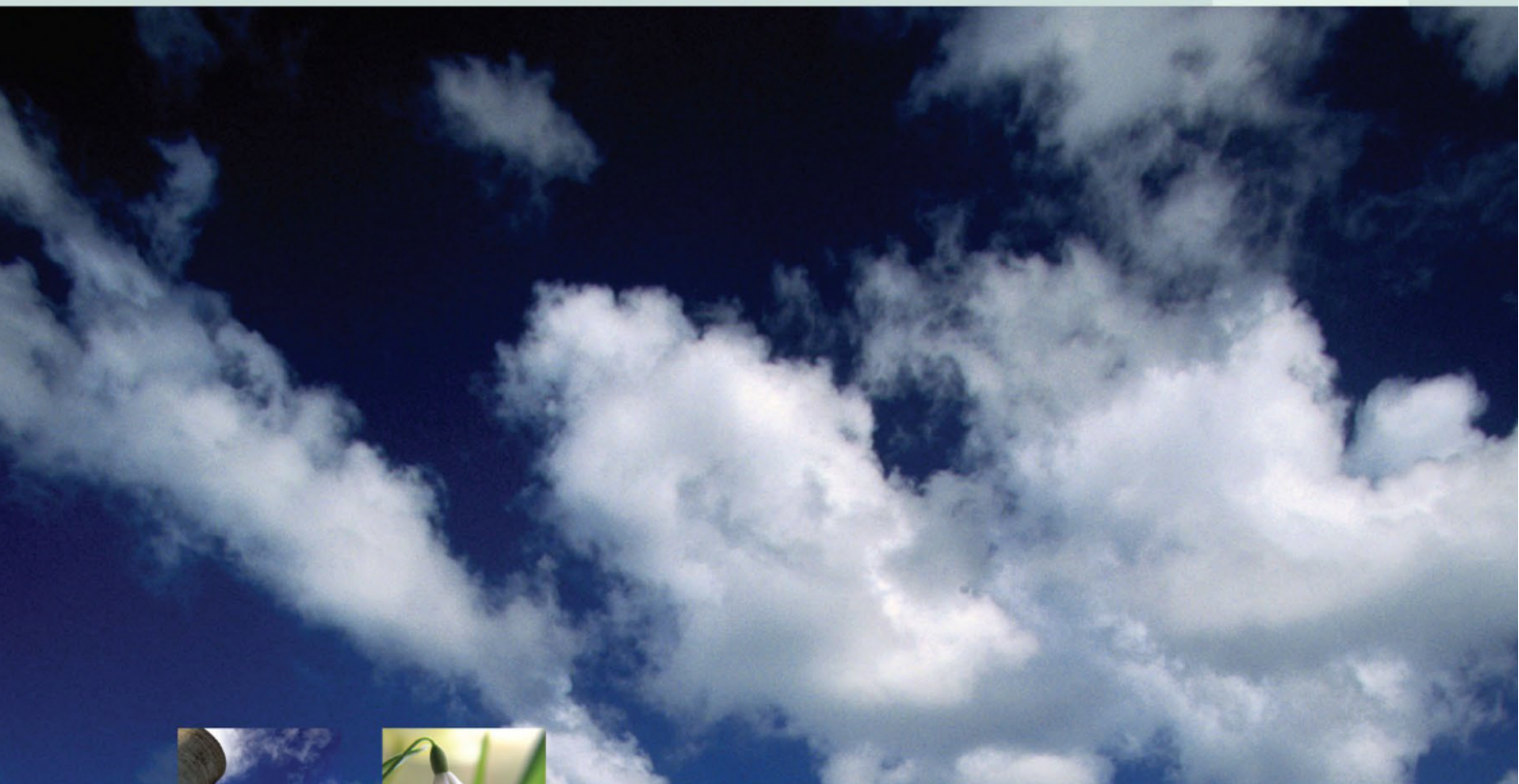




Energy Statement

Codmore Hill Industrial Estate Phase 2

Broomers Hill Lane, Codmore Hill

Prepared for:
Philips Surveyors Ltd

Date:
June 2026

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1. EXECUTIVE SUMMARY

Sol Environment Ltd ('Sol' hereafter) were engaged by Philips Surveyors Ltd ('the Applicant' hereafter) to undertake an assessment of energy use and carbon emissions and produce an energy strategy for the proposed development of a new Industrial Development on land off Broomers Hill Lane, Codmore Hill.

This report has been prepared by Sol Environment Ltd in cooperation with the applicant and in accordance with the following policies and guidance:

- National Planning Policy Framework (Published 2024)
- Building Regulations Part L 2021 (Published 2022)
- Horsham District Planning Framework (Published 2015)

1.1 Energy Strategy Summary

The energy assessment and subsequent strategy has been prepared such that it is aligned with the Energy Hierarchy, with particular focus on sustainable building design (reduction of energy consumption at source), provision of energy efficiency measures, and the installation of building-integrated low and zero carbon (LZC) technologies.

Table 1.1: Proposed Building Design Values

Building Fabric Performance Values		Building Services & Renewable/LZC Technologies	
Walls	0.2 W/m ² K	Heating/Cooling	Electric panel heaters and electric air heaters (100% Efficiency)
Roof	0.16 W/m ² K	Lighting	100% LED
Floor	0.15 W/m ² K	Hot Water	Ariston Andris Lux 2kW 10l Storage Electric DHW (100% efficiency)
Glazing	1.4 W/m ² K	Building Management	Thermostatic controls on the heating system, and programmers to panel heaters additionally.
Glazed Doors	1.4 W/m ² K	Renewable/LZC Technology	136kW roof mounted PV array
Vehicle Doors	1.3 W/m ² K		
Air Permeability	5m ³ /(hr.m ²)		

The conclusion of the energy strategy is that, based on planning stage calculations and the implementation of the Energy Hierarchy, the proposed development aligns with Building Regulations Part L (2021) benchmark in relation to carbon emissions, hence meeting the requirements of Policy 36 of the Horsham District Planning Framework (Published 2015). Policy 36 requires developments provide an Energy Statement demonstrating and quantifying how the development will comply with the Energy Hierarchy. Compliance has been determined following an energy modelling exercise, as summary of which is detailed in Table 1.2 below.

Table 1.2: Energy Assessment Results: Energy Hierarchy

Scenario	Energy Demand (kWh / year)	Energy saving achieved (%)	Regulated CO ₂ Emissions (kgCO ₂ / year)	Saving achieved in CO ₂ emissions (%)
Benchmark Building	172,743	-	16,668	-
Be Lean (improved building fabric and lighting)	151,191	12%	14,577	13%
Be Clean	151,191	-	14,577	-
Be Green (addition of 136kW PV array)	51,908	66%	6,028	59%
Total Savings in Energy and Emissions	120,835	70.0%	10,640	64%

Compliance against a 2021 Part L Compliant Benchmark Building is demonstrated in Table 1.3 below.

Table 1.3: Energy Assessment Results: Part L

Scenario	Building Primary Energy Rate (kWh _{PE} / m ² .year)	Energy saving achieved (%)	Building CO ₂ Emission Rate (kgCO ₂ / m ² .year)	Saving achieved in CO ₂ emissions (%)
2021 Part L Compliant Benchmark Building (TER/TPER)	57.85	-	6.17	-
Proposed Building (BER/BPER)	53.13	8%	6.17	0%

2. INTRODUCTION

2.1 Background

Sol Environment Ltd ('Sol' hereafter) was engaged by Philips Surveyors Ltd ('the applicant' hereafter) to undertake an assessment of energy use and carbon emissions to produce an energy strategy for the proposed new Industrial Development on land off Broomers Hill Lane, Codmore Hill.

This Energy Statement has been formulated to provide a sustainable energy solution for the proposed development in support of a full planning application, and to detail recommendations to improve energy efficiency and reduce carbon emissions.

Proprietary energy demand calculations for the proposed development have been undertaken using approved SBEM modelling software. Part L of the current Building Regulations (2021) has been used for this assessment in terms of Primary energy use and regulated carbon emissions associated with heating, cooling, lighting, and ventilation.

2.2 Proposed Development

The proposed development comprises of the construction of a new Industrial Development on land off Broomers Hill Lane, Codmore Hill. The development consists of two phases. This report assesses the phase B development, which comprises of 10 warehouse units with ancillary spaces, each of varying size within one industrial block. The units will be fitted out to a shell and core specification.

A schedule of the overall site information is provided in Table 2.1 below:

Table 2.1: Proposed Development

Building Use Type	Number of Units	Gross Internal Area (m ²)
Industrial Development	10	964
Total	10	964

A site plan showing the proposed development is provided overleaf.



Fig 2.1: Proposed Site Plan prepared by Place By Design.

3. POLICY

This energy statement has been prepared for the development to show how the proposed scheme is compliant with the current relevant national and local policies and guidance as detailed within this section. Where relevant, these policies have informed the energy statement and subsequent strategy.

3.1 National Policy

The following policies at a national level are considered to be relevant to the development.

3.1.1 National Planning Policy Framework (December 2024)

The National Planning Policy Framework ('NPPF') sets out the Government's planning policies for England and how they are expected to be applied. It sets out a framework that aims to achieve sustainable development throughout the planning system with three overarching objectives – economic, social and environmental.

At the heart of the NPPF is a 'presumption in favour of sustainable development', which requires Local Authorities as part of any plan-making or decision-making, to provide clear guidance on how the presumption should be applied locally.

The NPPF sets out how to deliver sustainable development under 17 subheadings. Subheading 14 of the NPPF outlines how the planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

3.1.2 Building Regulations Part L (2021)

Part L of the Building Regulations in England sets the standards for the energy performance of new and existing buildings and includes the specification of both minimum (benchmark) and notional (best practice) performance standards relating to building fabric, HVAC, and lighting.

The previous Building Regulations Part L (2013) was updated in July 2022 following the Future Building Standards consultation document published by the government in January 2021. This document set out the changes to regulations as a step towards the aim to deliver Zero Carbon ready buildings.

Local planning policies typically refer to Part L standards in order to set a minimum percentage improvement beyond the Part L benchmark in relation to carbon emissions. The recent changes to Part L require all new (non-residential) developments to produce around 27% less carbon emissions than was previously acceptable by Part L 2013 minimum standards. Additionally, a new metric must now be achieved related to Primary Energy Rate (TPER), measured in kWh/m²/year.

3.2 Local & Regional Policy

Local policies include Horsham District Planning Framework (Published 2015).



Horsham District Planning Framework (excluding South Downs National Park)



November 2015

Fig 3.1: Local Plan & SPD Cover Sheets

3.2.1 Horsham District Planning Framework (Published 2015)

Policy 35

Strategic Policy: Climate Change

Development will be supported where it makes a clear contribution to mitigating and adapting to the impacts of climate change and to meeting the district's carbon reduction targets as set out in the Council's Acting Together on Climate Change Strategy, 2009.

Measures which should be used to mitigate the effects of climate change include;

1. Reduced energy use in construction;
2. Improved energy efficiency in new developments, including influencing the behaviour of occupants to reduce energy use;
3. The use of decentralised, renewable and low carbon energy supply systems;
4. The use of patterns of development which reduce the need to travel, encourage walking and cycling and include good accessibility to public transport and other forms of sustainable transport; and

5. Measures which reduce the amount of biodegradable waste sent to landfill.

Development must be designed so that it can adapt to the impacts of climate change, reducing vulnerability, particularly in terms of flood risk, water supply and changes to the district's landscape. Developments should adapt to climate change using the following measures:

1. Provision of appropriate flood storage capacity in new building development;
2. Use of green infrastructure and dual use SuDS to help absorb heat, reduce surface water runoff, provide flood storage capacity and assist habitat migration;
3. Use of measures which promote the conservation of water and/or greywater recycling; and
4. Use of site layout, design measures and construction techniques that provide resilience to climate change (opportunities for natural ventilation and solar gain).

If it is not possible to incorporate the adaption and mitigation measures proposed, an explanation should be provided as to why this is the case.

Policy 36

Strategic Policy: Appropriate Energy Use

Energy hierarchy

All development will be required to contribute to clean, efficient energy in Horsham based on the following hierarchy:

1. Lean – use less energy – e.g. through demand reduction
2. Clean – supply energy efficiently – e.g. through heat networks
3. Green – use renewable energy sources

District Heating and Cooling

Commercial and residential developments in Heat Priority Areas or the strategic development locations will be expected to connect to district heating networks where they exist using the following hierarchy, or incorporate the necessary infrastructure for connection to future network.

Development should demonstrate that the heating and cooling systems have been selected in accordance with the following heating and cooling hierarchy;

1. Connection to existing (C)CHP distribution networks
2. Site wide renewable (C)CHP
3. Site wide gas-fired (C)CHP
4. Site wide renewable community heating/cooling
5. Site wide gas-fired community heating/cooling
6. Individual building renewable heating
7. Individual building heating, with the exception of electric heating

All (C)CHP must be of a scale and operated to maximise the potential for carbon reduction. Where site-wide (C)CHP is proposed, consideration must be given to extending the network to adjacent sites.

Energy Statements

All applications for residential or commercial development must include an Energy Statement demonstrating and quantifying how the development will comply with the Energy Hierarchy.

Developments in Heat Priority Areas and strategic developments should demonstrate and quantify how the development will comply with the heating and cooling hierarchy. Horsham District Council will work proactively with applicants on major developments to ensure these requirements are met.

Renewable energy schemes

The Council will permit schemes for renewable energy (e.g. solar) where they do not have a significant adverse effect on landscape and townscape character, biodiversity, heritage or cultural assets or amenity value. Community initiatives which seek to deliver renewable and low carbon energy will be encouraged.

Policy 37

Sustainable Construction

Proposals must seek to improve the sustainability of development. To deliver sustainable design, development should incorporate the following measures where appropriate according to the type of development and location:

1. Maximise energy efficiency and integrate the use of decentralised, renewable and low carbon energy;
2. Limit water use to 110 litres/person/day;
3. Use design measures to minimise vulnerability to flooding and heatwave events;
4. Be designed to encourage the use of natural lighting and ventilation;
5. Be designed to encourage walking, cycling, cycle storage and accessibility to sustainable forms of transport;
6. Minimise construction and demolition waste and utilise recycled and low-impact materials;
7. Be flexible to allow future modification of use or layout, facilitating future adaptation, refurbishment and retrofitting;
8. Incorporate measures which enhance the biodiversity value of development.

All new development will be required to provide satisfactory arrangements for the storage of refuse and recyclable materials as an integral part of design.

New homes and workplaces should include the provision of high-speed broadband access and enable provision of future technologies where available.

3.3 Policy Review

A summary of the policy drivers relevant to energy use and carbon emissions for the proposed development are as follows:

The current local policy stipulates the development should improve energy efficiency and use decentralised, renewable and low carbon energy supply systems to mitigate the effects of climate change and adapt to the impacts of climate change by use of site layout, design measures and construction techniques, such as providing opportunities for natural ventilation and solar gain.

The development must provide an Energy Statement demonstrating and quantifying how the development will comply with the Energy Hierarchy.

The development does not sit within a Heat Priority Area or the strategic development locations and therefore is not expected to demonstrate compliance with the heating and cooling hierarchy, requiring priority be given to connections to District Heating and CHP networks.

This report shall demonstrate compliance with the above policy requirements, where feasible.

4. METHODOLOGY

4.1 The Energy Hierarchy

The Energy Hierarchy adopts a set of principles to guide design development and decisions regarding energy, balanced with the need to optimise environmental and economic benefits. The Hierarchy, which is a widely accepted approach amongst many Local & County Councils, seeks to ensure that development incorporate energy efficiency through the approach outlined in Figure 4.1.



Fig 4.1: The Energy Hierarchy

It is considered that the Energy Hierarchy principles for carbon reduction form the most appropriate approach from both a practical and financial perspective. The industry is broadly in agreement that energy efficiency and low carbon technologies have the greatest impact in offsetting CO₂ emissions. Therefore, it is logical to encourage enhanced mitigation through energy efficiency and low carbon technologies in the first instance, as opposed to applying renewables as a first option at a significantly greater cost.

4.1.1 Be Lean

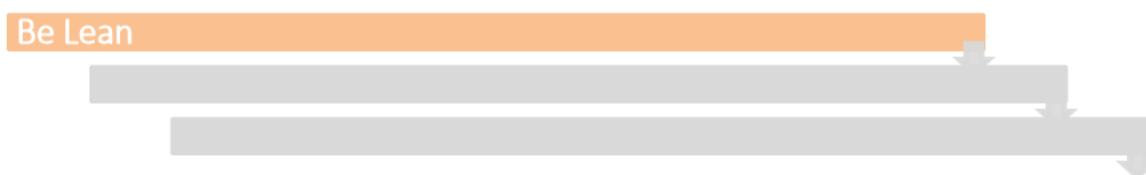


Fig 4.2: The Energy Hierarchy – Be Lean

The first measure within the Energy Hierarchy is aimed at using less energy and managing energy demand during operation through enhanced building fabric and services performance, and the incorporation of flexibility measures.

It is stated within Part L of the 2021 Building Regulations that *'measures to make the building energy efficient must be incorporated within the scheme design'*. Typically, passive design and energy efficiency measures can ensure Building Regulations minimum standards are achieved in new build projects.

Passive design measures manage internal heating through solar gain and as such, reduce heating and cooling loads. Therefore, buildings that are aligned in a north-south orientation are observed to maximise daylight and sunlight (i.e., solar gain), subsequently reducing energy consumption associated with excessive heating and lighting requirements.

4.1.2 Be Clean



Fig 4.3: The Energy Hierarchy – Be Clean

The 'Be Clean' stage of the Energy Hierarchy is aimed at ensuring an efficient and clean source of heat and power is supplied to developments, which typically relates to local sources on a decentralised network. This supports a more effective and efficient use of energy by reducing primary energy demand and minimising the amount of energy that is ultimately wasted within the network.

Most commonly, this step of the Energy Hierarchy can be achieved through installation of Combined Heat and Power (CHP) units or connection to a Decentralised Energy Network (DEN). CHP generates both heat and power efficiently and can be supplied to individual buildings or a network. A DEN is a way of distributing the heat energy generated from a range of sources and offers an efficient and competitive solution for heating buildings in urban areas with high heat density, providing the added benefit of enabling the use of secondary energy or waste heat sources.

4.1.3 Be Green

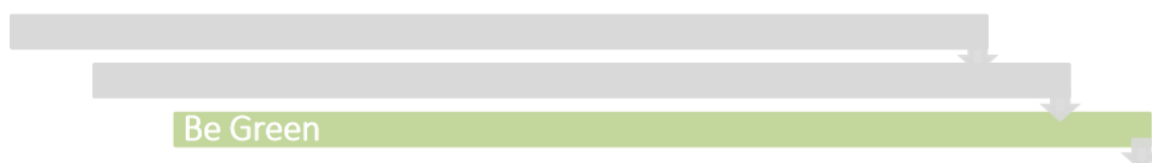


Fig 4.4: The Energy Hierarchy – Be Green

Once energy demand has been reduced as far as possible, the feasibility of on-site renewable energy generation should be considered. Priority should be given to renewable energy technologies with no polluting emissions i.e., electric heat pumps or Solar PV. Opportunities should be maximised for producing, storing, and using renewable energy on-site.

4.2 Energy Modelling

To determine compliance with policy requirements, a baseline modelling and assessment exercise was undertaken using DesignBuilder SBEM modelling software. Proprietary energy demand calculations were prepared using Building Regulations Part L (2021) to define the minimum benchmark standard for the assessment for regulated energy and associated CO₂ emissions (heating, lighting, and ventilation).

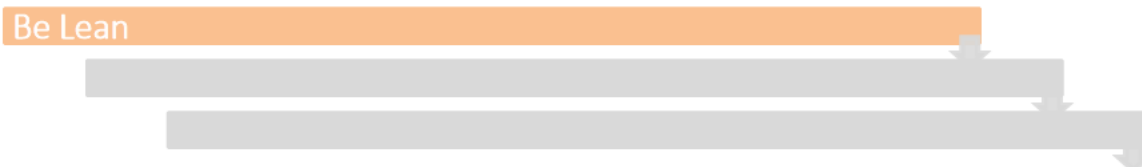
Upon calculation of a baseline, a remodelling exercise was then performed to account for the various stages of the Energy Hierarchy and subsequently demonstrate a reduction in energy use and CO₂ emissions for the proposed development.

As the calculations are based on assumptions, figures are indicative only, and changes may occur during detailed design. This includes, but is not limited to, building air-tightness which will require verification through an air permeability test, the auxiliary load which may be significantly reduced when specification of items such as presence detection (PIR) sensors are finalised, and building services efficiencies and specifications.

5. RESULTS

5.1 The Energy Hierarchy

5.1.1 Be Lean



The measures in this section are prioritised to ensure that energy demand is reduced through enhanced building fabric and services performance, and the incorporation of flexibility measures.

In summary, the development will achieve a CO₂ emissions reduction of **13%** compared to limiting values for building fabric and lighting, therefore demonstrating a saving in the first stage of the energy hierarchy in compliance with Policy 36 of the Horsham District Planning Framework (Published 2015) as per the policy review in section 3.3 of this report

Table 5.1 below details the 'Be Lean' design strategies for the proposed development associated with this stage of the energy hierarchy.

Table 5.1: Passive Design Measures and Energy Efficiency	
Site Features 	Site Location The site is located in Codmore Hill, a hamlet within the Horsham District of West Sussex. Site Weather To ensure accuracy of energy modelling, the weather location file for <u>London</u> has been used in accordance with convention 2.04 SBEM Weather Locations of the 'Non-Domestic Conventions for England & Wales Issue 7.1' Microclimate There are no considerations with regards to microclimate (such as significant overshadowing or large waterbodies) that would prevent any passive design measures from being implemented.
Passive Design Principles 	Building Form Glazing is located primarily on northern facades, and eastern and northern facades where this is not feasible to allow for glazing to be provided that supports beneficial solar gain while avoiding excessive heat from direct southern exposure. The form is simple with minimal junctions to allow for improved air-tightness and reduced thermal bridging. Building Layout The layout of the building shall provide some minor benefits in relation to the solar orientation of internal facilities. Longer term occupied building areas including welfare spaces are located

Table 5.1: Passive Design Measures and Energy Efficiency

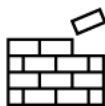
	primarily on northern facades, and eastern and northern facades where this is not feasible. This allows for glazing to be provided that supports beneficial solar gain while avoiding excessive heat from direct southern exposure. Tinted glass and blinds are proposed for any windows which are at the risk of solar gain due to aspect, and rooflights will implement a double skin obscure system to minimise solar gain while maximising light. Minimising Overshadowing Where no restrictions apply due to internal site layout, areas that do not require conditioning or mechanical heating shall be located to the north of the building. Therefore, maximising the utilisation of solar gain with minimal overshadowing and subsequently lowering residual energy consumption. Building Orientation Where orientation provides favourable conditions and no physical restrictions are provided by surrounding buildings, the glazing ratios within the development shall be designed such that the potential for solar gain is maximised.																							
Building Fabric 	Fabric Performance Consideration will be given to design the envelopes of the development to utilise materials that not only provide high insulation values, but also have high thermal mass. The Part L limiting fabric values and proposed fabric values for the proposed development are summarised below: Proposed Building U Values <table><tr><th rowspan="2">Component</th><th colspan="2">U-Value (W/m²k)</th></tr><tr><th>Part L Limiting Value</th><th>Proposed Value</th></tr><tr><td>Walls</td><td>0.26</td><td>0.2</td></tr><tr><td>Roof</td><td>0.18</td><td>0.16</td></tr><tr><td>Floor</td><td>0.18</td><td>0.15</td></tr><tr><td>Doors</td><td>1.6</td><td>1.4</td></tr><tr><td>Windows</td><td>1.6</td><td>1.4</td></tr><tr><td>Vehicle Access Doors</td><td>1.3</td><td>1.3</td></tr></table> Air Permeability The elements of the building shall endeavour not to exceed a maximum air permeability of 5m³/(hr.m²)*, which can be achieved through the following measures: • Adequate sealing between openings/windows and panels • Adequate sealing of ceiling-to-wall joints • Provision of a continuous air barrier over ceiling areas and adequate sealing of service ducts and penetrations • High specification openings	Component	U-Value (W/m²k)		Part L Limiting Value	Proposed Value	Walls	0.26	0.2	Roof	0.18	0.16	Floor	0.18	0.15	Doors	1.6	1.4	Windows	1.6	1.4	Vehicle Access Doors	1.3	1.3
Component	U-Value (W/m²k)																							
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Vehicle Access Doors	1.3	1.3																						

Table 5.1: Passive Design Measures and Energy Efficiency

	Where a brick/block construction is specified, the application of wet plastering / parging / dry lining will be required. <i>*Part L limiting Air Permeability rate is 8m³/(hr.m²)</i> Thermal Bridging A thermal bridge (sometimes referred to as cold bridge) is an area of construction which has higher heat transfer than the surrounding materials. It typically occurs where there is a break in insulation, less insulation or insulation is penetrated by an element or material with higher thermal conductivity (such as a metal cladding bracket). Where these thermal bridges occur, there is additional heat loss from the fabric resulting in increased heating requirements and in some cases result in surface condensation. Careful and simplified construction details are required to ensure the junctions do not create unnecessary heat loss paths. Thermal bridges are potentially one of the main sources of unquantified thermal losses in low energy buildings. Accredited construction details will therefore be followed in order to minimise the impact of thermal bridges. Thermal Mass High thermal mass can help to moderate indoor temperature fluctuations by absorbing heat during the day to release when temperatures drop. This works vice versa to absorb cold during the night for release the next day to cool the internal space. The proposed development could benefit from the effects of thermal mass from an exposed concrete floor slab.
Building Use Characteristics 	Occupancy All building areas will conserve energy with PIR and occupancy sensing controls, linked to lighting and ventilation systems. The building is expected to have an intermittent use given its use as an industrial warehouse development. Each unit will be provided with electric heating with thermostatic controls and programmers to any entrance, WCs and associated office spaces created by each tenant. Open warehouse spacing will have electric air heating with variable heat output via thermostats depending on final tenant occupation and use.
Daylight and Lighting 	Daylighting Designs shall ensure a balance between the potential for excessive solar gain and the benefit of transmittance of natural light through openings. Low-emissivity glazing shall be considered to limit solar gain without reducing the amount of natural light entering the development, thus reducing the reliance on artificial lighting systems. Solar Gain Glazing is located primarily on northern facades, and eastern and northern facades where this is not feasible. This allows for glazing to be provided that supports beneficial solar gain while avoiding excessive heat from direct southern exposure. Tinted glass and blinds are proposed for

Table 5.1: Passive Design Measures and Energy Efficiency

	any windows which are at the risk of solar gain due to aspect, and rooflights will implemented a double skin obscure system to minimise solar gain while maximising light. Internal Lighting Specifying highly efficient lighting systems throughout will reduce energy consumption at source and reduce the heat output from luminaires, which as a result, will lower energy use associated with cooling systems. All building areas will conserve energy with PIR and occupancy sensing controls with programmable over run timers linked to lighting systems. The building is expected to have an intermittent use given its use as an industrial warehouse development. In addition, LED daylight harvesting light panels are proposed within the office and ancillary spaces to provide further energy savings. Internal lighting for the new building shall achieve the initial luminous efficacy as detailed in the table below: <table><tr><th rowspan="2">Lighting</th><th colspan="2">Luminous Efficacy (Lumens / Circuit Watt)</th></tr><tr><th>Part L Limiting Value</th><th>Proposed Minimum Value</th></tr><tr><td>General</td><td>95</td><td>110</td></tr></table>	Lighting	Luminous Efficacy (Lumens / Circuit Watt)		Part L Limiting Value	Proposed Minimum Value	General	95	110
Lighting	Luminous Efficacy (Lumens / Circuit Watt)								
	Part L Limiting Value	Proposed Minimum Value							
General	95	110							
Ventilation 	Natural Ventilation Natural ventilation strategies tend to use significantly less energy than mechanical ventilation systems and will be provided where feasible. Offices and circulation spaces will be provided with natural ventilation via opening windows. It is proposed that the warehouse spaces (except Units 10, 7 and 4) will be provided with natural ventilation by louvred passive ventilation via rear elevations, opening roller shutters and/or roof ventilators. Mechanical Ventilation To maintain good indoor air quality while supporting energy efficiency, mechanical ventilation systems will be specified in line with Part L 2021 requirements, using high efficiency fans and low specific fan powers. Heat recovery supply and extract ventilation is proposed where natural ventilation is not feasible. It has been assumed that the warehouses within Unit 10, Unit 7 and Unit 4 will be mechanically ventilated and will implement heat recovery. It is proposed that the ventilation system will be linked to occupancy sensors. The WC facilities and kitchenettes will use local mechanical extract units.								

Table 5.1: Passive Design Measures and Energy Efficiency

	Where feasible, passive design principles such as zoning, thermal mass, and strategic window placement will support natural or hybrid ventilation.
Space Heating 	Heating System The development will be serviced by a combination of electric panel heaters and electric air heaters. The system is specified with an efficiency of 100%. Passive building design measures following the energy hierarchy, including good thermal insulation, appropriate glazing ratios, exposed thermal mass, and air tightness, will ensure that heating demand is reduced.
Domestic Hot Water 	Domestic Hot Water Due to the low water demand of the development, point of use electric water heaters with a COP of 100% have been selected. A system of this type is able to deliver hot water directly without suffering energy losses associated with centralised hot water storage or distribution pipework.
Cooling 	Cooling Hierarchy The cooling hierarchy guides the design process to ensure that cooling demand is addressed in the most energy-efficient way. The hierarchy prioritises passive and low-energy measures before resorting to mechanical or active systems, summarised as follows: • Minimise internal heat generation (i.e. reduce the demand for cooling) • Reduce the heat entering the building in summer • Manage heat within the building • Passive ventilation • Mechanical ventilation • Active cooling systems (Include use of FCU's / Comfort cooling) In accordance with this hierarchy, the proposed development incorporates several passive design features to reduce the need for active cooling: • Glazing is located primarily on northern facades, and eastern and northern facades where this is not feasible, to limit solar gain, particularly in the summer months. • Glazing is specified with lower solar transmission to balance daylight and heat gain, for any windows which are at the risk of solar gain due to aspect. • Rooflights will implement a double skin obscure system to minimise solar gain while maximising light. • Efficient LED lighting is specified to limit heat gains. • Heat is recovered via mechanical ventilation units where natural ventilation is not feasible, to supplement the unit's heating system. Cooling System Due to the passive design features implemented, and the expected intermittent use of the spaces, it is proposed that the need for cooling has been designed out and therefore no cooling

Table 5.1: Passive Design Measures and Energy Efficiency	
	system has been implemented. The natural and mechanical ventilation system will provide a degree of cooling.

Following implementation of the strategy detailed in Table 5.1 above for the proposed new development, savings in carbon emissions are shown in a graphical representation of the emissions reduction associated with the first stage of the Energy Hierarchy provided in Figure 5.1 below:

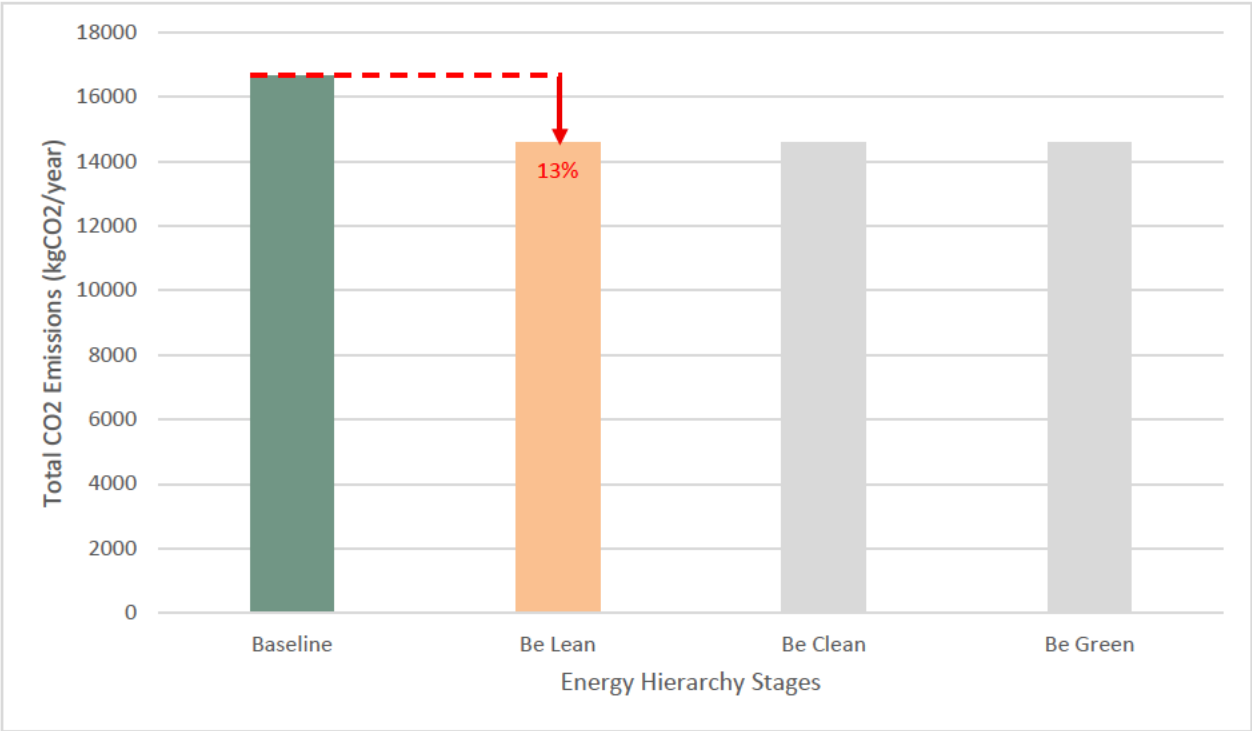


Fig 5.1: Be Lean CO₂ emissions reduction.

5.1.2 Be Clean



The feasibility of incorporating clean infrastructure and energy supply measures into the proposed development has been reviewed to determine if measures can be implemented to lead to potential savings in CO₂ emissions.

The results of the feasibility assessment are detailed in Table 5.2 below.

Table 5.2: Clean Energy Infrastructure Measures

 Combined Heat and Power	Combined Heat and Power (CHP) comprises the combination of the generation of electricity for general consumption, with the recovery of exhausted heat energy (otherwise emitted from power stations/generators as waste heat) which can be used to provide heating for domestic and industrial processes. CHP plants are typically 75% - 80% efficient, significantly more than a typical oil/gas fired power station (35% - 45% efficient), even when used in combination with fossil fuels such as gas and diesel. In addition, transmission losses (typically 5% when consuming grid electricity) are minimised by on-site generation and, as such, gas-fired CHP presents an opportunity to deliver cleaner energy than is available from the National Grid. Feasibility for this development The specification of CHP would lead to a reliance on non-renewable fuel sources as the sites limited footprint is unlikely to allow for suitable storage of biofuels. As such, CHP has been discounted from the assessment.
 Decentralised Energy Networks	Decentralised Energy Networks (DEN) are networks where energy is generated off the main grid, closer to the site of energy consumption. This can include energy from waste plants, combined heat and power, district heating and cooling, and geothermal, biomass, or solar energy. Feasibility for this development Based on the latest available data map for Horsham, there are not currently any existing or proposed heat networks within the vicinity of the proposed development site to provide further support for this application. Therefore, Decentralised Energy Networks are not a feasible source of clean energy for the development.

Following the review, it has been determined that no measures can be implemented within this development, and therefore as per Figure 5.2 overleaf, no further savings were possible at this stage of the Energy Hierarchy.

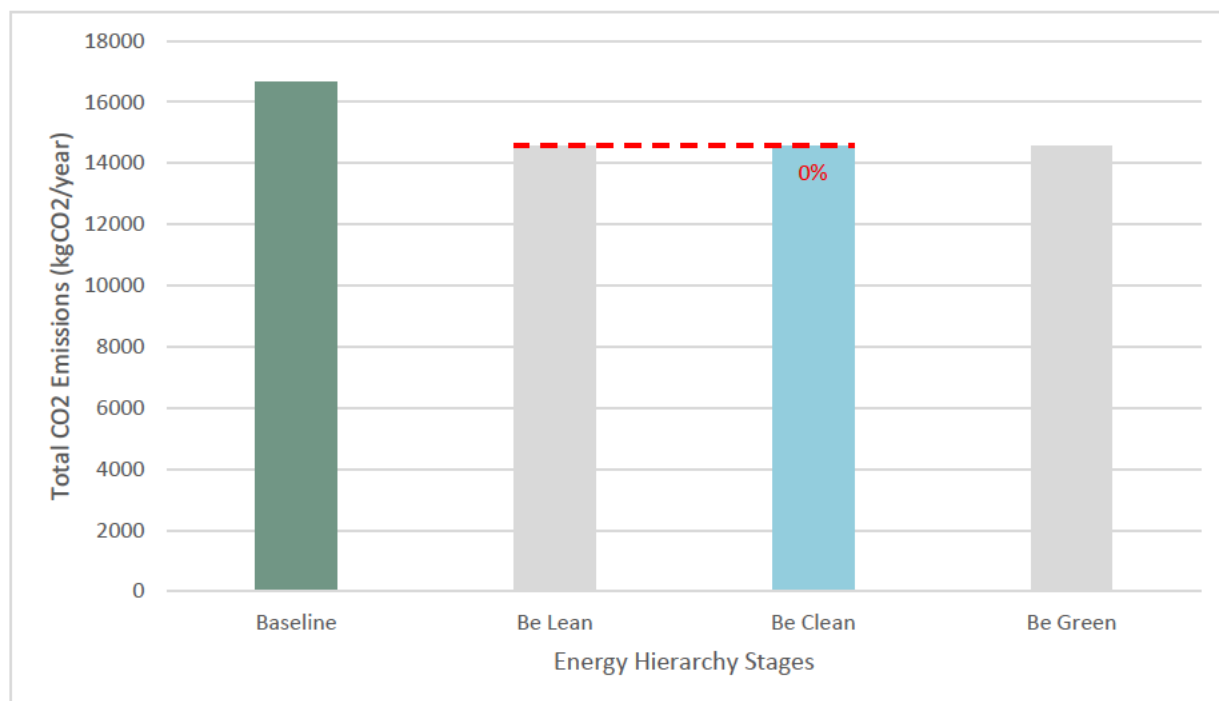
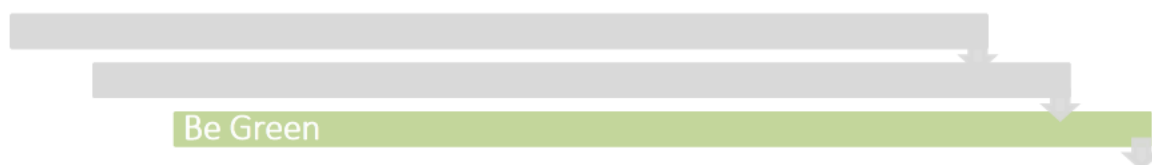


Fig 5.2: Be Clean CO₂ emissions reduction.

5.1.3 Be Green



A high-level feasibility study has been conducted to ascertain the viability of appropriate renewable and low zero carbon technologies based on the proposed developments energy demand, location, and features of the site including ground conditions and provision of space.

Table 5.3: Renewable and LZC Feasibility Study

 Solar Thermal Heating / Hot Water	Solar thermal panels are typically used in order to provide supplementary heat for the purposes of space heating or domestic hot water (DHW). These systems consist of solar collectors, a pump, a control unit, connecting pipes, hot water tank, and a conventional heat source (gas / oil fired boiler). The collectors are usually mounted on the roof and provide heat to a fluid circulated between the collectors and a water storage tank. The efficiency of solar collector panels depends on a number of factors, including the type of collector, correct installation, location, and orientation. Installing solar thermal heating panels could reduce energy consumption and carbon impacts through significant reductions in gas / oil supply. A well-designed system should satisfy 70-80% of the hot water demand in the summer and 20-30% in the winter.
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Table 5.3: Renewable and LZC Feasibility Study

	Typically, solar collectors would produce approximately 5-600kWh/m² of hot water. Evacuated tube systems are about 30% more efficient but have a corresponding increased capital outlay. A collector area of 4-5m² will normally save approximately 230Kg of CO₂ emissions per year. Feasibility for this development The provision of supplementary DHW heating via the installation of a solar thermal system is not considered suitable for this development due to the very limited domestic hot water requirement.
 Ground Source Heat Pumps	Ground Source Heat Pumps (GSHPs) operate by the removal of residual heat from the ground by using various 'loops' containing water and glycol fluid mix. Heat from the ground is absorbed into this fluid and is pumped through a heat exchanger in the heat pump. Low grade heat passes through a compressor and is concentrated into a higher temperature gas capable of heating water for DHW and central heating systems. There are a number of configurations for GSHP systems. A vertical collector system is considered to be the most appropriate in the context of the proposed development given the large scale of the system and limited area available for horizontal collectors. Vertical collectors can be between 15 – 180m deep and minimum spacing between adjacent boreholes should be maintained at 5 – 15m to prevent thermal interference. The heat yielded from GSHPs is relatively small (collecting approximately 14 – 20Wth per metre of collector loop), therefore the adequacy of the accompanying heat exchanger is vital in ensuring greater heat transfer (although more efficient exchangers have a significantly larger capital cost). The performance of a GSHP system is entirely dependent on the appropriateness of the ground condition (i.e., depth of soil cover, the type of soil or rock, ground temperature, and thermal conductivity), which would be established subject to a ground survey. 'Reversible' heat pump systems are also available that give the potential for the provision of space cooling if required. Groundwater can also be used to cool buildings where a suitable source exists, abstraction and discharge permissions can be obtained from the Environment Agency and test bores are favourable. Feasibility for this development Installation of GSHPs as a supplementary heating system for the building is not considered to be feasible due to the significant amount of groundworks required for this development.

Table 5.3: Renewable and LZC Feasibility Study

 Air Source Heat Pumps	Air Source Heat Pumps (ASHPs) absorb heat from ambient air in order to provide heat for the purposes of space heating and domestic hot water. ASHPs work on a similar principal to a fridge, extracting heat from the inside. An evaporator coil mounted outside absorbs heat; a compressor unit then drives refrigerant through the heat pump and compresses it to the right level to suit the heat distribution system. A heat exchanger then transfer the heat from the refrigerant for use, which can be provided in two forms depending on the type of system: • Air to air – produces warm air which is circulated by a network of ducts and fans • Air to water – uses heat to warm water which is circulated as it would be in a conventional boiler system using heat emitters. Heat pumps heat water to a lower temperature than a standard boiler system, and are therefore better suited to underfloor systems over radiator systems due to the greater surface area required to distribute the heat effectively. The efficiency of ASHPs is measures by a Coefficient of Performance (CoP) i.e., the amount of heat produced compared to the amount of electricity needed for them to operate. ASHPs have a relatively low heat yield compared with traditional boilers, therefore buildings must be well insulated and draught-proofed to ensure that the heating system is effective. Due to the required electrical load of ASHPs, consideration must be given to the source of grid electricity when determining the potential carbon savings they can deliver. Therefore, the purchase of 'cleaner' grid electricity (i.e., renewable or CHP tariffs) results in increased carbon savings from ASHPs. ASHPs are often a more popular and technically/financially viable alternative to GSHPs due to lack of requirement for extensive excavation, requiring far less space and an easier installation. Feasibility for this development An ASHP system is not considered feasible within the proposed development due to the complexity of the system and associated pipework which has been deemed not appropriate for the function of the largely unoccupied spaces.
 Biomass Boilers	Biomass boilers replace conventionally powered boilers with an almost carbon neutral fuel (such as wood pellets). In addition, the installation and operation of a biomass boiler in new-build developments could yield significant revenue from the Renewable Heat Incentive, a government funded clean energy cashback scheme. Although many biomass burners will meet Clean Air Act requirements, combustion of woody biomass releases higher quantities of NOx compared to a comparable system fuelled by natural gas. As a consequence, many local authorities, particularly in urban areas have

Table 5.3: Renewable and LZC Feasibility Study

	concerns about the potential impact on air quality that the widespread uptake of biomass boilers would have. When linked to a large-scale CHP unit, as opposed to being used for individual boilers, biomass is generally approved as a viable LZC technology. Feasibility for this development The use of biomass is not considered feasible due to both air quality issues and the significant storage and handling areas given the sites limited footprint.
 Photovoltaic Cells	Solar Photovoltaics (PVs) are solar panels which generate electricity through photon-to-electron energy transfer, which takes place in the dielectric materials that make up the cells. The cells comprise of layers of semi-conducting silicon material which, when illuminated by the sun, produces an electric field which generates an electrical current. PVs can generate electricity even on overcast days, as they require daylight rather than direct sunlight. This makes them viable even in the UK, although peak output is obtained at midday on a sunny summer's day. PVs offer a simple, proven solution to generating renewable electricity. Feasibility for this development Due to the large flat roof space available on the proposed development, it is considered suitable and feasible to install a PV array. Development is proposing to install a large 136kW PV array.
 Micro Wind Turbines	Large wind turbines are an established means of capturing wind energy and converting it into usable electricity. Wind turbines come in various sizes depending on the location and electrical load of a particular site. A wind turbine usually consists of a nacelle containing a generator connected, sometimes via a gearbox, to a rotor consisting of three blades. Feasibility for this development Wind turbines are likely to have a significant visual impact on local environment, as well as health and safety implications for occupiers or site users on-site and on adjacent areas as a result of noise and light flicker. Local planning policy requires renewable technologies to be considerate of these impacts, and therefore wind turbines are not considered to be feasible.

Table 5.3: Renewable and LZC Feasibility Study

 On-Site Battery Storage	Although not technically a form of renewable energy, housing banks of commercial-scale batteries on site could provide a significant financial saving on the store's energy bill as well as reducing the peak energy demand. The batteries, producing around 10MW of power per site, will charge when the National Grid has surplus power and deliver the stored power back to the National Grid at times of peak demand. In addition to grid balancing, battery storage can also be coupled with renewable energy generation such as wind or solar PV to store the energy generated when the sun is shining, or wind is blowing and allow the energy to be available for use when it is needed 24hrs a day all year round. Battery storage is most beneficial when the development has uses at times when the grid's demand and renewable energy availability are both low. Feasibility for this development Due to the constrained site, installed on site battery storage was not considered a viable option.
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5.1.4 Feasibility Assessment Summary (Be Green)

Following the high-level feasibility study on 'be green and be clean' measures from the Energy Hierarchy scheme. It can be seen that the proposed development can benefit from the use of a 136kW Solar PV array.

Through implementation of the above renewable technologies, an estimated carbon equivalent emission saving of approximately 8.55 tonnes per annum is achievable, as demonstrated in Figure 5.3 below.

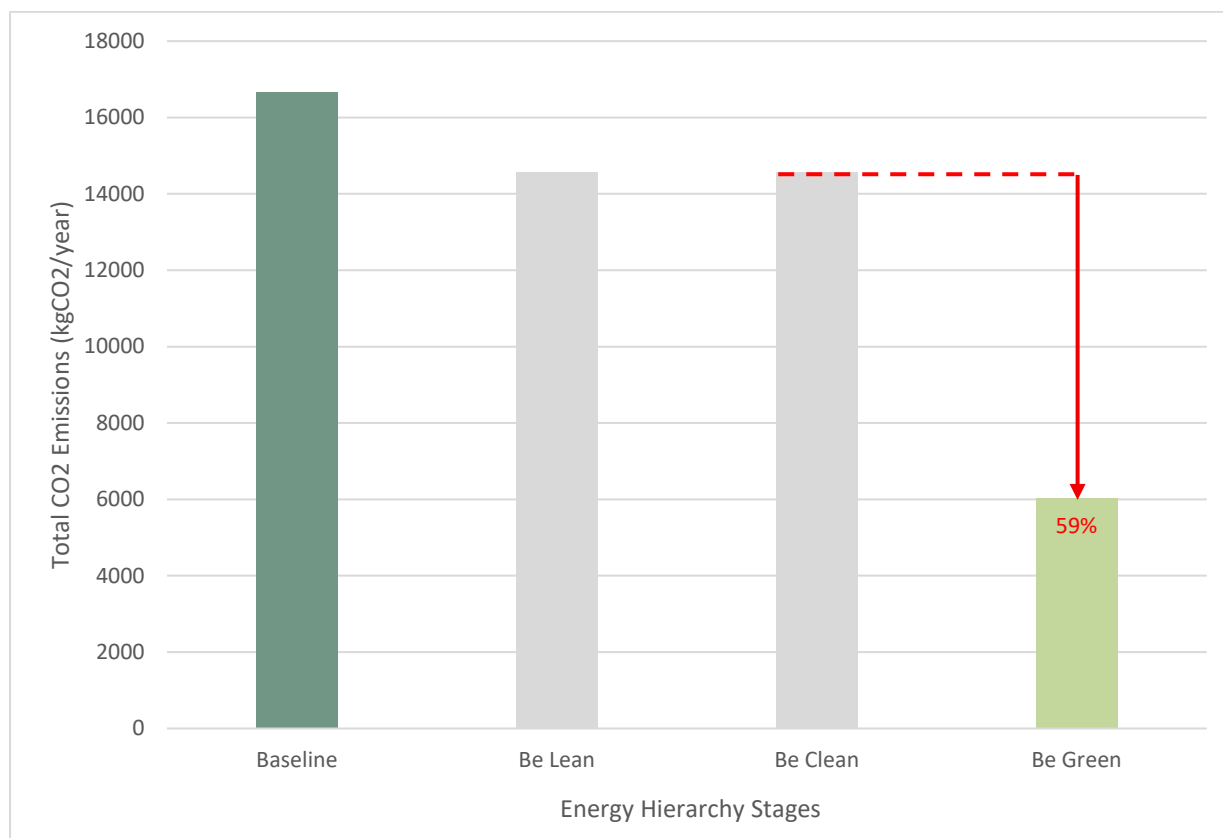


Fig 5.3: Be Green CO₂ emissions reduction.

5.2 Modelling Results

The conclusion of the energy assessment is that, based on planning stage calculations and implementation of the Energy Hierarchy, the new development achieves an energy saving through both energy efficiency and renewable technologies, when compared with a Building Regulations Part L (2021) compliant development, and aligns with Building Regulations Part L (2021) benchmark in relation to carbon emissions, hence meeting the requirements of Policy 36 of the Horsham District Planning Framework (Published 2015). Policy 36 requires developments provide an Energy Statement demonstrating and quantifying how the development will comply with the Energy Hierarchy.

A breakdown of the results of the Energy Assessment in accordance with the Energy Hierarchy is provided in Table 5.4 below.

Table 5.4: Energy Assessment Results: Energy Hierarchy

Scenario	Energy Demand (kWh / year)	Energy saving achieved (%)	Regulated CO ₂ Emissions (kgCO ₂ / year)	Saving achieved in CO ₂ emissions (%)
Benchmark Building	172,743	-	16,668	-
Be Lean (improved building fabric and lighting)	151,191	12%	14,577	13%
Be Clean	151,191	-	14,577	-
Be Green (addition of 136kW PV array)	51,908	66%	6,028	59%
Total Savings in Energy and Emissions	120,835	70.0%	10,640	64%

The savings in CO₂ emissions across all stages of the energy hierarchy are demonstrated in figure 5.4 below.

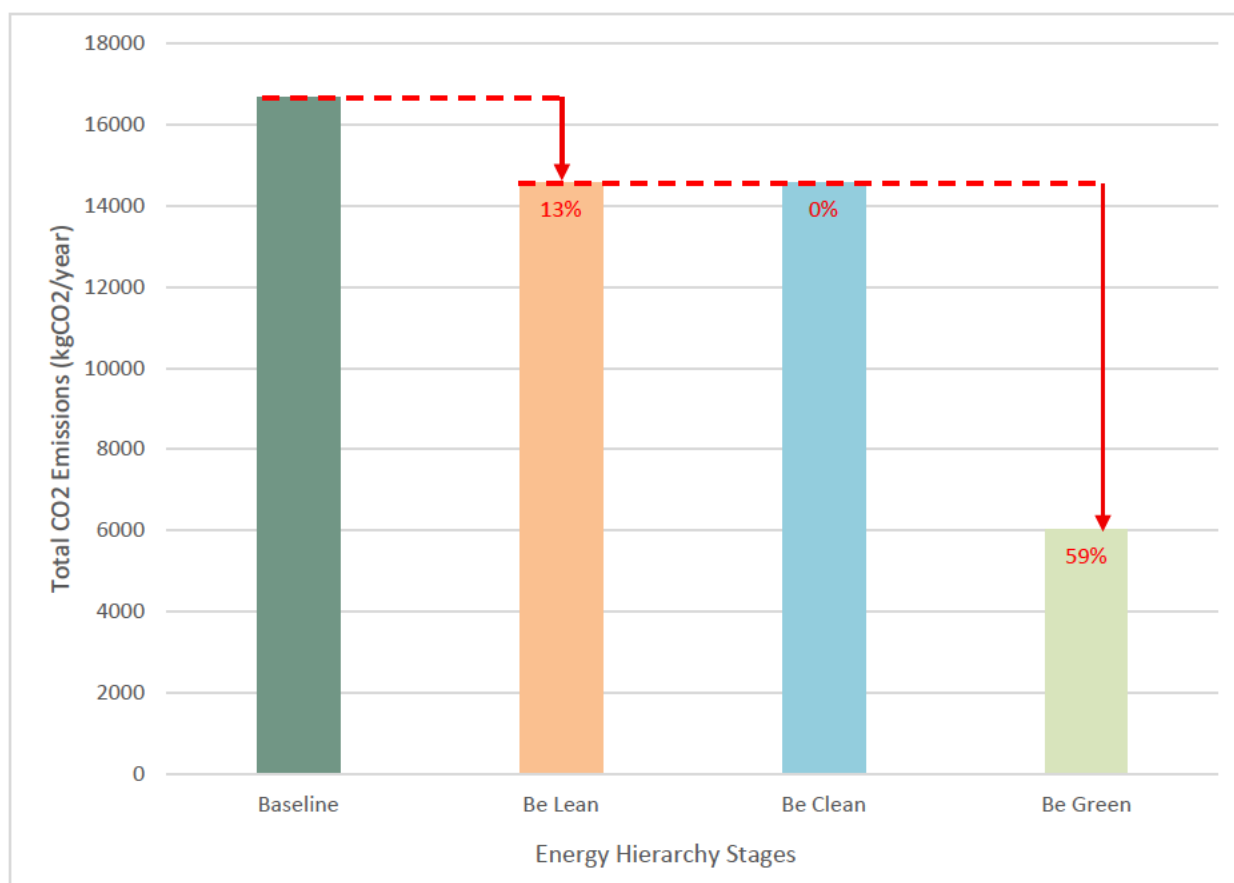


Fig 5.4: Energy Strategy CO₂ emissions reduction.

Compliance against a 2021 Part L Compliant Benchmark Building is demonstrated in Table 5.5 below.

Table 5.5: Energy Assessment Results: Part L

Scenario	Building Primary Energy Rate (kWh _{PE} / m ² .year)	Energy saving achieved (%)	Building CO2 Emission Rate (kgCO ₂ / m ² .year)	Saving achieved in CO ₂ emissions (%)
2021 Part L Compliant Benchmark Building (TER/TPER)	57.85	-	6.17	-
Proposed Building (BER/BPER)	53.13	8%	6.17	0%

6. CONCLUSION

In conclusion, the proposed strategy has utilised sustainable design measures in accordance with the Energy Hierarchy to reduce energy consumption. An energy modelling exercise has been undertaken to demonstrate a total predicted energy consumption saving of 120,835kWh/year and a predicted CO₂ emissions reduction of 10,640kgCO₂/year when compared to a baseline building with Part L limiting fabric and lighting systems. The savings are achieved through specification of a well-insulated and airtight building fabric, limiting excessive solar gains through massing and location of internal facilities, efficient internal lighting and control systems, and renewable technologies including a 136kW roof-mounted Solar PV array.

Compliance has been demonstrated with Policy 35, Policy 36 and Policy 37, given the development's all electric systems are supported by a 136kW Solar PV array, and climate adaptation techniques have been implemented where practical, such as the optimisation of building orientation to reduce unwanted solar gains, simplification of form to allow for improved air-tightness and reduced thermal bridging, and maximising the use of natural ventilation and daylight via rooflights specified with double skin obscure systems to minimise solar gain. The development achieves a 64% CO₂ emissions saving over a baseline building with Part L limiting fabric and lighting systems. The development meets the Part L benchmark in relation to carbon emissions, through the implementation of the 136kW Solar PV array. The PV array achieves an estimated carbon equivalent emission saving of approximately 8.55 tonnes per annum.

Details of the building fabric, building services, and renewable and LZC technologies proposed for the development are summarised within table 6.1 below:

Table 6.1: Proposed Building Design Values

Building Fabric Performance Values		Building Services & Renewable/LZC Technologies	
Walls	0.2 W/m ² K	Heating/Cooling	Electric panel heaters and electric air heaters (100% Efficiency)
Roof	0.16 W/m ² K	Lighting	100% LED
Floor	0.15 W/m ² K	Hot Water	Ariston Andris Lux 2kW 10l Storage Electric DHW (100% efficiency)
Glazing	1.4 W/m ² K	Building Management	Thermostatic controls on the heating system, and programmers to panel heaters additionally.
Doors	1.4 W/m ² K	Renewable/LZC Technology	136kW roof mounted PV array
Vehicle Doors	1.3 W/m ² K		
Air Permeability	5m ³ /(hr.m ²)		

Appendix A: 'Baseline' BRUKL

Project name

Shell and Core

Area B - Building (Units 1 to 10): Baseline

As designed

Date: Tue Jun 02 09:16:26 2026

Administrative information

Building Details

Address: Codmore Hill, Industrial Estate Phase 2, Codmore Hill, RH20

Certifier details

Name: Charlie MacKnight

Telephone number:

Address: Unit 5.3 Paintworks Arnos Vale, Bristol, BS4 3EH

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.3.1

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

Foundation area [m²]: 977The CO₂ 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	6.17
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	17.06
Target primary energy rate (TPER), kWh _{PE} /m ² .annum	57.85
Building primary energy rate (BPER), kWh _{PE} /m ² .annum	176.81
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-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.26	0.26	GF - Unit 3 - Entry_W_9
Floors	0.18	0.12	0.18	GF - Unit 3 - WC_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	GF - Unit 4 - WH_R_12
Windows** and roof windows	1.6	1.6	1.6	GF - Unit 3 - Entry_G_10
Rooflights***	2.2	2.2	2.2	GF - Unit 3 - WH_G_14
Personnel doors^	1.6	1.6	1.6	GF - Unit 3 - WH_D_10
Vehicle access & similar large doors	1.3	1.3	1.3	GF - Unit 3 - WH_D_9
High usage entrance doors	3	-	-	No external high usage entrance doors

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

* 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/m²K

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	8

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	<0.9

1- Codmore Ancillary - unfanned

	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

2- Codmore HVAC - WH fanned

	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

1- Codmore DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.001
Standard value	1	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	Zone	Standard
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
GF - Unit 3 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 2 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 4 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 8 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 5 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 1 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 10 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 9 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 3 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 2 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I		
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
GF - Unit 4 - WH		-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 10 - WH		-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 7 - WH		-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 10 - Kitchenette		0.3	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 8 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 6 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 5 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 1 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 9 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
GF - Unit 3 - Entry	NO
GF - Unit 2 - Office	NO
GF - Unit 2 - Entry	NO
GF - Unit 4 - Entry	NO
GF - Unit 3 - WC	NO
GF - Unit 2 - WC	NO
GF - Unit 4 - WC	NO
GF - Unit 1 - Office	NO
GF - Unit 8 - Entry	NO
GF - Unit 8 - WC	NO
GF - Unit 7 - Entry	NO
GF - Unit 6 - Entry	NO
GF - Unit 6 - Office	NO
GF - Unit 5 - Entry	NO
GF - Unit 5 - WC	NO
GF - Unit 1 - WC	NO
GF - Unit 1 - Entry	NO
GF - Unit 10 - Entry	NO
GF - Unit 10 - WC	NO
GF - Unit 10 - Office	NO
GF - Unit 9 - WC	NO
GF - Unit 9 - Entry	NO
GF - Unit 3 - WH	NO
GF - Unit 2 - WH	NO
GF - Unit 3 - Kitchenette	NO
GF - Unit 2 - Kitchenette	NO
GF - Unit 4 - WH	NO
GF - Unit 1 - WH	NO
GF - Unit 10 - WH	NO
GF - Unit 7 - WH	NO
GF - Unit 6 - WH	NO
GF - Unit 5 - WH	NO
GF - Unit 10 - Kitchenette	NO

Shell and core configuration

Zone	Assumed shell?
GF - Unit 9 - WH	NO
GF - Unit 8 - WH	NO
GF - Unit 8 - Kitchenette	NO
GF - Unit 6 - Kitchenette	NO
GF - Unit 5 - Kitchenette	NO
GF - Unit 1 - Kitchenette	NO
GF - Unit 9 - Kitchenette	NO

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
GF - Unit 3 - Entry		95	-	-
GF - Unit 2 - Office		95	-	-
GF - Unit 2 - Entry		95	-	-
GF - Unit 4 - Entry		95	-	-
GF - Unit 3 - WC		95	-	-
GF - Unit 2 - WC		95	-	-
GF - Unit 4 - WC		95	-	-
GF - Unit 1 - Office		95	-	-
GF - Unit 8 - Entry		95	-	-
GF - Unit 8 - WC		95	-	-
GF - Unit 7 - Entry		95	-	-
GF - Unit 6 - Entry		95	-	-
GF - Unit 6 - Office		95	-	-
GF - Unit 5 - Entry		95	-	-
GF - Unit 5 - WC		95	-	-
GF - Unit 1 - WC		95	-	-
GF - Unit 1 - Entry		95	-	-
GF - Unit 10 - Entry		95	-	-
GF - Unit 10 - WC		95	-	-
GF - Unit 10 - Office		95	-	-
GF - Unit 9 - WC		95	-	-
GF - Unit 9 - Entry		95	-	-
GF - Unit 3 - WH		95	-	-
GF - Unit 2 - WH		95	-	-
GF - Unit 3 - Kitchenette		95	-	-
GF - Unit 2 - Kitchenette		95	-	-
GF - Unit 4 - WH		95	-	-
GF - Unit 1 - WH		95	-	-
GF - Unit 10 - WH		95	-	-
GF - Unit 7 - WH		95	-	-
GF - Unit 6 - WH		95	-	-
GF - Unit 5 - WH		95	-	-
GF - Unit 10 - Kitchenette		95	-	-
GF - Unit 9 - WH		95	-	-

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
GF - Unit 8 - WH		95	-	-
GF - Unit 8 - Kitchenette		95	-	-
GF - Unit 6 - Kitchenette		95	-	-
GF - Unit 5 - Kitchenette		95	-	-
GF - Unit 1 - Kitchenette		95	-	-
GF - Unit 9 - Kitchenette		95	-	-

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?
GF - Unit 2 - Office	NO (-41.1%)	NO
GF - Unit 1 - Office	NO (-55.7%)	NO
GF - Unit 6 - Office	NO (-41.1%)	NO
GF - Unit 10 - Office	NO (-22.5%)	NO
GF - Unit 3 - WH	NO (-50.7%)	NO
GF - Unit 2 - WH	NO (-51.5%)	NO
GF - Unit 3 - Kitchenette	N/A	N/A
GF - Unit 2 - Kitchenette	N/A	N/A
GF - Unit 4 - WH	NO (-8.3%)	NO
GF - Unit 1 - WH	NO (-27.2%)	NO
GF - Unit 10 - WH	NO (-8.3%)	NO
GF - Unit 7 - WH	NO (-8.3%)	NO
GF - Unit 6 - WH	NO (-29.9%)	NO
GF - Unit 5 - WH	NO (-29.9%)	NO
GF - Unit 10 - Kitchenette	N/A	N/A
GF - Unit 9 - WH	NO (-51.5%)	NO
GF - Unit 8 - WH	NO (-51.1%)	NO
GF - Unit 8 - Kitchenette	N/A	N/A
GF - Unit 6 - Kitchenette	N/A	N/A
GF - Unit 5 - Kitchenette	N/A	N/A
GF - Unit 1 - Kitchenette	N/A	N/A
GF - Unit 9 - Kitchenette	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]	1148	1148
External area [m ²]	3010	3010
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	8	5
Average conductance [W/K]	927.22	933.31
Average U-value [W/m ² K]	0.31	0.31
Alpha value* [%]	14.92	61.82

* 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
100	Storage or Distribution
	Hotels
	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/m²]

	Actual	Notional
Heating	79.95	59.92
Cooling	0	0
Auxiliary	3.5	0.94
Lighting	18.61	14.95
Hot water	11.6	11.38
Equipment*	40.68	40.68
TOTAL**	113.66	87.19

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	50.19
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>50.19</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	306.57	357.43
Primary energy [kWh _{PE} /m ²]	176.81	57.85
Total emissions [kg/m ²]	17.06	6.17

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	153.2	94.9	53.2	0	1	0.8	0	1	0
Notional	273.7	58.1	56.7	0	1.4	1.34	0	----	----
[ST] Other local room heater - fanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Natural Gas									
Actual	248.1	72	86.1	0	4.1	0.8	0	1	0
Notional	292.6	70.7	60.7	0	0.8	1.34	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

Appendix B: 'Be Lean' BRUKL

Project name

Shell and Core

Area B - Building (Units 1 to 10): Be Lean

As designed

Date: Fri May 29 16:52:30 2026

Administrative information

Building Details

Address: Codmore Hill, Industrial Estate Phase 2, Codmore Hill, RH20

Certifier details

Name: Charlie MacKnight

Telephone number:

Address: Unit 5.3 Paintworks Arnos Vale, Bristol, BS4 3EH

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.3.1

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

Foundation area [m²]: 977The CO₂ 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	6.17
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	14.92
Target primary energy rate (TPER), kWh _{PE} /m ² .annum	57.85
Building primary energy rate (BPER), kWh _{PE} /m ² .annum	154.75
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 -Limit	U _a -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	0.2	0.2	GF - Unit 3 - Entry_W_9
Floors	0.18	0.11	0.15	GF - Unit 3 - WC_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	GF - Unit 4 - WH_R_12
Windows** and roof windows	1.6	1.4	1.4	GF - Unit 3 - Entry_G_10
Rooflights***	2.2	2.2	2.2	GF - Unit 3 - WH_G_14
Personnel doors^	1.6	1.4	1.4	GF - Unit 3 - WH_D_10
Vehicle access & similar large doors	1.3	1.3	1.3	GF - Unit 3 - WH_D_9
High usage entrance doors	3	-	-	No external high usage entrance doors

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

* 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/m²K

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	<0.9

1- Codmore Ancillary - unfanned

	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

2- Codmore HVAC - WH fanned

	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

1- Codmore DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.001
Standard value	1	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	Zone	Standard
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
GF - Unit 3 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 2 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 4 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 8 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 5 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 1 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 10 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 9 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 3 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 2 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
GF - Unit 4 - WH	-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 10 - WH	-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 7 - WH	-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 10 - Kitchenette	0.3	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 8 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 6 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 5 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 1 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 9 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
GF - Unit 3 - Entry	NO
GF - Unit 2 - Office	NO
GF - Unit 2 - Entry	NO
GF - Unit 4 - Entry	NO
GF - Unit 3 - WC	NO
GF - Unit 2 - WC	NO
GF - Unit 4 - WC	NO
GF - Unit 1 - Office	NO
GF - Unit 8 - Entry	NO
GF - Unit 8 - WC	NO
GF - Unit 7 - Entry	NO
GF - Unit 6 - Entry	NO
GF - Unit 6 - Office	NO
GF - Unit 5 - Entry	NO
GF - Unit 5 - WC	NO
GF - Unit 1 - WC	NO
GF - Unit 1 - Entry	NO
GF - Unit 10 - Entry	NO
GF - Unit 10 - WC	NO
GF - Unit 10 - Office	NO
GF - Unit 9 - WC	NO
GF - Unit 9 - Entry	NO
GF - Unit 3 - WH	NO
GF - Unit 2 - WH	NO
GF - Unit 3 - Kitchenette	NO
GF - Unit 2 - Kitchenette	NO
GF - Unit 4 - WH	NO
GF - Unit 1 - WH	NO
GF - Unit 10 - WH	NO
GF - Unit 7 - WH	NO
GF - Unit 6 - WH	NO
GF - Unit 5 - WH	NO
GF - Unit 10 - Kitchenette	NO

Shell and core configuration

Zone	Assumed shell?
GF - Unit 9 - WH	NO
GF - Unit 8 - WH	NO
GF - Unit 8 - Kitchenette	NO
GF - Unit 6 - Kitchenette	NO
GF - Unit 5 - Kitchenette	NO
GF - Unit 1 - Kitchenette	NO
GF - Unit 9 - Kitchenette	NO

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
GF - Unit 3 - Entry		110	-	-
GF - Unit 2 - Office		110	-	-
GF - Unit 2 - Entry		110	-	-
GF - Unit 4 - Entry		110	-	-
GF - Unit 3 - WC		110	-	-
GF - Unit 2 - WC		110	-	-
GF - Unit 4 - WC		110	-	-
GF - Unit 1 - Office		110	-	-
GF - Unit 8 - Entry		110	-	-
GF - Unit 8 - WC		110	-	-
GF - Unit 7 - Entry		110	-	-
GF - Unit 6 - Entry		110	-	-
GF - Unit 6 - Office		110	-	-
GF - Unit 5 - Entry		110	-	-
GF - Unit 5 - WC		110	-	-
GF - Unit 1 - WC		110	-	-
GF - Unit 1 - Entry		110	-	-
GF - Unit 10 - Entry		110	-	-
GF - Unit 10 - WC		110	-	-
GF - Unit 10 - Office		110	-	-
GF - Unit 9 - WC		110	-	-
GF - Unit 9 - Entry		110	-	-
GF - Unit 3 - WH		110	-	-
GF - Unit 2 - WH		110	-	-
GF - Unit 3 - Kitchenette		110	-	-
GF - Unit 2 - Kitchenette		110	-	-
GF - Unit 4 - WH		110	-	-
GF - Unit 1 - WH		110	-	-
GF - Unit 10 - WH		110	-	-
GF - Unit 7 - WH		110	-	-
GF - Unit 6 - WH		110	-	-
GF - Unit 5 - WH		110	-	-
GF - Unit 10 - Kitchenette		110	-	-
GF - Unit 9 - WH		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
GF - Unit 8 - WH		110	-	-
GF - Unit 8 - Kitchenette		110	-	-
GF - Unit 6 - Kitchenette		110	-	-
GF - Unit 5 - Kitchenette		110	-	-
GF - Unit 1 - Kitchenette		110	-	-
GF - Unit 9 - Kitchenette		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?
GF - Unit 2 - Office	NO (-41.1%)	NO
GF - Unit 1 - Office	NO (-55.7%)	NO
GF - Unit 6 - Office	NO (-41.1%)	NO
GF - Unit 10 - Office	NO (-22.5%)	NO
GF - Unit 3 - WH	NO (-50.7%)	NO
GF - Unit 2 - WH	NO (-51.5%)	NO
GF - Unit 3 - Kitchenette	N/A	N/A
GF - Unit 2 - Kitchenette	N/A	N/A
GF - Unit 4 - WH	NO (-8.3%)	NO
GF - Unit 1 - WH	NO (-27.2%)	NO
GF - Unit 10 - WH	NO (-8.3%)	NO
GF - Unit 7 - WH	NO (-8.3%)	NO
GF - Unit 6 - WH	NO (-29.9%)	NO
GF - Unit 5 - WH	NO (-29.9%)	NO
GF - Unit 10 - Kitchenette	N/A	N/A
GF - Unit 9 - WH	NO (-51.5%)	NO
GF - Unit 8 - WH	NO (-51.1%)	NO
GF - Unit 8 - Kitchenette	N/A	N/A
GF - Unit 6 - Kitchenette	N/A	N/A
GF - Unit 5 - Kitchenette	N/A	N/A
GF - Unit 1 - Kitchenette	N/A	N/A
GF - Unit 9 - Kitchenette	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]	1148	1148
External area [m ²]	3010	3010
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	842.59	933.31
Average U-value [W/m ² K]	0.28	0.31
Alpha value* [%]	16.42	61.82

* 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

100 Storage or Distribution

Hotels
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/m²]

	Actual	Notional
Heating	68.03	59.92
Cooling	0	0
Auxiliary	3.29	0.94
Lighting	16.61	14.95
Hot water	11.6	11.38
Equipment*	40.68	40.68
TOTAL**	99.54	87.19

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	50.19
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>50.19</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	275.06	357.43
Primary energy [kWh _{PE} /m ²]	154.75	57.85
Total emissions [kg/m ²]	14.92	6.17

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	130.4	101	45.3	0	1	0.8	0	1	0
Notional	273.7	58.1	56.7	0	1.4	1.34	0	----	----
[ST] Other local room heater - fanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Natural Gas									
Actual	211.1	74.1	73.3	0	3.8	0.8	0	1	0
Notional	292.6	70.7	60.7	0	0.8	1.34	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

Appendix C: 'Proposed' BRUKL

Project name

Shell and Core

Area B - Building (Units 1 to 10): Be Green

As designed

Date: Fri May 29 16:51:31 2026

Administrative information

Building Details

Address: Codmore Hill, Industrial Estate Phase 2, Codmore Hill, RH20

Certifier details

Name: Charlie MacKnight

Telephone number:

Address: Unit 5.3 Paintworks Arnos Vale, Bristol, BS4 3EH

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.3.1

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

Foundation area [m²]: 977The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	6.17
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	6.17
Target primary energy rate (TPER), kWh _{PE} /m ² .annum	57.85
Building primary energy rate (BPER), kWh _{PE} /m ² .annum	53.13
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 -Limit	U _a -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	0.2	0.2	GF - Unit 3 - Entry_W_9
Floors	0.18	0.11	0.15	GF - Unit 3 - WC_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	GF - Unit 4 - WH_R_12
Windows** and roof windows	1.6	1.4	1.4	GF - Unit 3 - Entry_G_10
Rooflights***	2.2	2.2	2.2	GF - Unit 3 - WH_G_14
Personnel doors^	1.6	1.4	1.4	GF - Unit 3 - WH_D_10
Vehicle access & similar large doors	1.3	1.3	1.3	GF - Unit 3 - WH_D_9
High usage entrance doors	3	-	-	No external high usage entrance doors

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

* 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/m²K

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	<0.9

1- Codmore Ancillary - unfanned

	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

2- Codmore HVAC - WH fanned

	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

1- Codmore DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.001
Standard value	1	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	Zone	Standard
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
GF - Unit 3 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 2 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 4 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 8 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 5 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 1 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 10 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 9 - WC		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 3 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 2 - Kitchenette		0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
GF - Unit 4 - WH	-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 10 - WH	-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 7 - WH	-	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 10 - Kitchenette	0.3	-	-	-	1.9	-	-	-	-	0.76	N/A
GF - Unit 8 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 6 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 5 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 1 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
GF - Unit 9 - Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
GF - Unit 3 - Entry	NO
GF - Unit 2 - Office	NO
GF - Unit 2 - Entry	NO
GF - Unit 4 - Entry	NO
GF - Unit 3 - WC	NO
GF - Unit 2 - WC	NO
GF - Unit 4 - WC	NO
GF - Unit 1 - Office	NO
GF - Unit 8 - Entry	NO
GF - Unit 8 - WC	NO
GF - Unit 7 - Entry	NO
GF - Unit 6 - Entry	NO
GF - Unit 6 - Office	NO
GF - Unit 5 - Entry	NO
GF - Unit 5 - WC	NO
GF - Unit 1 - WC	NO
GF - Unit 1 - Entry	NO
GF - Unit 10 - Entry	NO
GF - Unit 10 - WC	NO
GF - Unit 10 - Office	NO
GF - Unit 9 - WC	NO
GF - Unit 9 - Entry	NO
GF - Unit 3 - WH	NO
GF - Unit 2 - WH	NO
GF - Unit 3 - Kitchenette	NO
GF - Unit 2 - Kitchenette	NO
GF - Unit 4 - WH	NO
GF - Unit 1 - WH	NO
GF - Unit 10 - WH	NO
GF - Unit 7 - WH	NO
GF - Unit 6 - WH	NO
GF - Unit 5 - WH	NO
GF - Unit 10 - Kitchenette	NO

Shell and core configuration

Zone	Assumed shell?
GF - Unit 9 - WH	NO
GF - Unit 8 - WH	NO
GF - Unit 8 - Kitchenette	NO
GF - Unit 6 - Kitchenette	NO
GF - Unit 5 - Kitchenette	NO
GF - Unit 1 - Kitchenette	NO
GF - Unit 9 - Kitchenette	NO

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
GF - Unit 3 - Entry		110	-	-
GF - Unit 2 - Office		110	-	-
GF - Unit 2 - Entry		110	-	-
GF - Unit 4 - Entry		110	-	-
GF - Unit 3 - WC		110	-	-
GF - Unit 2 - WC		110	-	-
GF - Unit 4 - WC		110	-	-
GF - Unit 1 - Office		110	-	-
GF - Unit 8 - Entry		110	-	-
GF - Unit 8 - WC		110	-	-
GF - Unit 7 - Entry		110	-	-
GF - Unit 6 - Entry		110	-	-
GF - Unit 6 - Office		110	-	-
GF - Unit 5 - Entry		110	-	-
GF - Unit 5 - WC		110	-	-
GF - Unit 1 - WC		110	-	-
GF - Unit 1 - Entry		110	-	-
GF - Unit 10 - Entry		110	-	-
GF - Unit 10 - WC		110	-	-
GF - Unit 10 - Office		110	-	-
GF - Unit 9 - WC		110	-	-
GF - Unit 9 - Entry		110	-	-
GF - Unit 3 - WH		110	-	-
GF - Unit 2 - WH		110	-	-
GF - Unit 3 - Kitchenette		110	-	-
GF - Unit 2 - Kitchenette		110	-	-
GF - Unit 4 - WH		110	-	-
GF - Unit 1 - WH		110	-	-
GF - Unit 10 - WH		110	-	-
GF - Unit 7 - WH		110	-	-
GF - Unit 6 - WH		110	-	-
GF - Unit 5 - WH		110	-	-
GF - Unit 10 - Kitchenette		110	-	-
GF - Unit 9 - WH		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
GF - Unit 8 - WH		110	-	-
GF - Unit 8 - Kitchenette		110	-	-
GF - Unit 6 - Kitchenette		110	-	-
GF - Unit 5 - Kitchenette		110	-	-
GF - Unit 1 - Kitchenette		110	-	-
GF - Unit 9 - Kitchenette		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?
GF - Unit 2 - Office	NO (-41.1%)	NO
GF - Unit 1 - Office	NO (-55.7%)	NO
GF - Unit 6 - Office	NO (-41.1%)	NO
GF - Unit 10 - Office	NO (-22.5%)	NO
GF - Unit 3 - WH	NO (-50.7%)	NO
GF - Unit 2 - WH	NO (-51.5%)	NO
GF - Unit 3 - Kitchenette	N/A	N/A
GF - Unit 2 - Kitchenette	N/A	N/A
GF - Unit 4 - WH	NO (-8.3%)	NO
GF - Unit 1 - WH	NO (-27.2%)	NO
GF - Unit 10 - WH	NO (-8.3%)	NO
GF - Unit 7 - WH	NO (-8.3%)	NO
GF - Unit 6 - WH	NO (-29.9%)	NO
GF - Unit 5 - WH	NO (-29.9%)	NO
GF - Unit 10 - Kitchenette	N/A	N/A
GF - Unit 9 - WH	NO (-51.5%)	NO
GF - Unit 8 - WH	NO (-51.1%)	NO
GF - Unit 8 - Kitchenette	N/A	N/A
GF - Unit 6 - Kitchenette	N/A	N/A
GF - Unit 5 - Kitchenette	N/A	N/A
GF - Unit 1 - Kitchenette	N/A	N/A
GF - Unit 9 - Kitchenette	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]	1148	1148
External area [m ²]	3010	3010
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	842.59	933.31
Average U-value [W/m ² K]	0.28	0.31
Alpha value* [%]	16.42	61.82

* 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

100 Storage or Distribution

Hotels
 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/m²]

	Actual	Notional
Heating	68.03	59.92
Cooling	0	0
Auxiliary	3.29	0.94
Lighting	16.61	14.95
Hot water	11.6	11.38
Equipment*	40.68	40.68
TOTAL**	99.54	87.19

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	69.52	50.19
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>69.52</i>	<i>50.19</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	275.06	357.43
Primary energy [kWh _{PE} /m ²]	53.13	57.85
Total emissions [kg/m ²]	6.17	6.17

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	130.4	101	45.3	0	1	0.8	0	1	0
Notional	273.7	58.1	56.7	0	1.4	1.34	0	----	----
[ST] Other local room heater - fanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Natural Gas									
Actual	211.1	74.1	73.3	0	3.8	0.8	0	1	0
Notional	292.6	70.7	60.7	0	0.8	1.34	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