - Second Floor - Office 6	N/A	N/A
Storey 2 - Second Floor - Bedroom	N/A	N/A
Storey 2 - Second Floor - Server	N/A	N/A
Storey 2 - Second Floor - Office 7	N/A	N/A
Storey 2 - Second Floor - Office	N/A	N/A
Storey 3 - Third Floor - Bedroom 1	N/A	N/A
Storey 3 - Third Floor - Bedroom 2	N/A	N/A
Storey 3 - Third Floor - Bedroom 3	N/A	N/A
Storey 3 - Third Floor - Bedroom 4	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 3 - Third Floor - Bedroom 5	N/A	N/A
Storey 3 - Third Floor - Bedroom 6	N/A	N/A
Storey 3 - Third Floor - Bedrooms 1	N/A	N/A
Storey 3 - Third Floor - Bedroom 7	N/A	N/A
Storey 3 - Third Floor - Consulting	N/A	N/A
Storey 3 - Third Floor - Consulting 22	N/A	N/A
Storey 3 - Third Floor - Office 1	N/A	N/A
Storey 3 - Third Floor - Office 4	N/A	N/A
Storey 3 - Third Floor - Office 5	N/A	N/A
Storey 3 - Third Floor - Office 2	N/A	N/A
Storey 3 - Third Floor - Bedroom 8	N/A	N/A
Storey 3 - Third Floor - Bedrooms	N/A	N/A
Storey 3 - Third Floor - Office 3	N/A	N/A
Storey 3 - Third Floor - Office 6	N/A	N/A
Storey 3 - Third Floor - Bedroom	N/A	N/A
Storey 3 - Third Floor - Server	N/A	N/A
Storey 3 - Third Floor - Server	N/A	N/A
Storey 3 - Third Floor - Consulting 28	N/A	N/A
Storey 3 - Third Floor - Consulting 29	N/A	N/A
Storey 3 - Third Floor - Office 7	N/A	N/A
Storey 3 - Third Floor - Office	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	11087	11087
External area [m^2]	32259.5	32259.5
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	25145.6	7339.01
Average U-value [W/m^2K]	0.78	0.23
Alpha value* [%]	1.43	7.29

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
100	**Residential Institutions: Hospitals and Care Homes**
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	3.46	1.58
Cooling	9.99	4.88
Auxiliary	13.96	10.34
Lighting	15.51	9.19
Hot water	165.4	125.96
Equipment*	38.48	38.48
TOTAL**	**208.32**	**151.95**

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

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	3.04
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*3.04*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	394.35	205.53
Primary energy [kWh_{PE}/m^2]	249.07	176.14
Total emissions [kg/m^2]	40.58	29.47

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] Single-duct VAV, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	2.7	235.6	1.2	54.9	47.4	0.65	1.19	0.93	2
	Notional	1.9	218	0.6	13.8	16.4	0.86	4.4	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Natural Gas										
	Actual	118.9	396.8	41.3	0	38.1	0.8	0	1	0
	Notional	83.3	376	17.3	0	16.3	1.34	0	----	----
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	5.8	194.5	2.2	14.6	19	0.73	3.69	0.93	4.5
	Notional	3.8	148.6	1.2	9.4	19.2	0.86	4.4	----	----
[ST] No Heating or Cooling										
	Actual	429.7	150.9	0	0	0.5	0	0	0	0
	Notional	99.7	119	0	0	0.2	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

A4. RENEWABLE ENERGY FEASIBILITY ASSESSMENT

Technology	Appraisal	Included in Development?
Biomass	This technology is not considered a practical solution for reducing carbon dioxide emissions, in the view of limited options available for domestic scale installations, storage space requirements for the combustible material, and the transport related carbon emissions which are not normally accounted for within energy modelling. Furthermore, high nitrous oxide (NOx) and particulate matter (PMx) emissions are associated with the use of biomass fuel, and as the proposed development is located within an urban settlement, permitted emissions will be restricted.	

Air Source Heat Pump	Given the site location and the lack of local existing or proposed heat networks, it is proposed that air source heat pump (ASHP) technology is incorporated within the development. The implementation of these systems is supported by the government, as detailed within the Net Zero Strategy (October 2021) and the Future Buildings Standard 2025 (March 2019). It is proposed that highly efficient, water-to-water ASHP systems are installed to serve both the space and water heating demands of the proposed development. As detailed above, it is intended that heat recovery (hybrid) chillers be employed to enable extremely high energy efficiencies, and to reduce the need for two separate ASHP systems to deliver heating and cooling. At this stage, it is expected that the proposed systems would deliver both a heating coefficient and hot water coefficient of performance of 3.3. The proposed heat recovery (hybrid) chillers would deliver a heat recovery efficiency of 0.75, which is in compliance with the efficiencies specified within Part L of the Building Regulations. It is expected that the proposed system will operate quietly, however, as the design progresses, it is recommended that acoustic measures to further limit the noise generated by the outside unit of the system during operation are considered.	
Ground Source Heat Pump	Due to the nature of the wider surrounding within which the scheme is located, the site is not suitable for a horizontal ground collection loop. Furthermore, ground investigation and borehole drilling are likely to be cost prohibitive and may not yield a suitable energy source. In addition to this, the carbon dioxide and energy cost savings arising from the use of this technology are unlikely to be significant, particularly as high-grade heat is required to generate domestic hot water. The use of ground source heat pumps for the proposed development is therefore not considered viable, and it is intended that air source heat pump (ASHP) technology will be employed instead.	

Photovoltaics (PV)	Whilst the employment of this technology within the proposed development is technically feasible, for the purposes of this strategy, it has been rejected at this stage. Whilst PV roof panels exist amongst buildings within the Stockley Park Registered Park & Garden (RP&G), they exist only on roofs which can accommodate them without being visible from pedestrian level. Such buildings are located in Phase I of the RP&G which is characterised by its variety of building designs, albeit with shared qualities. There is no precedent for PV roof panels on buildings located within Phase II of the RP&G (The Square). Buildings within The Square are characterised by their collective architectural design, comprising glazed outer skins with plain roofs which are largely imperceptible from pedestrian level due to their shallow pitches. The harmonious design amongst buildings within The Square contributes to the significance of the RP&G. Due to the shallow pitch of the existing roof of the Site, and its lack of parapet, the installation of PV roof panels would almost certainly be visible from within the Registered Park and Garden. To install PV panels on the roof of the Site would potentially distract from the harmonious design of buildings within The Square and potentially have a negative impact upon the significance of the RP&G. Furthermore, whilst there is an area of space to the north of the existing building that could house PV panels at a lower level, this location would result in a decreased efficiency of the panels, as they would either be required to face in an unfavourable direction, or would be overshadowed by the building. Further to this, at this stage, it is considered that the proposed 'fabric first' approach and intended employment of air source heat pump (ASHP) technology to serve the space and water heating demands of the scheme will enable the achievement of a level of carbon dioxide emissions reductions over Part L of the Building Regulations significantly in excess of the 35% required on-site by the Greater London Authority (GLA) and the London Borough of Hillingdon Council, without the need for additional electricity generation. It is noted, however, that should this technology be incorporated in the future, details of its location, efficiency, outputs and associated	

	carbon dioxide emissions savings should be provided as part of a Reserved Matters Application.	
Solar Thermal Hot Water (STHW)	This technology is presently rejected as domestic hot water is proposed to be provided by the proposed air source heat pump (ASHP) system. In addition to this, hot water demand is considered to be outside the energy generating period for the solar thermal panels, meaning its ability to significantly reduce carbon emissions during operation is limited.	
Wind Turbines	This technology is rejected on the basis of its potential impact on visual amenity and relatively low efficiency from unpredictable, turbulent wind conditions associated with urban locations.	

A5. BRUKL REPORTS – BE GREEN

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

The Square Stockley Park

As designed

Date: Mon Oct 30 15:59:33 2023

Administrative information

Building Details

Address: 3 The Square,, Stockley Park, Hayes, Uxbridge, UB11 1ET

Certifier details

Name: Paul Dodds

Telephone number: 01325 310404

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.1.4

BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 1009.17

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	8.62	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	11.39	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	93.84	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	124.31	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.26	0.26	Storey 0 - Ground Floor - Consulting 7_P_7
Floors	0.18	0.18	0.34	Storey 0 - Ground Floor - Consulting 15_S_4
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	Storey 3 - Third Floor - Lockers 1_R_4
Windows** and roof windows	1.6	-	-	No external windows/roof-windows
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

* 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. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	5

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- Project HVAC - Zone Heating & Cooling Coils

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.3	4.5	-	1.8	0.75
Standard value	2.5*	4.5**	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

** Standard shown is for air-cooled chillers >=400 kW. For chillers <400 kW, limiting SEER is 4.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

2- Project HVAC - Electric Panel Heater

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

3- Project HVAC - 4 Pipe FCU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.3	4.5	-	0.2	0.75
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- Project DHW - Heat Pump

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.3	0.015
Standard value	2*	N/A

* Standard shown is for all types except absorption and gas engine heat pumps.

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 0 - Ground Floor - Spa 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa 2	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa 3	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa 4	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Spa	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Cleaner 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Consulting 5	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Consulting 6	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 0 - Ground Floor - Toilet 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 3	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Kitchen	-	-	-	-	1.5	-	-	-	1.5	0.75	N/A
Storey 0 - Ground Floor - Toilet 4	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 5	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 6	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 7	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 8	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 9	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet 10	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Toilet	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Lockers 2	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting 38	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting 39	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Toilet 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 2	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 3	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 4	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 5	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 6	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 7	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 8	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 9	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 10	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Toilet 11	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Shower 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Shower	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Toilet	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Consulting 48	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 1 -First Floor - Consulting	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 2 - Second Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 2 - Second Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 3 - Third Floor - Lockers 1	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 3 - Third Floor - Lockers	-	-	-	-	1.8	-	-	-	-	0.75	N/A
Storey 3 - Third Floor - Shower 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 3 - Third Floor - Shower	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Gym 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Gym	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Office 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 8	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 9	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 18	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 19	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 21	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 22	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 25	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 28	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Shower 1	-	-	1.6	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Shower	-	-	1.6	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Consulting 29	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Lobby	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Canteen	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Server 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Lockers 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Lockers	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Office	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 8	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 10	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 12	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 17	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 24	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 25	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 27	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 3	-	-	-	-	-	-	-	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 1 -First Floor - Consulting 34	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 35	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 36	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 21	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 22	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 37	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 41	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 28	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 32	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 43	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 46	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Consulting 47	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Office	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 1 -First Floor - Store	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 6	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedrooms 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 7	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Consulting 2	2	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom 8	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedrooms	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 6	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Bedroom	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - Office 7	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 2 - Second Floor - 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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Storey 3 - Third Floor - Bedroom 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 6	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedrooms 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 7	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Consulting	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Consulting 22	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 1	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 4	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 5	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom 8	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedrooms	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 3	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 6	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Bedroom	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Server	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Consulting 28	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Consulting 29	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office 7	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 3 - Third Floor - Office	-	-	-	-	-	-	-	0.2	-	-	N/A
Storey 0 - Ground Floor - Cleaner 1	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 0 - Ground Floor - Cleaner	-	-	1.6	-	-	-	-	-	-	-	N/A
Storey 1 -First Floor - Consulting 9	-	-	1.6	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Storey 0 - Ground Floor - Consulting 7	110	-	-
Storey 0 - Ground Floor - Consulting 10	110	-	-
Storey 0 - Ground Floor - Consulting 11	110	-	-
Storey 0 - Ground Floor - Consulting 12	110	-	-
Storey 0 - Ground Floor - Consulting 13	110	-	-
Storey 0 - Ground Floor - Consulting 14	110	-	-
Storey 0 - Ground Floor - Consulting 15	110	-	-
Storey 0 - Ground Floor - Consulting 16	110	-	-
Storey 0 - Ground Floor - Consulting 17	110	-	-
Storey 0 - Ground Floor - Consulting 20	110	-	-
Storey 0 - Ground Floor - Consulting 23	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 0 - Ground Floor - Consulting 24	110	-	-
Storey 0 - Ground Floor - Consulting 26	110	-	-
Storey 0 - Ground Floor - Consulting 27	110	-	-
Storey 0 - Ground Floor - Consulting 30	110	-	-
Storey 0 - Ground Floor - Consulting	110	-	-
Storey 1 -First Floor - Consulting 1	110	-	-
Storey 1 -First Floor - Consulting 3	110	-	-
Storey 1 -First Floor - Consulting 6	110	-	-
Storey 1 -First Floor - Consulting	110	-	-
Storey 1 -First Floor - Consulting 7	110	-	-
Storey 1 -First Floor - Consulting 11	110	-	-
Storey 1 -First Floor - Consulting 16	110	-	-
Storey 1 -First Floor - Consulting 18	110	-	-
Storey 1 -First Floor - Consulting 19	110	-	-
Storey 1 -First Floor - Consulting 20	110	-	-
Storey 1 -First Floor - Consulting 23	110	-	-
Storey 1 -First Floor - Consulting 26	110	-	-
Storey 1 -First Floor - Consulting 29	110	-	-
Storey 1 -First Floor - Consulting 14	110	-	-
Storey 1 -First Floor - Consulting 15	110	-	-
Storey 1 -First Floor - Consulting 13	110	-	-
Storey 1 -First Floor - Consulting 30	110	-	-
Storey 1 -First Floor - Consulting 31	110	-	-
Storey 1 -First Floor - Consulting 33	110	-	-
Storey 1 -First Floor - Consulting 40	110	-	-
Storey 1 -First Floor - Consulting 42	110	-	-
Storey 1 -First Floor - Consulting 44	110	-	-
Storey 1 -First Floor - Consulting 45	110	-	-
Storey 1 -First Floor - Consulting 49	110	-	-
Storey 0 - Ground Floor - Spa 1	110	-	-
Storey 0 - Ground Floor - Spa 2	110	-	-
Storey 0 - Ground Floor - Spa 3	110	-	-
Storey 0 - Ground Floor - Spa 4	110	-	-
Storey 0 - Ground Floor - Spa	110	-	-
Storey 0 - Ground Floor - Cleaner 2	110	-	-
Storey 0 - Ground Floor - Consulting 5	110	-	-
Storey 0 - Ground Floor - Consulting 6	110	-	-
Storey 0 - Ground Floor - Toilet 1	110	-	-
Storey 0 - Ground Floor - Toilet 2	110	-	-
Storey 0 - Ground Floor - Toilet 3	110	-	-
Storey 0 - Ground Floor - Kitchen	110	-	-
Storey 0 - Ground Floor - Toilet 4	110	-	-
Storey 0 - Ground Floor - Toilet 5	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 0 - Ground Floor - Toilet 6	110	-	-
Storey 0 - Ground Floor - Toilet 7	110	-	-
Storey 0 - Ground Floor - Toilet 8	110	-	-
Storey 0 - Ground Floor - Toilet 9	110	-	-
Storey 0 - Ground Floor - Toilet 10	110	-	-
Storey 0 - Ground Floor - Toilet	110	-	-
Storey 1 -First Floor - Lockers 1	110	-	-
Storey 1 -First Floor - Lockers 2	110	-	-
Storey 1 -First Floor - Consulting 38	110	-	-
Storey 1 -First Floor - Consulting 39	110	-	-
Storey 1 -First Floor - Toilet 1	110	-	-
Storey 1 -First Floor - Toilet 2	110	-	-
Storey 1 -First Floor - Toilet 3	110	-	-
Storey 1 -First Floor - Toilet 4	110	-	-
Storey 1 -First Floor - Toilet 5	110	-	-
Storey 1 -First Floor - Toilet 6	110	-	-
Storey 1 -First Floor - Toilet 7	110	-	-
Storey 1 -First Floor - Toilet 8	110	-	-
Storey 1 -First Floor - Toilet 9	110	-	-
Storey 1 -First Floor - Toilet 10	110	-	-
Storey 1 -First Floor - Toilet 11	110	-	-
Storey 1 -First Floor - Shower 1	110	-	-
Storey 1 -First Floor - Shower	110	-	-
Storey 1 -First Floor - Lockers	110	-	-
Storey 1 -First Floor - Toilet	110	-	-
Storey 1 -First Floor - Consulting 48	110	-	-
Storey 1 -First Floor - Consulting	110	-	-
Storey 2 - Second Floor - Lockers 1	110	-	-
Storey 2 - Second Floor - Lockers	110	-	-
Storey 3 - Third Floor - Lockers 1	110	-	-
Storey 3 - Third Floor - Lockers	110	-	-
Storey 3 - Third Floor - Shower 1	110	-	-
Storey 3 - Third Floor - Shower	110	-	-
Storey 0 - Ground Floor - Gym 1	110	-	-
Storey 0 - Ground Floor - Gym	110	-	-
Storey 0 - Ground Floor - Consulting 1	110	-	-
Storey 0 - Ground Floor - Consulting 2	110	-	-
Storey 0 - Ground Floor - Consulting 3	110	-	-
Storey 0 - Ground Floor - Consulting 4	110	-	-
Storey 0 - Ground Floor - Office 1	110	-	-
Storey 0 - Ground Floor - Consulting 8	110	-	-
Storey 0 - Ground Floor - Consulting 9	110	-	-
Storey 0 - Ground Floor - Consulting 18	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 0 - Ground Floor - Consulting 19	110	-	-
Storey 0 - Ground Floor - Consulting 21	110	-	-
Storey 0 - Ground Floor - Consulting 22	110	-	-
Storey 0 - Ground Floor - Consulting 25	110	-	-
Storey 0 - Ground Floor - Consulting 28	110	-	-
Storey 0 - Ground Floor - Shower 1	110	-	-
Storey 0 - Ground Floor - Shower	110	-	-
Storey 0 - Ground Floor - Consulting 29	110	-	-
Storey 0 - Ground Floor - Lobby	110	-	-
Storey 0 - Ground Floor - Canteen	110	-	-
Storey 0 - Ground Floor - Server 1	110	-	-
Storey 0 - Ground Floor - Server	110	-	-
Storey 0 - Ground Floor - Lockers 1	110	-	-
Storey 0 - Ground Floor - Lockers	110	-	-
Storey 0 - Ground Floor - Office 2	110	-	-
Storey 0 - Ground Floor - Office	110	-	-
Storey 1 -First Floor - Consulting 2	110	-	-
Storey 1 -First Floor - Consulting 4	110	-	-
Storey 1 -First Floor - Consulting 5	110	-	-
Storey 1 -First Floor - Consulting 8	110	-	-
Storey 1 -First Floor - Consulting 10	110	-	-
Storey 1 -First Floor - Consulting 12	110	-	-
Storey 1 -First Floor - Consulting 17	110	-	-
Storey 1 -First Floor - Office 1	110	-	-
Storey 1 -First Floor - Office 2	110	-	-
Storey 1 -First Floor - Consulting 24	110	-	-
Storey 1 -First Floor - Consulting 25	110	-	-
Storey 1 -First Floor - Consulting 27	110	-	-
Storey 1 -First Floor - Office 3	110	-	-
Storey 1 -First Floor - Consulting 34	110	-	-
Storey 1 -First Floor - Consulting 35	110	-	-
Storey 1 -First Floor - Consulting 36	110	-	-
Storey 1 -First Floor - Consulting 21	110	-	-
Storey 1 -First Floor - Consulting 22	110	-	-
Storey 1 -First Floor - Consulting 37	110	-	-
Storey 1 -First Floor - Consulting 41	110	-	-
Storey 1 -First Floor - Store 1	110	-	-
Storey 1 -First Floor - Consulting 28	110	-	-
Storey 1 -First Floor - Consulting 32	110	-	-
Storey 1 -First Floor - Store 2	110	-	-
Storey 1 -First Floor - Store	110	-	-
Storey 1 -First Floor - Store 3	110	-	-
Storey 1 -First Floor - Consulting 43	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 1 -First Floor - Server	110	-	-
Storey 1 -First Floor - Server	110	-	-
Storey 1 -First Floor - Consulting 46	110	-	-
Storey 1 -First Floor - Consulting 47	110	-	-
Storey 1 -First Floor - Office 4	110	-	-
Storey 1 -First Floor - Office 5	110	-	-
Storey 1 -First Floor - Office	110	-	-
Storey 1 -First Floor - Store	110	-	-
Storey 2 - Second Floor - Bedroom 1	110	-	-
Storey 2 - Second Floor - Bedroom 2	110	-	-
Storey 2 - Second Floor - Bedroom 3	110	-	-
Storey 2 - Second Floor - Bedroom 4	110	-	-
Storey 2 - Second Floor - Bedroom 5	110	-	-
Storey 2 - Second Floor - Bedroom 6	110	-	-
Storey 2 - Second Floor - Bedrooms 1	110	-	-
Storey 2 - Second Floor - Bedroom 7	110	-	-
Storey 2 - Second Floor - Consulting 22	110	-	-
Storey 2 - Second Floor - Office 1	110	-	-
Storey 2 - Second Floor - Office 4	110	-	-
Storey 2 - Second Floor - Office 5	110	-	-
Storey 2 - Second Floor - Office 2	110	-	-
Storey 2 - Second Floor - Bedroom 8	110	-	-
Storey 2 - Second Floor - Bedrooms	110	-	-
Storey 2 - Second Floor - Office 3	110	-	-
Storey 2 - Second Floor - Office 6	110	-	-
Storey 2 - Second Floor - Bedroom	110	-	-
Storey 2 - Second Floor - Server	110	-	-
Storey 2 - Second Floor - Office 7	110	-	-
Storey 2 - Second Floor - Office	110	-	-
Storey 3 - Third Floor - Bedroom 1	110	-	-
Storey 3 - Third Floor - Bedroom 2	110	-	-
Storey 3 - Third Floor - Bedroom 3	110	-	-
Storey 3 - Third Floor - Bedroom 4	110	-	-
Storey 3 - Third Floor - Bedroom 5	110	-	-
Storey 3 - Third Floor - Bedroom 6	110	-	-
Storey 3 - Third Floor - Bedrooms 1	110	-	-
Storey 3 - Third Floor - Bedroom 7	110	-	-
Storey 3 - Third Floor - Consulting	110	-	-
Storey 3 - Third Floor - Consulting 22	110	-	-
Storey 3 - Third Floor - Office 1	110	-	-
Storey 3 - Third Floor - Office 4	110	-	-
Storey 3 - Third Floor - Office 5	110	-	-
Storey 3 - Third Floor - Office 2	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 3 - Third Floor - Bedroom 8	110	-	-
Storey 3 - Third Floor - Bedrooms	110	-	-
Storey 3 - Third Floor - Office 3	110	-	-
Storey 3 - Third Floor - Office 6	110	-	-
Storey 3 - Third Floor - Bedroom	110	-	-
Storey 3 - Third Floor - Server	110	-	-
Storey 3 - Third Floor - Server	110	-	-
Storey 3 - Third Floor - Consulting 28	110	-	-
Storey 3 - Third Floor - Consulting 29	110	-	-
Storey 3 - Third Floor - Office 7	110	-	-
Storey 3 - Third Floor - Office	110	-	-
Storey 0 - Ground Floor - Outer Circulation 1	110	-	-
Storey 0 - Ground Floor - General Circulation 1	110	-	-
Storey 0 - Ground Floor - Riser 1	110	-	-
Storey 0 - Ground Floor - Stair 1	110	-	-
Storey 0 - Ground Floor - Outer circulation	110	-	-
Storey 0 - Ground Floor - Lobby 1	110	-	-
Storey 0 - Ground Floor - Lobby 2	110	-	-
Storey 0 - Ground Floor - Stair 2	110	-	-
Storey 0 - Ground Floor - Riser	110	-	-
Storey 0 - Ground Floor - Lifts 1	110	-	-
Storey 0 - Ground Floor - Cleaner 1	110	-	-
Storey 0 - Ground Floor - Cleaner	110	-	-
Storey 0 - Ground Floor - Lifts	110	-	-
Storey 0 - Ground Floor - Stair	110	-	-
Storey 0 - Ground Floor - Corridor 1	110	-	-
Storey 0 - Ground Floor - Corridor	110	-	-
Storey 1 -First Floor - General Circulation	110	-	-
Storey 1 -First Floor - Consulting 9	110	-	-
Storey 1 -First Floor - Riser 1	110	-	-
Storey 1 -First Floor - Lobby 1	110	-	-
Storey 1 -First Floor - Lobby 2	110	-	-
Storey 1 -First Floor - Riser	110	-	-
Storey 1 -First Floor - Corridor	110	-	-
Storey 1 -First Floor - Stair	110	-	-
Storey 1 -First Floor - Store 4	110	-	-
Storey 1 -First Floor - Store 5	110	-	-
Storey 1 -First Floor - Lifts 1	110	-	-
Storey 2 - Second Floor - General Circulation 2	110	-	-
Storey 2 - Second Floor - Lobby 1	110	-	-
Storey 3 - Third Floor - General Circulation 2	110	-	-
Storey 3 - Third Floor - Riser 1	110	-	-
Storey 3 - Third Floor - Stair 1	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Storey 3 - Third Floor - Lobby 1	110	-	-
Storey 3 - Third Floor - Lobby 2	110	-	-
Storey 3 - Third Floor - Stair 2	110	-	-
Storey 3 - Third Floor - Riser	110	-	-
Storey 3 - Third Floor - Stair	110	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 0 - Ground Floor - Consulting 7	N/A	N/A
Storey 0 - Ground Floor - Consulting 10	N/A	N/A
Storey 0 - Ground Floor - Consulting 11	N/A	N/A
Storey 0 - Ground Floor - Consulting 12	N/A	N/A
Storey 0 - Ground Floor - Consulting 13	N/A	N/A
Storey 0 - Ground Floor - Consulting 14	N/A	N/A
Storey 0 - Ground Floor - Consulting 15	N/A	N/A
Storey 0 - Ground Floor - Consulting 16	N/A	N/A
Storey 0 - Ground Floor - Consulting 17	N/A	N/A
Storey 0 - Ground Floor - Consulting 20	N/A	N/A
Storey 0 - Ground Floor - Consulting 23	N/A	N/A
Storey 0 - Ground Floor - Consulting 24	N/A	N/A
Storey 0 - Ground Floor - Consulting 26	N/A	N/A
Storey 0 - Ground Floor - Consulting 27	N/A	N/A
Storey 0 - Ground Floor - Consulting 30	N/A	N/A
Storey 0 - Ground Floor - Consulting	N/A	N/A
Storey 1 -First Floor - Consulting 1	N/A	N/A
Storey 1 -First Floor - Consulting 3	N/A	N/A
Storey 1 -First Floor - Consulting 6	N/A	N/A
Storey 1 -First Floor - Consulting	N/A	N/A
Storey 1 -First Floor - Consulting 7	N/A	N/A
Storey 1 -First Floor - Consulting 11	N/A	N/A
Storey 1 -First Floor - Consulting 16	N/A	N/A
Storey 1 -First Floor - Consulting 18	N/A	N/A
Storey 1 -First Floor - Consulting 19	N/A	N/A
Storey 1 -First Floor - Consulting 20	N/A	N/A
Storey 1 -First Floor - Consulting 23	N/A	N/A
Storey 1 -First Floor - Consulting 26	N/A	N/A
Storey 1 -First Floor - Consulting 29	N/A	N/A
Storey 1 -First Floor - Consulting 14	N/A	N/A
Storey 1 -First Floor - Consulting 15	N/A	N/A
Storey 1 -First Floor - Consulting 13	N/A	N/A
Storey 1 -First Floor - Consulting 30	N/A	N/A
Storey 1 -First Floor - Consulting 31	N/A	N/A
Storey 1 -First Floor - Consulting 33	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 1 -First Floor - Consulting 40	N/A	N/A
Storey 1 -First Floor - Consulting 42	N/A	N/A
Storey 1 -First Floor - Consulting 44	N/A	N/A
Storey 1 -First Floor - Consulting 45	N/A	N/A
Storey 1 -First Floor - Consulting 49	N/A	N/A
Storey 0 - Ground Floor - Spa 1	N/A	N/A
Storey 0 - Ground Floor - Spa 2	N/A	N/A
Storey 0 - Ground Floor - Spa 3	N/A	N/A
Storey 0 - Ground Floor - Spa 4	N/A	N/A
Storey 0 - Ground Floor - Spa	N/A	N/A
Storey 0 - Ground Floor - Consulting 5	N/A	N/A
Storey 0 - Ground Floor - Consulting 6	N/A	N/A
Storey 0 - Ground Floor - Gym 1	N/A	N/A
Storey 0 - Ground Floor - Gym	N/A	N/A
Storey 0 - Ground Floor - Consulting 1	N/A	N/A
Storey 0 - Ground Floor - Consulting 2	N/A	N/A
Storey 0 - Ground Floor - Consulting 3	N/A	N/A
Storey 0 - Ground Floor - Consulting 4	N/A	N/A
Storey 0 - Ground Floor - Office 1	N/A	N/A
Storey 0 - Ground Floor - Consulting 8	N/A	N/A
Storey 0 - Ground Floor - Consulting 9	N/A	N/A
Storey 0 - Ground Floor - Consulting 18	N/A	N/A
Storey 0 - Ground Floor - Consulting 19	N/A	N/A
Storey 0 - Ground Floor - Consulting 21	N/A	N/A
Storey 0 - Ground Floor - Consulting 22	N/A	N/A
Storey 0 - Ground Floor - Consulting 25	N/A	N/A
Storey 0 - Ground Floor - Consulting 28	N/A	N/A
Storey 0 - Ground Floor - Shower 1	N/A	N/A
Storey 0 - Ground Floor - Shower	N/A	N/A
Storey 0 - Ground Floor - Consulting 29	N/A	N/A
Storey 0 - Ground Floor - Lobby	N/A	N/A
Storey 0 - Ground Floor - Canteen	N/A	N/A
Storey 0 - Ground Floor - Server 1	N/A	N/A
Storey 0 - Ground Floor - Server	N/A	N/A
Storey 0 - Ground Floor - Lockers 1	N/A	N/A
Storey 0 - Ground Floor - Lockers	N/A	N/A
Storey 0 - Ground Floor - Office 2	N/A	N/A
Storey 0 - Ground Floor - Office	N/A	N/A
Storey 1 -First Floor - Consulting 2	N/A	N/A
Storey 1 -First Floor - Consulting 4	N/A	N/A
Storey 1 -First Floor - Consulting 5	N/A	N/A
Storey 1 -First Floor - Consulting 8	N/A	N/A
Storey 1 -First Floor - Consulting 10	N/A	N/A
Storey 1 -First Floor - Consulting 12	N/A	N/A
Storey 1 -First Floor - Consulting 17	N/A	N/A
Storey 1 -First Floor - Office 1	N/A	N/A
Storey 1 -First Floor - Office 2	N/A	N/A
Storey 1 -First Floor - Consulting 24	N/A	N/A
Storey 1 -First Floor - Consulting 25	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 1 -First Floor - Consulting 27	N/A	N/A
Storey 1 -First Floor - Office 3	N/A	N/A
Storey 1 -First Floor - Consulting 34	N/A	N/A
Storey 1 -First Floor - Consulting 35	N/A	N/A
Storey 1 -First Floor - Consulting 36	N/A	N/A
Storey 1 -First Floor - Consulting 21	N/A	N/A
Storey 1 -First Floor - Consulting 22	N/A	N/A
Storey 1 -First Floor - Consulting 37	N/A	N/A
Storey 1 -First Floor - Consulting 41	N/A	N/A
Storey 1 -First Floor - Store 1	N/A	N/A
Storey 1 -First Floor - Consulting 28	N/A	N/A
Storey 1 -First Floor - Consulting 32	N/A	N/A
Storey 1 -First Floor - Store 2	N/A	N/A
Storey 1 -First Floor - Store	N/A	N/A
Storey 1 -First Floor - Store 3	N/A	N/A
Storey 1 -First Floor - Consulting 43	N/A	N/A
Storey 1 -First Floor - Server	N/A	N/A
Storey 1 -First Floor - Server	N/A	N/A
Storey 1 -First Floor - Consulting 46	N/A	N/A
Storey 1 -First Floor - Consulting 47	N/A	N/A
Storey 1 -First Floor - Office 4	N/A	N/A
Storey 1 -First Floor - Office 5	N/A	N/A
Storey 1 -First Floor - Office	N/A	N/A
Storey 1 -First Floor - Store	N/A	N/A
Storey 2 - Second Floor - Bedroom 1	N/A	N/A
Storey 2 - Second Floor - Bedroom 2	N/A	N/A
Storey 2 - Second Floor - Bedroom 3	N/A	N/A
Storey 2 - Second Floor - Bedroom 4	N/A	N/A
Storey 2 - Second Floor - Bedroom 5	N/A	N/A
Storey 2 - Second Floor - Bedroom 6	N/A	N/A
Storey 2 - Second Floor - Bedrooms 1	N/A	N/A
Storey 2 - Second Floor - Bedroom 7	N/A	N/A
Storey 2 - Second Floor - Consulting 22	N/A	N/A
Storey 2 - Second Floor - Office 1	N/A	N/A
Storey 2 - Second Floor - Office 4	N/A	N/A
Storey 2 - Second Floor - Office 5	N/A	N/A
Storey 2 - Second Floor - Office 2	N/A	N/A
Storey 2 - Second Floor - Bedroom 8	N/A	N/A
Storey 2 - Second Floor - Bedrooms	N/A	N/A
Storey 2 - Second Floor - Office 3	N/A	N/A
Storey 2 - Second Floor - Office 6	N/A	N/A
Storey 2 - Second Floor - Bedroom	N/A	N/A
Storey 2 - Second Floor - Server	N/A	N/A
Storey 2 - Second Floor - Office 7	N/A	N/A
Storey 2 - Second Floor - Office	N/A	N/A
Storey 3 - Third Floor - Bedroom 1	N/A	N/A
Storey 3 - Third Floor - Bedroom 2	N/A	N/A
Storey 3 - Third Floor - Bedroom 3	N/A	N/A
Storey 3 - Third Floor - Bedroom 4	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Storey 3 - Third Floor - Bedroom 5	N/A	N/A
Storey 3 - Third Floor - Bedroom 6	N/A	N/A
Storey 3 - Third Floor - Bedrooms 1	N/A	N/A
Storey 3 - Third Floor - Bedroom 7	N/A	N/A
Storey 3 - Third Floor - Consulting	N/A	N/A
Storey 3 - Third Floor - Consulting 22	N/A	N/A
Storey 3 - Third Floor - Office 1	N/A	N/A
Storey 3 - Third Floor - Office 4	N/A	N/A
Storey 3 - Third Floor - Office 5	N/A	N/A
Storey 3 - Third Floor - Office 2	N/A	N/A
Storey 3 - Third Floor - Bedroom 8	N/A	N/A
Storey 3 - Third Floor - Bedrooms	N/A	N/A
Storey 3 - Third Floor - Office 3	N/A	N/A
Storey 3 - Third Floor - Office 6	N/A	N/A
Storey 3 - Third Floor - Bedroom	N/A	N/A
Storey 3 - Third Floor - Server	N/A	N/A
Storey 3 - Third Floor - Server	N/A	N/A
Storey 3 - Third Floor - Consulting 28	N/A	N/A
Storey 3 - Third Floor - Consulting 29	N/A	N/A
Storey 3 - Third Floor - Office 7	N/A	N/A
Storey 3 - Third Floor - Office	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	11087	11087
External area [m^2]	32259.5	32259.5
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	25145.6	7339.01
Average U-value [W/m^2K]	0.78	0.23
Alpha value* [%]	1.43	7.29

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
100	**Residential Institutions: Hospitals and Care Homes**
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	2.74	1.21
Cooling	7.82	4.88
Auxiliary	13.96	10.34
Lighting	15.51	9.19
Hot water	44.28	41
Equipment*	38.48	38.48
TOTAL**	**84.31**	**66.62**

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

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	3
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*3*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	394.35	205.53
Primary energy [kWh_{PE}/m^2]	124.31	93.84
Total emissions [kg/m^2]	11.39	8.62

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] Single-duct VAV, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	2.7	235.6	0.3	24.4	47.4	2.29	2.68	3.3	4.5
	Notional	1.9	218	0.2	13.8	16.4	2.64	4.4	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Natural Gas										
	Actual	118.9	396.8	41.3	0	38.1	0.8	0	1	0
	Notional	83.3	376	17.3	0	16.3	1.34	0	----	----
[ST] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	5.8	194.5	0.6	14.6	19	2.57	3.69	3.3	4.5
	Notional	3.8	148.6	0.4	9.4	19.2	2.64	4.4	----	----
[ST] No Heating or Cooling										
	Actual	429.7	150.9	0	0	0.5	0	0	0	0
	Notional	99.7	119	0	0	0.2	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

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