

Energy Strategy Report

Site: Land North of Lavant Drive

Client: Perseus Land & Developments





Harniss Consulting Ltd.

1 Weekley Wood Avenue
Kettering
Northants
NN14 1UQ

Tel: 01933 656850

Email: info@harniss.co.uk

Revision	Date Issued	Description/Summary of Changes	Prepared	Approved
P01	19.06.2026	Issued For Planning	NM	TS
P02	16.07.2026	Updated to incorporate comments	NM	TS



Energy Strategy Report

CONTENTS

Executive Summary	1
1 Introduction	2
1.1 Background	2
1.2 Description of the Development	2
2 Planning Policies	4
2.1 Summary of Policy Requirements	4
3 Energy Strategy Approach	5
3.1 Energy Hierarchy	5
3.2 Energy and Carbon Assessment Methodology	5
4 Baseline CO ₂ Emissions	6
5 Energy Efficiency (Be Lean)	6
5.1 Passive Design	6
5.2 Building Fabric	7
5.3 Energy Efficient Systems	7
5.4 Proposed Energy Efficiency Data	9
6 Efficient Energy Supply (Be Clean)	10
6.1 Energy Supply Options Assessment	10
6.2 Connection to Existing District Heating Networks	10
7 Renewable Energy Technology (Be Green)	11
7.1 Summary	11
7.2 Air Source Heat Pumps (ASHP's)	14
7.3 Photovoltaic Array	15
8 Available Grants	16
9 Payback	17
10 Summary and Conclusion	19
10.1 Emissions & Primary Energy	19
10.2 Final Strategy	19
Appendix A – BRUKL Document	21
Figure 1 – Site Plan	3
Figure 2 – Ground Floor Plan	3
Figure 3 – Energy Hierarchy	5
Figure 4 – EDSL TAS Model Screenshot	5
Figure 5 – Local Heat Network Search	10
Figure 6 – Air Source Heat Pump	14
Graph 1 – Photovoltaic Lifecycle Cost	17
Graph 2 – ASHP Lifecycle Cost	18
Graph 3 – LZC Technologies life cycle cost	18



Executive Summary

This document details the intended energy strategy for the proposed care home located at the Land at Lavant Drive, Havant, P09 2AW. The development briefly comprises of the construction of a new 86 Bed Care Home (Use Class C2) on the site and the associated works including car parking, access, landscaping and associated engineering. This report has been prepared by Harniss Consulting on behalf of Perseus Land & Developments.

Prior to the application of LZC technologies the development will reduce regulated CO₂ emissions by incorporating a range of passive design and energy efficiency measures for the development, including improved building fabric standards beyond the requirements of Approved Document L:2021 of the Building Regulations and energy efficient mechanical and electrical systems. These measures will enable the proposed development to exceed Target Emission Rates (TER) and Target Primary Energy Rating (TPER) through energy efficiency measures alone.

To demonstrate compliance with the Part L of the building regulations, and the requirements of Havant Borough Council, an all-electric, space heating and hot water generation system has been used, in addition to a 72m² Photovoltaic array. As well as these low carbon and renewable energy technology systems, highly efficient LED lighting and efficient ventilation systems are included with the passive design measures.



1 Introduction

1.1 Background

Harniss Consulting has been appointed by Perseus Land & Developments to produce an Energy Strategy Report to support a planning application to build a new 86 Bed Care Home located at the Land North of Lavant Drive, Havant, P09 2AW.

This report outlines the energy strategy of the development to comply with local planning policies and conditions applicable to the carbon dioxide emissions, energy consumption and the on-site generation of the development. This document identifies and describes the energy efficiency design and low carbon/renewable technology options that have been explored and the preferred options for achieving the required reduction in carbon emissions.

1.2 Description of the Development

The proposed development consists of a new 86 Bed Care Home (Use Class C2) with a GIA of 4,385m² located at the Land at Lavant Drive, Havant, P09 2AW briefly comprising of:

- 86 Bedrooms with dedicated en-suites
- Community spaces including:
 - Lounge/Dining Rooms
 - Designated Lounges
 - Designated Dining rooms
 - Garden rooms
 - Hair & Beauty
 - Cinema
 - Activity areas
- Designated internal and external Plant Areas.

Our Assessment has been based on the following architectural AutoCAD drawings, produced by Architects at Vestar architecture + design.

- 26.112-VST-XX-00-DR-A-0200-Proposed GA Plan-Ground Floor-P02
- 26.112-VST-XX-01-DR-A-0201-Proposed GA Plan-First Floor-P02
- 26.112-VST-XX-02-DR-A-0202-Proposed GA Plan-Second Floor-P02
- 26.112-VST-XX-03-DR-A-0203-Proposed GA Plan-Roof Plan-P01
- 26.112-VST-XX-ZZ-DR-A-0300-Proposed GA Elevations-Sheet 1 of 2-P01
- 26.112-VST-XX-ZZ-DR-A-0301-Proposed GA Elevations-Sheet 2 of 2-P01
- 26.112-VST-XX-ZZ-DR-A-0500-Proposed Site Plan-P02



Energy Strategy Report



Figure 1 – Site Plan



Figure 2 – Ground Floor Plan



2 Planning Policies

2.1 Summary of Policy Requirements

Havant Borough Core Strategy (2011) and Site Allocations Plan (2014)

The proposed development has been designed in accordance with the adopted Havant Borough Core Strategy (2011) and Site Allocations Plan (2014). The scheme adopts a fabric-first approach to minimise energy demand and incorporates energy-efficient building services and low-carbon technologies where feasible. The development will comply with the energy performance requirements of Building Regulations Part L and support Havant Borough Council's wider climate change objectives.

Havant Borough Council's current adopted planning policies do not specify a mandatory carbon emissions reduction target beyond Part L of the Building Regulations, nor do they require a prescribed proportion of energy demand to be met through on-site renewable energy generation. Nevertheless, the proposed development incorporates a 72m² photovoltaic (PV) installation, together with additional low-carbon design measures, to improve energy performance, reduce operational carbon emissions, and contribute towards wider sustainability objectives.



3 Energy Strategy Approach

3.1 Energy Hierarchy

The proposed energy strategy for the development will follow the Energy Hierarchy approach of Be Lean, Be Clean and Be Green to enable the maximum viable reductions in regulated and total CO₂ emissions over the baseline.

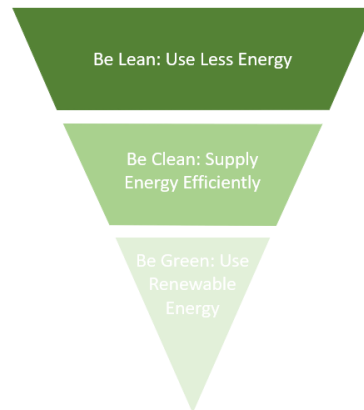


Figure 3 – Energy Hierarchy

3.2 Energy and Carbon Assessment Methodology

Analysis for the building has been undertaken utilising EDSL Tas software version 9.5.7. EDSL Tas is industry leading NCM accredited thermal modelling software which carries out dynamic hourly simulations of the anticipated energy usage and compares it against the notional benchmarks set under Approved Document Part L2 of the Building Regulations.

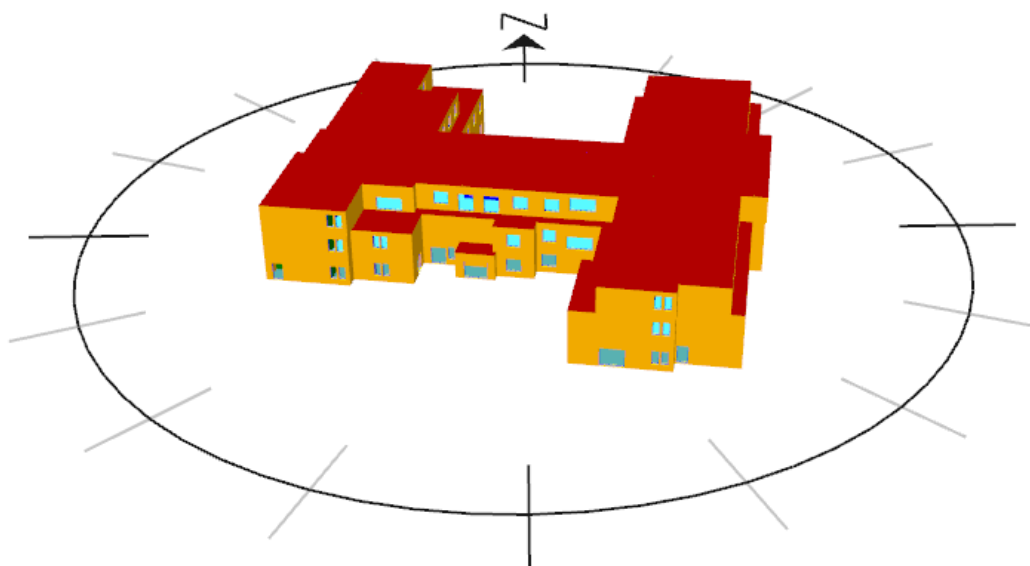


Figure 4 – EDSL TAS Model Screenshot



Energy Strategy Report

An assessment of the energy performance of the development considers regulated energy usage for different building services such as cooling, heating, lighting and ventilation.

Although the produced data by the EDSL Tas software provides estimations of possible energy and carbon performance of the non-residential development for assessment purposes, again it is not intended to be used as a detailed design tool.

Further work will be required at later stages in the detailed design process to ensure that the requirement to comply with the above targets and that all statutory guidelines or local planning enforcement requirements are met.

4 Baseline CO₂ Emissions

In order to assess CO₂ performance of the proposed energy strategy, a CO₂ emissions baseline needs to be established. This section sets out the approach taken to calculating the baseline CO₂ emissions.

The total baseline CO₂ emissions for the proposed development is defined as regulated CO₂ emissions covered by Building Regulations Part L.

For the development, the CO₂ emissions baseline is determined based on the TER for building services calculated using EDSL Tas software.

5 Energy Efficiency (Be Lean)

5.1 Passive Design

The proposed design incorporates optimal thermal characteristics of buildings to achieve and maintain good environmental conditions with minimum resources of material and fuel. The passive design aims to maximise use of natural heating, cooling, and ventilation to create comfortable considering inside the buildings.

An optimal site layout and building with efficient room layouts are proposed.

It is proposed to incorporate passive solar design measures across the development. The building incorporates balconies which help to provide shading. The proposed glazed areas have been designed to maximise daylight and optimise solar gains. The glazing specification will be selected to provide a balance of solar control and access to passive solar gain.

Natural ventilation has been incorporated across most areas; however, some zones have required an element of mechanical ventilation. These areas have been determined to be require the implementation of a mechanical ventilation strategy with heat recovery to supply fresh air and expel unwanted pollutants using a controlled and balanced ventilation strategy.

Openable windows are available to provide fresh air.

The ventilation strategy will be reviewed and developed as the design progresses to ensure compliance with all the relevant regulations and standards.



5.2 Building Fabric

Part L2:2021 Building Regulations highlights the need for an energy efficient design. The minimum building fabric requirements for Part L2:2021 and the proposed specification for individual building elements for the non-residential floor space are presented below.

Building Fabric Parameter	Value
Air permeability ($\text{m}^3/(\text{m}^2.\text{h})$ @ 50Pa)	5.0
External Wall U-Value ($\text{W}/\text{m}^2.\text{K}$)	0.19
Roof U-value ($\text{W}/\text{m}^2.\text{K}$)	0.13
Ground Floor U-Value ($\text{W}/\text{m}^2.\text{K}$)	0.15
Glazing U-Value ($\text{W}/\text{m}^2.\text{K}$)	1.4
Glazing G-Value	0.4

Table 1 - Proposed Building Fabric standards

Implementing these (or similar) building fabric standards will help to deliver substantial reductions in CO₂ emissions compared with the current building performance and regulations. The proposed specification should be viewed as guidance.

A significant improvement over limiting U-Values within Building Regulations. The thermal performance of the building envelope has been maximised to its fullest within the constraints of a traditional build with 100mm cavity.

Air permeability improved over the limiting value. The target will be to improve yet further on the air permeability during the construction phase but given the relatively small percentage of total energy that the heating system contributes to, any further gain will result in minimal actual reduction against the Target Emission Rate calculated under Approved Document Part L.

5.3 Energy Efficient Systems

Energy demand can be significantly reduced by using energy efficient M&E systems. The below energy efficiency measures for the proposed development have been used to conduct the energy and carbon modelling for this report. The overarching principle for final selection of the building fabric standards and energy efficient systems is to achieve compliance with Part L 2021 requirements.

Lighting

A major energy demand within modern non-residential developments is typically the lighting loads. Specified lighting in these areas should be low wattage and designed to CIBSE Illuminance levels.

Display lighting may be required which generate a significant energy demand. Therefore, if applicable, it is proposed that all display lighting should use energy efficient luminaires.



Energy Strategy Report

This development has improved efficacy lighting specified which reduces primary energy usage.

Appropriate automatic lighting controls used throughout, where appropriate for care i.e. proximity infrared used throughout in ensuites, bathrooms, stores, etc. Absence detection controls have also been included in the energy strategy and have been provided to all day spaces and offices.

Ventilation

Air tightness standards will exceed Approved Document Part L2 requirements. Mechanical ventilation with heat recovery has been modelled for the purposes of this report.

Improved SFP's for ventilation systems including high efficiency heat recovery.

Domestic Hot Water

The estimated hot water demand will be significant due the nature of the development use. However, it is expected to present a consistent load throughout the year, although there will be peaks and troughs in daily use. This hot water demand will be efficiently supplied by All Electric Air Source Heat Pumps .

Heating and Cooling

The space heating load does not present a consistent demand and is seasonal in nature. It will also be minimised through the application of the proposed energy efficiency measures modelled for this report. During the summer months, space heating may not be needed, or its requirement will be relatively low.

At this stage, it is assumed that space heating can effectively be provided by a standalone energy efficient heating system such as Air Source Heat Pump (ASHP). It is recommended to select a ASHP system with a high Seasonal Coefficient of Performance (SCOP).

At this stage, it is assumed that cooling is to be provided to the development in specific spaces. The cooling requirement has been minimised by the proposed solar gain control measures. Cooling can be effectively provided by a Variable Refrigerant Flow (VRF) system.



Energy Strategy Report

Energy Metering and Monitoring

It is assumed that metering and submetering within the development of major energy consuming systems together with an accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol will be provided.

5.4 Proposed Energy Efficiency Data

Weather File	Southampton TRY
LTHW Heating System	
Heat Source	Heat Pump (electric): air source
Fuel Type	Grid Supplied Electricity
Seasonal Efficiency	320%
Circulation Pump	Variable speed, pressure control across pump
System Controls	Central time control, Weather Compensation control
VRF Heat Pump System	
Heat Source	Heat Pump (electric): air source
Fuel Type	Grid Supplied Electricity
SEER	5.0
SCOP	6.0
DHWS System	
Heat Source	Heat Pump (Electric) : air Source
Fuel Type	Grid Supplied Electricity
Seasonal Efficiency	320%
Ventilation Systems	
Overall supply and extract SFP	1.1W/l/s
Min. heat recovery efficiency	80%
Overall extract SFP	0.2W/l/s
Kitchen extract SFP	1.0W/l/s
Lighting	
Lumens / circuit Watt	110

Table 2 – System Input Information



Energy Strategy Report

6 Efficient Energy Supply (Be Clean)

6.1 Energy Supply Options Assessment

The feasibility of a building wide heating network as a Be Clean measure has been evaluated. Following reduction of the energy demand, this strategy must demonstrate how systems will supply energy efficiently and reduce CO₂ emissions by following the hierarchy detailed below.

- Connection to existing area wide heat networks.
- Use of site-wide heat network or building level heating system.
- Low Carbon Individual heating system.

The inclusion of a decentralised heating network has been investigated in terms of appropriateness to the proposed development as it can help to provide the greatest reductions in CO₂ emissions.

6.2 Connection to Existing District Heating Networks

The site falls outside of the London Heat Map, however an investigation using the Heat Networks Planning Database has been carried out to identify existing and planned district heating networks in the vicinity of the site. The search provided below indicates that there are no existing or proposed heat networks within proximity of the site. The site is also found within an area of low heat demand.

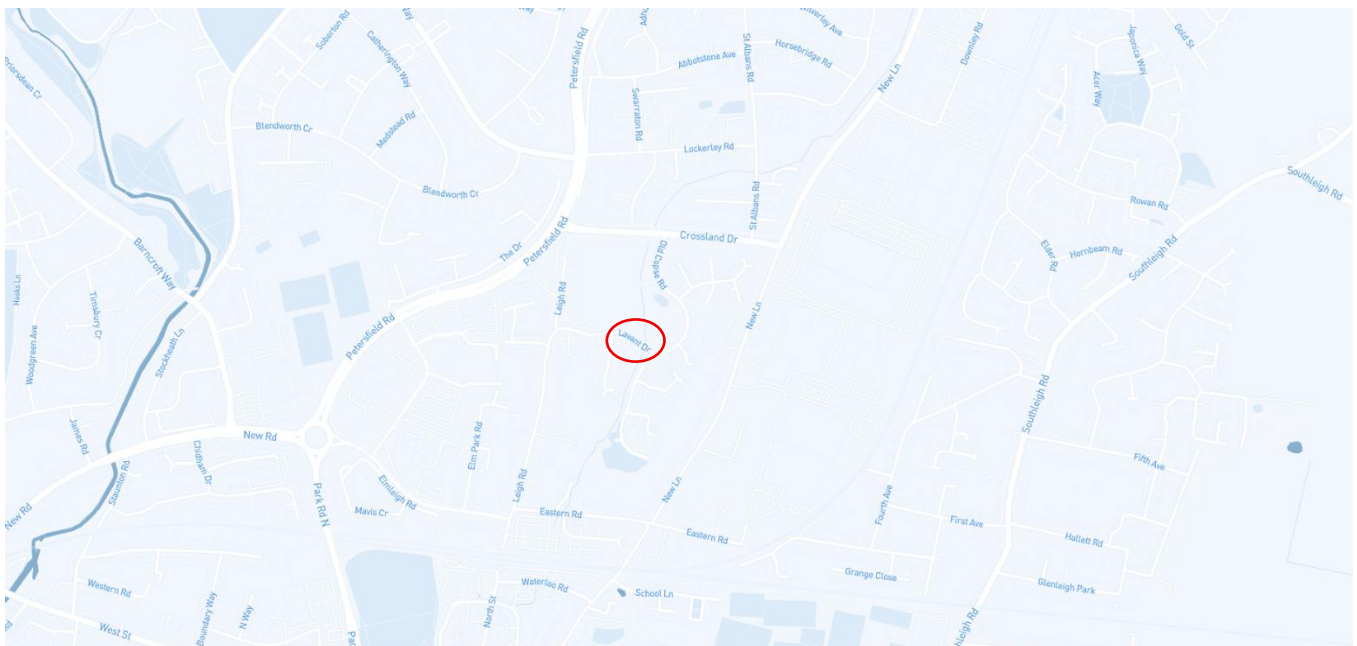


Figure 5 – Local Heat Network Search

Unfortunately, there is no recent or local heat network. Which means there is no feasible site to connect to. This does not preclude the development to connect to a heat network should one become available.



Energy Strategy Report

7 Renewable Energy Technology (Be Green)

7.1 Summary

The 'Be Green' element of the energy hierarchy uses renewable energy technologies to provide a further reduction in anticipated carbon dioxide emissions, through on-site generation where feasible.

The below table provides a brief overview of available renewable and low/zero carbon technologies (LZC). The technical feasibility of installing each LZC technology at the proposed care home has been assessed to discount any unsuitable options at an early stage. A summary of the feasibility process presented in the following table discusses the advantages and disadvantages that are specific to the proposed development.

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Solar Photovoltaic	Photovoltaic panels convert solar radiation into electrical energy	Low maintenance. No moving parts. Easily integrated into building design.	Any overshadowing affects panel performance. Large area required for installation. Panels ideally inclined and facing southerly direction.	Yes
Solar Thermal	Solar thermal energy can contribute towards space heating and hot water requirements.	Low maintenance.	Must be sized for the building base load hot water requirements. Panels ideally inclined at around 30 degrees and facing southerly direction	No
Wind Turbine	Wind generation equipment operates on the basis of wind turning a propeller, which is used to drive an alternator to generate electricity. Small scale (1kW – 15kW) wind turbines can be pole or roof mounted.	Low maintenance/ On-going cost. Excess electricity can be exported to the grid.	Planning issues. Aesthetic impact. Background noise Space limitations on site. Minimum wind speed requirements. Wind survey to be undertaken to verify 'local' viability.	No
Biomass	Modern wood-fuel boilers are highly efficient, clean and almost carbon	Stable long-term running costs. Potential good CO ₂ saving.	Large area needed for fuel delivery and storage. Reliable fuel supply chain required.	No



Energy Strategy Report

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
			Regular maintenance required Significant plant space required. Air pollution / Clean Air Act limits use.	
Ground Source Heat Pump (GSHP)	GSHP systems tap into the earth's considerable energy store to provide both heating and cooling to buildings.	Minimal maintenance. Unobtrusive technology. Flexible installation options to meet available site footprint.	Large area required for horizontal pipes Full ground survey required to determine geology. More beneficial to the development if cooling is required. Integration with piled foundations must be done at an early stage. The lack of space to locate the underground pipework loops and the associated plant around the site.	No
Air Source Heat Pump (ASHP)	Electric air source heat pumps extract thermal energy from the surrounding air and transfer it to the working fluid (air or water).	Efficient use of fuel. Relatively low capital costs.	Specialist maintenance. Some additional plant space required. External proximity to boundary and noise generation with units cycling. Impact of the required external plant and associated noise within the domestic setting can be a nuisance to residents.	Yes



Energy Strategy Report

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Combined Heat and Power	A Combined Heat and Power (CHP) installation is effectively a mini on-site power plant providing both electrical power and thermal heat. CHP is strictly an energy efficiency measure rather than a renewable energy technology.	Excess electricity can be exported to the grid	Maintenance intensive. Sufficient base thermal and electrical demand required. Additional plant space required. Noise and air quality constraints. Limited CO ₂ savings available due to the carbon factors.	No
Earth Ducts	Passive pre-treatment of fresh air	Low cost Free energy	Requires significant air loads and riser space	No
Onsite Battery Storage	PV Battery Storage able to charge the battery during periods of low electrical load & discharging battery power at times of low/no solar radiation	Battery discharges power during periods of low solar radiation. Reduce electrical energy supply costs.	Specialist Maintenance Additional Plant space required Low Electrical baseload, battery storage not economically viable	No

Table 3 – LZC Technology Feasibility



Energy Strategy Report

7.2 Air Source Heat Pumps (ASHP's)

Although Heat Pumps aren't like other renewable energy sources as they still utilise an energy source to power them, they are considered industry wide as a 'pure form' renewable technology they still are under the category of renewable technology in the correct application.

Heat pumps take a low-grade source of heat e.g. a lake or external air, and through a process similar to that of a domestic refrigerator, "upgrade" the heat for use in a heating system, or for domestic hot water generation.

Reverse-cycle heat pumps can also use the same process in reverse to provide cooling if required. For the purposes of this report, given the nature of the development and typical service strategy is assumed that any heat pumps installed will only operate in heating mode. Although there are several day spaces that require cooling, the typical servicing arrangement would suggest these are best fed from local plant rather than the introduction of multiple heat pump units, chilled pipework and equipment etc.

Air source heat pumps operate on the same principle as ground source heat pumps, but instead of using the Earth as a heat source, they extract heat from external air. Heat pumps that generate significant amounts of heat will require external plant areas.

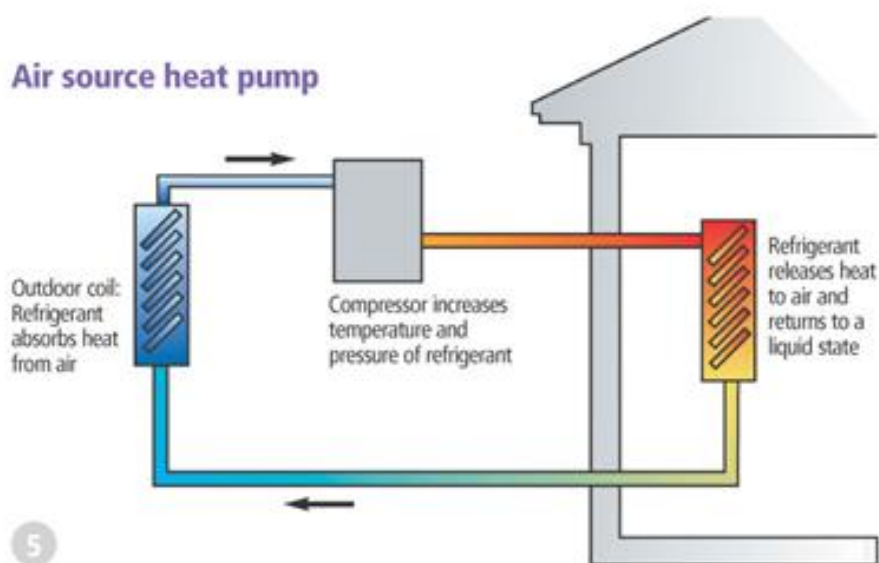


Figure 6 – Air Source Heat Pump



Energy Strategy Report

7.3 Photovoltaic Array

A PV system uses layers of semi-conductor material to produce electricity generated directly from sunlight. Several types of PV are available with varying costs and performance.

The efficiency ranges around 20% for high performance panels, based on peak output under ideal conditions. For panels to function effectively, they must be installed in an unshaded location, and correctly orientated based on the site latitude.

The PV panel system proposed of 72m² PV panels are mounted on a metal racking system which are typically angled at between 5 and 30 degrees to improve the energy capture, for maintenance the system requires access paths, provided with man safe system where required. Visual impact has to be taken into consideration. PV solar system installation will be prevented on sloping roof and therefore will be visible. The intermittency and unpredictability of solar energy due to weather is an element which can dictate that the system is not used at full potential. A further consideration is the additional structural provisions support the photovoltaic panels and metal racking system which for a system of this size is considerable.



Figure 7 – Frame mounted panels on flat roof



Figure 8 - Roof mounted panels



8 Available Grants

This section of the report lists the grants available for the LZC technology proposed on this scheme, in this case ASHP and PV.

RHI – *‘The Renewable Heat Incentive (RHI), launched in November 2011, is a DECC initiative designed to provide support to renewable heat technologies in order to increase deployment and aid market development with the ultimate aim of reducing cost of installation. The RHI supports heat where that heat is used in a building for ‘eligible purposes’: heating a space, heating water, or for carrying out a process where the heat is used. Heat utilised to produce or process the renewable fuel, or used for electricity generation, does not qualify for RHI.’*

Applications for the Renewable Heat Incentive (RHI) are now closed so this grant is no longer available.

GHNF – *‘The Green Heat Network Fund (GHNF) is a capital grant fund that will support:*

- *The commercialisation and construction of new low and zero carbon (LZC) heat networks (including the supply of cooling)*
- *The retrofitting and expansion of existing heat networks*

It aims to develop and grow the heat network market and to address some of the challenges of decarbonising the UK’s heat sector.’

The heating system used within the care home is a private standalone system and therefore the Green Heat Network Fund (GHNF) is not an applicable grant.

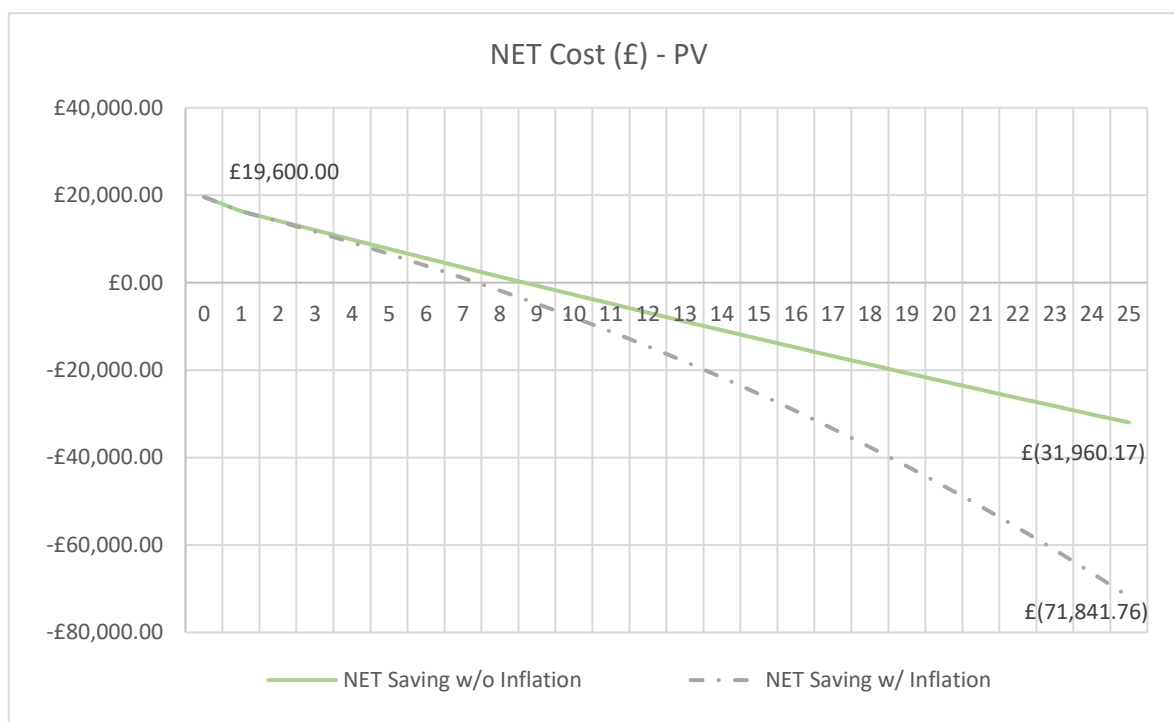


Energy Strategy Report

9 Payback

In order to establish the life cycle cost for the renewable systems the report will need to establish costing for Energy Consumption, Energy Generation, Maintenance and Estimated Fuel Tariffs. Based on the current Tariffs known of the operator of 5p/kWh and 22p/kWh for gas and electricity, respectively, the following can be calculated.

To achieve compliance with Approved Document L2: 2021 72m² photovoltaic panel array is required to be placed on the building. This is estimated at an installation cost of £19,600 Following the estimated electrical generation of the array based on the building location a payback period of 9.6 years has been calculated with a saving of £31,960 as over the 25-year life span of the installation. This can be seen as a reasonable worst case for the array with the above calculation accounting for a reduction in output of 0.5% per year and assuming no inflation in energy prices. Should the average inflation in energy prices of energy prices over the last 20-years (4%) be included in the calculation the saving over the installation lifespan increases to £71,841.76.

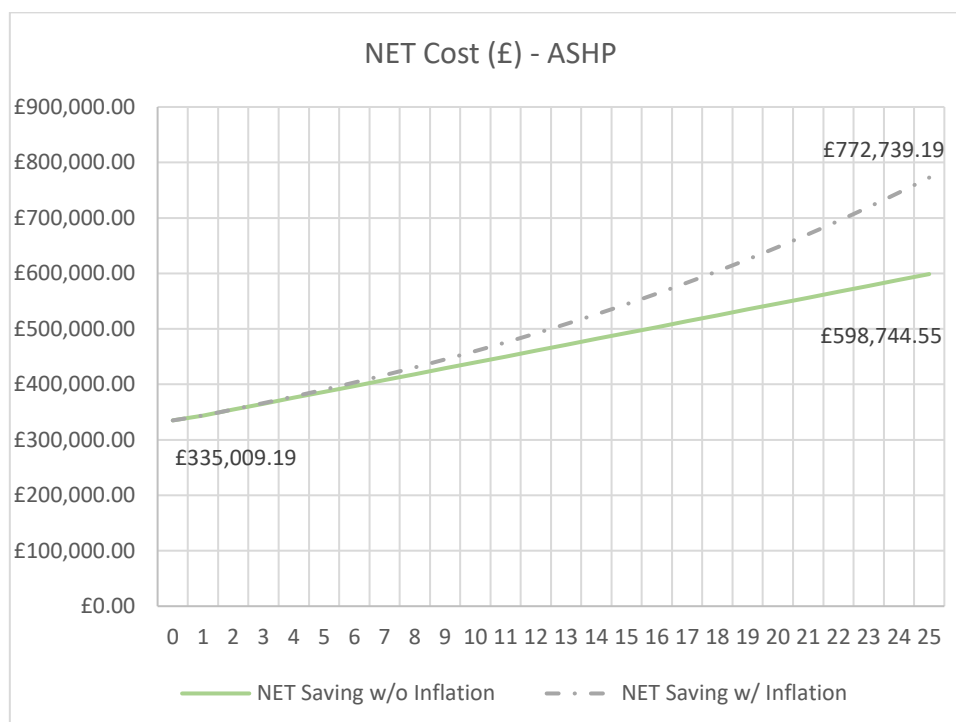


Graph 1 – Photovoltaic Lifecycle Cost

However, it should be noted that whilst the installation of a photovoltaic array will have a reduction in the operational running costs of the development the installation of an ASHP will be negative with an additional running cost compared to gas boilers of an estimated £598,744.55 (rising to an estimated £772,739.19 accounting for inflation).

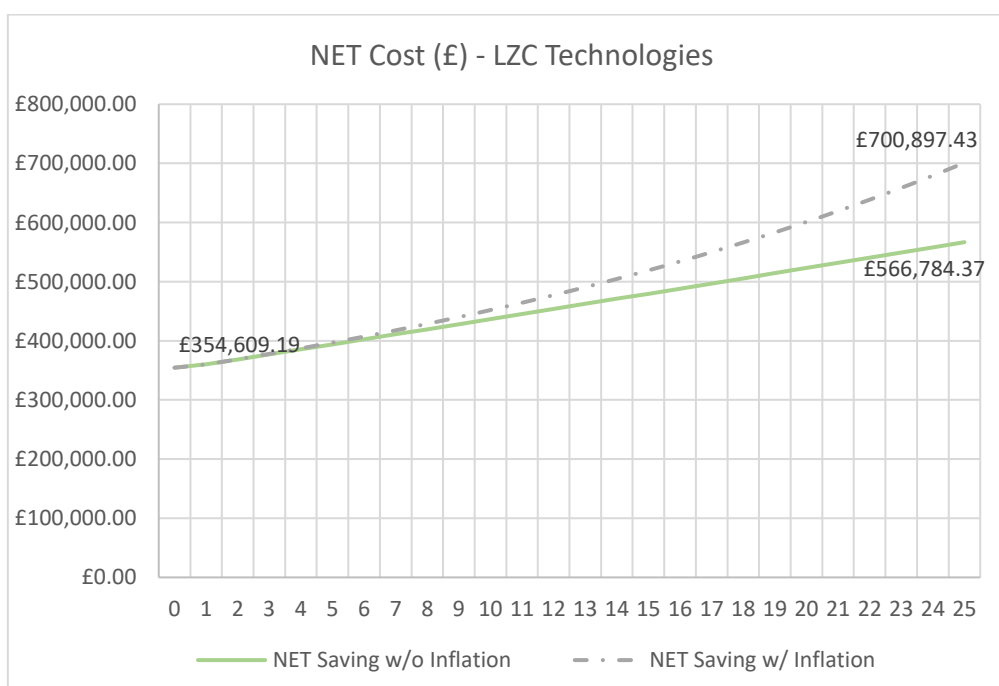


Energy Strategy Report



Graph 2 – ASHP Lifecycle Cost

Whilst the ASHP provides a negative running cost compared to a traditional gas boiler system once the low carbon and renewable systems are paired together, they provide an overall increased lifecycle cost of £566,784.37. However, once this figure is adjusted for inflation the systems lifecycle cost increases to £700,897.43 over a 25-year period.



Graph 3 – LZC Technologies life cycle cost



Energy Strategy Report

10 Summary and Conclusion

10.1 Emissions & Primary Energy

Through the above services strategy and the application of all-electric air source heat pump systems serving the space heating and hot water generation, 72m² PV array, BMS controls, highly efficient HVAC, and highly efficient lighting, the below emissions and primary energy ratings were achieved.

Target Emissions Rating (TER)	-	8.2	kgCO ₂ /m ² .annum
Building Emissions Rating (BER)	-	8.19	kgCO ₂ /m ² .annum
Target Primary Energy Rating (TPER)	-	88.92	kWh/m ² .annum
Building Primary Energy Rating (BPER)	-	88.65	kWh/m ² .annum

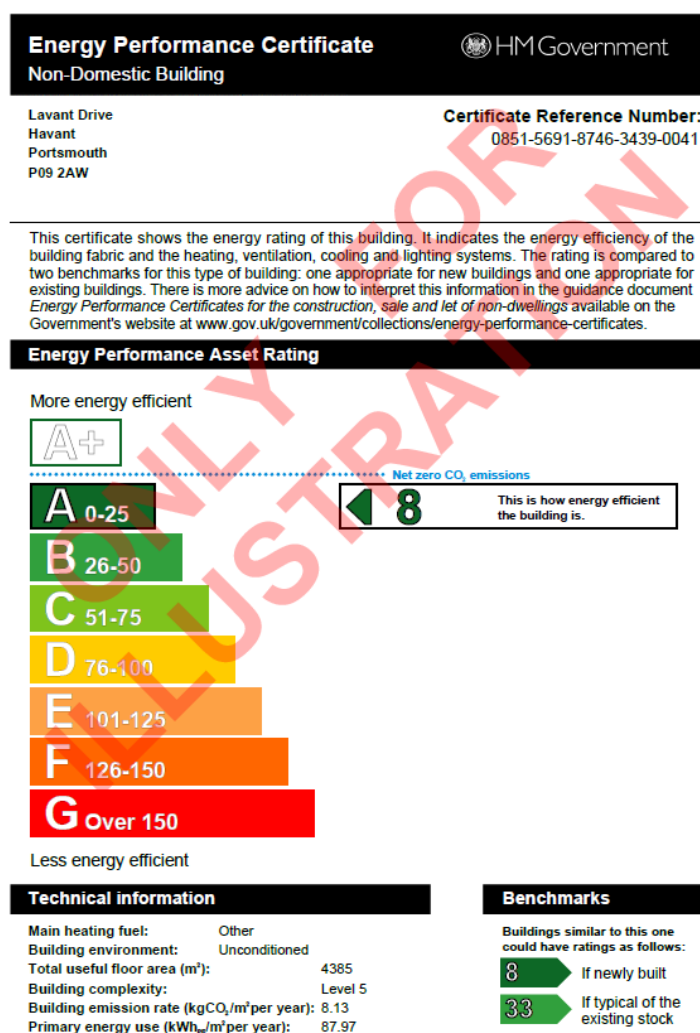


Figure 9 – EPC

10.2 Final Strategy

The Energy Strategy for the development has been formulated following the Energy Hierarchy: Be Lean, Be Clean and Be Green. The overarching objective of the strategy is to maximise the reductions



Energy Strategy Report

in total CO₂ emissions through the application of this hierarchy with a cost-effective and technically appropriate approach and to minimise the carbon emissions. The energy strategy measures are summarised and presented below.

Energy Hierarchy	Energy Strategy Measures
Be Lean	<p><u>Passive design</u> Compact building form, efficient layout Optimised design to enable controlled solar gain and improved direct and indirect natural lighting. Incorporation of balconies into the design to provide shading.</p> <p><u>Building Fabric</u> Use of high efficiency building fabric standards. Designed with low air permeability rates</p> <p><u>Energy Efficiency</u> Energy efficient lighting and appropriate controls Variable speed heating system with high delta T and low return temperatures High efficiency motors and variable speed pumps for heating and ventilation systems High efficiency heating plant and auxiliary equipment Appropriate controls for heating system Appropriate temperature and time zoning Appropriate insulation of heating distribution system ASHP systems to supply heating and hot water.</p>
Be Green	<p><u>Renewable energy</u> PV array.</p>

Table 6 – Energy hierarchy summary



Appendix A – BRUKL Document

Project name

Havant**As designed**

Date: Wed Jun 17 11:23:16 2026

Administrative information

Building Details

Address: Lavant Drive, Havant, Portsmouth, PO9 2AW

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.7"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.7

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

Foundation area [m²]: 1440.69The 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	8.2
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	8.19
Target primary energy rate (TPER), kWh _{PE} /m ² annum	88.92
Building primary energy rate (BPER), kWh _{PE} /m ² annum	88.65
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	0.19	0.19	External Wall
Floors	0.18	0.15	0.15	Ground Floor
Pitched roofs	0.16	0.13	0.13	Roof
Flat roofs	0.18	-	-	No flat roofs in project
Windows** and roof windows	1.6	1.43	1.44	ew.1
Rooflights***	2.2	-	-	No rooflights in project
Personnel doors^	1.6	-	-	No personnel doors in project
Vehicle access & similar large doors	1.3	-	-	No vehicle access or similar large doors in project
High usage entrance doors	3	-	-	No high usage entrance doors in project

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

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.2	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- extract (118 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.2	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

3- vrf/mech vent (17 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	5	6	-	-	0.8
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

4- mech vent (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.2	-	-	1.1	0.8
Standard value	2.5*	N/A	N/A	1.5^	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.					

5- kitchen (2 - kitchen)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.2	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

6- drugs/comms (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	5	6	-	-	-
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- ashp

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.2	0
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	
0 - ensuite 1	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 2	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 3	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 4	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 5	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 6	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 7	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 8	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 9	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 10	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 11	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 12	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 13	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 14	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 15	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 16	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 17	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 18	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 19	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 20	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 21	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 22	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 23	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 24	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 25	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 26	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	
0 - ensuite 27	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 28	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 29	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 30	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 31	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 32	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - ensuite 33	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 34	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 35	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 36	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 37	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 38	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 39	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 40	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 41	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 42	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 43	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 44	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 45	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 46	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 47	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 48	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 49	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 50	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 51	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 52	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 53	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 54	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 55	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 56	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 57	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 58	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 59	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 60	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 61	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 62	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 63	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 64	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 65	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 66	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 67	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - ensuite 68	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 69	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	
2 - ensuite 70	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 71	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 72	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 73	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 74	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 75	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 76	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 77	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 78	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 79	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 80	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 81	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 82	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 83	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 84	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - lounge	-	-	-	1.1	-	-	-	-	-	-	N/A	
0 - garden room	-	-	-	1.1	-	-	-	-	-	-	N/A	
0 - cafe	-	-	-	1.1	-	-	-	-	-	-	N/A	
0 - lounge/dining room	-	-	-	1.1	-	-	-	-	-	-	N/A	
0 - dining room	-	-	-	1.1	-	-	-	-	-	-	N/A	
0 - cleaners store 1	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - hoist store 1	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - hoist store 2	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - hair & beauty	-	-	-	1.1	-	-	-	-	-	-	N/A	
0 - cleaners store 2	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - assisted bath 1	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - assisted bath 2	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - care station 1	-	-	-	1.1	-	-	-	-	-	-	N/A	
0 - care station 2	-	-	-	1.1	-	-	-	-	-	-	N/A	
0 - assisted wc 1	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - assisted wc 2	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - visitor wc	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - assisted wc 3	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - sluice 1	0.2	-	-	-	-	-	-	-	-	-	N/A	
0 - sluice 2	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 85	0.2	-	-	-	-	-	-	-	-	-	N/A	
2 - ensuite 86	0.2	-	-	-	-	-	-	-	-	-	N/A	
1 - lounge/dining room	-	-	-	1.1	-	-	-	-	-	-	N/A	
1 - private dine/activity	-	-	-	1.1	-	-	-	-	-	-	N/A	
1 - dining room	-	-	-	1.1	-	-	-	-	-	-	N/A	
1 - lounge	-	-	-	1.1	-	-	-	-	-	-	N/A	
1 - care station 1	-	-	-	1.1	-	-	-	-	-	-	N/A	
1 - care station 2	-	-	-	1.1	-	-	-	-	-	-	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
1 - sluice 1		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - sluice 2		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - hoist store		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - cleaners store		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - garden room		-	-	-	1.1	-	-	-	-	-	-	N/A
1 - assisted wc 1		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - visitor wc		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - assisted wc 2		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - assisted wc 3		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - assisted bath 1		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - assisted bath 2		0.2	-	-	-	-	-	-	-	-	-	N/A
1 - assisted wc 4		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - female change		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - male change		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - laundry		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - lounge/activity		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - lounge		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - garden room		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - dining room		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - care station		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - cinema		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - staff shower 1		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - staff shower 2		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - assisted wc 1		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - assisted wc 2		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - assisted wc 3		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - sluice 1		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - assisted bath		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - chefs office		-	-	-	1.1	-	-	-	-	-	-	N/A
2 - cleaners store		0.2	-	-	-	-	-	-	-	-	-	N/A
2 - kitchen		-	-	-	-	-	-	-	-	1	-	N/A
0 - assisted wc 4		0.2	-	-	-	-	-	-	-	-	-	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
0 - bedroom 1		110	-	-
0 - bedroom 2		110	-	-
0 - bedroom 3		110	-	-
0 - bedroom 4		110	-	-
0 - bedroom 5		110	-	-
0 - bedroom 6		110	-	-
0 - bedroom 7		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
0 - bedroom 8		110	-	-
0 - bedroom 9		110	-	-
0 - bedroom 10		110	-	-
0 - bedroom 11		110	-	-
0 - bedroom 12		110	-	-
0 - bedroom 13		110	-	-
0 - bedroom 14		110	-	-
0 - bedroom 15		110	-	-
0 - bedroom 16		110	-	-
0 - bedroom 17		110	-	-
0 - bedroom 18		110	-	-
0 - bedroom 19		110	-	-
0 - bedroom 20		110	-	-
0 - bedroom 21		110	-	-
0 - bedroom 22		110	-	-
0 - bedroom 23		110	-	-
0 - bedroom 24		110	-	-
0 - bedroom 25		110	-	-
0 - bedroom 26		110	-	-
0 - bedroom 27		110	-	-
0 - bedroom 29		110	-	-
0 - bedroom 30		110	-	-
0 - bedroom 31		110	-	-
0 - bedroom 32		110	-	-
0 - bedroom 33		110	-	-
1 - bedroom 35		110	-	-
1 - bedroom 36		110	-	-
1 - bedroom 37		110	-	-
1 - bedroom 38		110	-	-
1 - bedroom 39		110	-	-
1 - bedroom 40		110	-	-
1 - bedroom 41		110	-	-
1 - bedroom 42		110	-	-
1 - bedroom 43		110	-	-
1 - bedroom 44		110	-	-
1 - bedroom 45		110	-	-
1 - bedroom 46		110	-	-
1 - bedroom 47		110	-	-
1 - bedroom 48		110	-	-
1 - bedroom 49		110	-	-
1 - bedroom 50		110	-	-
1 - bedroom 51		110	-	-
1 - bedroom 52		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
1 - bedroom 53		110	-	-
1 - bedroom 54		110	-	-
1 - bedroom 55		110	-	-
1 - bedroom 56		110	-	-
1 - bedroom 57		110	-	-
1 - bedroom 58		110	-	-
1 - bedroom 59		110	-	-
1 - bedroom 60		110	-	-
1 - bedroom 61		110	-	-
1 - bedroom 62		110	-	-
1 - bedroom 63		110	-	-
1 - bedroom 64		110	-	-
1 - bedroom 65		110	-	-
1 - bedroom 66		110	-	-
1 - bedroom 67		110	-	-
1 - bedroom 68		110	-	-
2 - bedroom 69		110	-	-
2 - bedroom 70		110	-	-
2 - bedroom 71		110	-	-
2 - bedroom 72		110	-	-
2 - bedroom 73		110	-	-
2 - bedroom 74		110	-	-
2 - bedroom 75		110	-	-
2 - bedroom 76		110	-	-
2 - bedroom 77		110	-	-
2 - bedroom 78		110	-	-
2 - bedroom 79		110	-	-
2 - bedroom 80		110	-	-
2 - bedroom 81		110	-	-
2 - bedroom 82		110	-	-
2 - bedroom 83		110	-	-
2 - bedroom 84		110	-	-
0 - ensuite 1		110	-	-
0 - ensuite 2		110	-	-
0 - ensuite 3		110	-	-
0 - ensuite 4		110	-	-
0 - ensuite 5		110	-	-
0 - ensuite 6		110	-	-
0 - ensuite 7		110	-	-
0 - ensuite 8		110	-	-
0 - ensuite 9		110	-	-
0 - ensuite 10		110	-	-
0 - ensuite 11		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
0 - ensuite 12		110	-	-
0 - ensuite 13		110	-	-
0 - ensuite 14		110	-	-
0 - ensuite 15		110	-	-
0 - ensuite 16		110	-	-
0 - ensuite 17		110	-	-
0 - ensuite 18		110	-	-
0 - ensuite 19		110	-	-
0 - ensuite 20		110	-	-
0 - ensuite 21		110	-	-
0 - ensuite 22		110	-	-
0 - ensuite 23		110	-	-
0 - ensuite 24		110	-	-
0 - ensuite 25		110	-	-
0 - ensuite 26		110	-	-
0 - ensuite 27		110	-	-
0 - ensuite 28		110	-	-
0 - ensuite 29		110	-	-
0 - ensuite 30		110	-	-
0 - ensuite 31		110	-	-
0 - ensuite 32		110	-	-
0 - ensuite 33		110	-	-
1 - ensuite 34		110	-	-
1 - ensuite 35		110	-	-
1 - ensuite 36		110	-	-
1 - ensuite 37		110	-	-
1 - ensuite 38		110	-	-
1 - ensuite 39		110	-	-
1 - ensuite 40		110	-	-
1 - ensuite 41		110	-	-
1 - ensuite 42		110	-	-
1 - ensuite 43		110	-	-
1 - ensuite 44		110	-	-
1 - ensuite 45		110	-	-
1 - ensuite 46		110	-	-
1 - ensuite 47		110	-	-
1 - ensuite 48		110	-	-
1 - ensuite 49		110	-	-
1 - ensuite 50		110	-	-
1 - ensuite 51		110	-	-
1 - ensuite 52		110	-	-
1 - ensuite 53		110	-	-
1 - ensuite 54		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
1 - ensuite 55		110	-	-
1 - ensuite 56		110	-	-
1 - ensuite 57		110	-	-
1 - ensuite 58		110	-	-
1 - ensuite 59		110	-	-
1 - ensuite 60		110	-	-
1 - ensuite 61		110	-	-
1 - ensuite 62		110	-	-
1 - ensuite 63		110	-	-
1 - ensuite 64		110	-	-
1 - ensuite 65		110	-	-
1 - ensuite 66		110	-	-
1 - ensuite 67		110	-	-
1 - ensuite 68		110	-	-
2 - ensuite 69		110	-	-
2 - ensuite 70		110	-	-
2 - ensuite 71		110	-	-
2 - ensuite 72		110	-	-
2 - ensuite 73		110	-	-
2 - ensuite 74		110	-	-
2 - ensuite 75		110	-	-
2 - ensuite 76		110	-	-
2 - ensuite 77		110	-	-
2 - ensuite 78		110	-	-
2 - ensuite 79		110	-	-
2 - ensuite 80		110	-	-
2 - ensuite 81		110	-	-
2 - ensuite 82		110	-	-
2 - ensuite 83		110	-	-
2 - ensuite 84		110	-	-
0 - lounge		110	-	-
0 - garden room		110	-	-
0 - cafe		110	-	-
0 - lounge/dining room		110	-	-
0 - dining room		110	-	-
0 - store 1		110	-	-
0 - store 2		110	-	-
0 - store 3		110	-	-
0 - store 4		110	-	-
0 - cleaners store 1		110	-	-
0 - med store 1		110	-	-
0 - hoist store 1		110	-	-
0 - hoist store 2		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
0 - med store 2		110	-	-
0 - store 10		110	-	-
0 - store 11		110	-	-
0 - stairs 1		110	-	-
0 - stairs 2		110	-	-
0 - stairs 3		110	-	-
0 - stairs 4		110	-	-
0 - stairs 5		110	-	-
0 - circulation 1		110	-	-
0 - circulation 2		110	-	-
0 - circulation 3		110	-	-
0 - circulation 4		110	-	-
0 - circulation 5		110	-	-
0 - circulation 6		110	-	-
0 - circulation 7		110	-	-
0 - hair & beauty		110	-	-
0 - admin		110	-	-
0 - managers		110	-	-
0 - cleaners store 2		110	-	-
0 - assisted bath 1		110	-	-
0 - assisted bath 2		110	-	-
0 - care station 1		110	-	-
0 - care station 2		110	-	-
0 - reception		110	95	-
0 - assisted wc 1		110	-	-
0 - assisted wc 2		110	-	-
0 - visitor wc		110	-	-
0 - assisted wc 3		110	-	-
0 - lobby		110	-	-
0 - sluice 1		110	-	-
0 - sluice 2		110	-	-
2 - bedroom 85		110	-	-
2 - bedroom 86		110	-	-
2 - ensuite 85		110	-	-
2 - ensuite 86		110	-	-
1 - circulation 1		110	-	-
1 - circulation 2		110	-	-
1 - circulation 3		110	-	-
1 - circulation 4		110	-	-
1 - circulation 5		110	-	-
1 - circulation 6		110	-	-
1 - circulation 7		110	-	-
1 - lounge/dining room		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
1 - private dine/activity		110	-	-
1 - dining room		110	-	-
1 - lounge		110	-	-
1 - care station 1		110	-	-
1 - care station 2		110	-	-
1 - sluice 1		110	-	-
1 - sluice 2		110	-	-
1 - stairs 1		110	-	-
1 - stairs 2		110	-	-
1 - stairs 3		110	-	-
1 - stairs 4		110	-	-
1 - stairs 5		110	-	-
1 - store 1		110	-	-
1 - store 2		110	-	-
1 - med store 1		110	-	-
1 - med store 2		110	-	-
1 - hoist store		110	-	-
1 - cleaners store		110	-	-
1 - store 3		110	-	-
1 - store 4		110	-	-
1 - store 5		110	-	-
1 - garden room		110	-	-
1 - assisted wc 1		110	-	-
1 - visitor wc		110	-	-
1 - assisted wc 2		110	-	-
1 - assisted wc 3		110	-	-
1 - assisted bath 1		110	-	-
1 - assisted bath 2		110	-	-
1 - assisted wc 4		110	-	-
2 - female change		110	-	-
2 - male change		110	-	-
2 - staff room		110	-	-
2 - laundry		110	-	-
2 - lounge/activity		110	-	-
2 - lounge		110	-	-
2 - garden room		110	-	-
2 - dining room		110	-	-
2 - plant room		110	-	-
2 - comms		110	-	-
2 - stairs 1		110	-	-
2 - stairs 2		110	-	-
2 - stairs 3		110	-	-
2 - stairs 4		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
2 - stairs 5		110	-	-
2 - care station		110	-	-
2 - cinema		110	-	-
2 - staff shower 1		110	-	-
2 - staff shower 2		110	-	-
2 - assisted wc 1		110	-	-
2 - assisted wc 2		110	-	-
2 - assisted wc 3		110	-	-
2 - sluice 1		110	-	-
2 - assisted bath		110	-	-
2 - med store		110	-	-
2 - circulation 1		110	-	-
2 - circulation 2		110	-	-
2 - circulation 3		110	-	-
2 - circulation 4		110	-	-
2 - circulation 5		110	-	-
2 - circulation 6		110	-	-
2 - circulation 7		110	-	-
2 - chefs office		110	-	-
2 - cleaners store		110	-	-
2 - store 1		110	-	-
2 - store 2		110	-	-
0 - bedroom 28		110	-	-
1 - bedroom 34		110	-	-
2 - kitchen		110	-	-
0 - assisted wc 4		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?
0 - bedroom 1	NO (-66%)	NO
0 - bedroom 2	NO (-30%)	NO
0 - bedroom 3	NO (-31%)	NO
0 - bedroom 4	NO (-47%)	NO
0 - bedroom 5	NO (-50%)	NO
0 - bedroom 6	NO (-46%)	NO
0 - bedroom 7	NO (-40%)	NO
0 - bedroom 8	NO (-35%)	NO
0 - bedroom 9	NO (-63%)	NO
0 - bedroom 10	NO (-21%)	NO
0 - bedroom 11	NO (-22%)	NO
0 - bedroom 12	NO (-17%)	NO
0 - bedroom 13	NO (-36%)	NO
0 - bedroom 14	NO (-20%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0 - bedroom 15	NO (-19%)	NO
0 - bedroom 16	NO (-37%)	NO
0 - bedroom 17	NO (-13%)	NO
0 - bedroom 18	NO (-21%)	NO
0 - bedroom 19	NO (-20%)	NO
0 - bedroom 20	NO (-19%)	NO
0 - bedroom 21	NO (-41%)	NO
0 - bedroom 22	NO (-28%)	NO
0 - bedroom 23	NO (-26%)	NO
0 - bedroom 24	NO (-34%)	NO
0 - bedroom 25	NO (-57%)	NO
0 - bedroom 26	NO (-39%)	NO
0 - bedroom 27	NO (-23%)	NO
0 - bedroom 29	NO (-24%)	NO
0 - bedroom 30	NO (-36%)	NO
0 - bedroom 31	NO (-19%)	NO
0 - bedroom 32	NO (-24%)	NO
0 - bedroom 33	NO (-23%)	NO
1 - bedroom 35	NO (-53%)	NO
1 - bedroom 36	NO (-50%)	NO
1 - bedroom 37	NO (-65%)	NO
1 - bedroom 38	NO (-58%)	NO
1 - bedroom 39	NO (-58%)	NO
1 - bedroom 40	NO (-58%)	NO
1 - bedroom 41	NO (-66%)	NO
1 - bedroom 42	NO (-83%)	NO
1 - bedroom 43	N/A	N/A
1 - bedroom 44	N/A	N/A
1 - bedroom 45	NO (-75%)	NO
1 - bedroom 46	NO (-53%)	NO
1 - bedroom 47	NO (-52%)	NO
1 - bedroom 48	NO (-62%)	NO
1 - bedroom 49	NO (-50%)	NO
1 - bedroom 50	NO (-51%)	NO
1 - bedroom 51	NO (-52%)	NO
1 - bedroom 52	NO (-47%)	NO
1 - bedroom 53	NO (-65%)	NO
1 - bedroom 54	NO (-55%)	NO
1 - bedroom 55	NO (-56%)	NO
1 - bedroom 56	NO (-65%)	NO
1 - bedroom 57	NO (-49%)	NO
1 - bedroom 58	NO (-52%)	NO
1 - bedroom 59	NO (-52%)	NO
1 - bedroom 60	NO (-77%)	NO
1 - bedroom 61	NO (-55%)	NO
1 - bedroom 62	NO (-57%)	NO
1 - bedroom 63	NO (-57%)	NO
1 - bedroom 64	NO (-76%)	NO
1 - bedroom 65	NO (-70%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1 - bedroom 66	NO (-52%)	NO
1 - bedroom 67	NO (-52%)	NO
1 - bedroom 68	NO (-77%)	NO
2 - bedroom 69	NO (-51%)	NO
2 - bedroom 70	NO (-47%)	NO
2 - bedroom 71	NO (-17%)	NO
2 - bedroom 72	NO (-3%)	NO
2 - bedroom 73	NO (-41%)	NO
2 - bedroom 74	NO (-2%)	NO
2 - bedroom 75	YES (+2%)	NO
2 - bedroom 76	NO (-73%)	NO
2 - bedroom 77	NO (-55%)	NO
2 - bedroom 78	NO (-55%)	NO
2 - bedroom 79	NO (-74%)	NO
2 - bedroom 80	NO (-17%)	NO
2 - bedroom 81	NO (-16%)	NO
2 - bedroom 82	NO (0%)	NO
2 - bedroom 83	NO (-16%)	NO
2 - bedroom 84	NO (-11%)	NO
0 - lounge	NO (-23%)	NO
0 - garden room	NO (-24%)	NO
0 - cafe	NO (-39%)	NO
0 - lounge/dining room	NO (-10%)	NO
0 - dining room	N/A	N/A
0 - med store 1	N/A	N/A
0 - med store 2	N/A	N/A
0 - hair & beauty	NO (-65%)	NO
0 - admin	NO (-63%)	NO
0 - managers	NO (-40%)	NO
0 - care station 1	N/A	N/A
0 - care station 2	N/A	N/A
0 - reception	N/A	N/A
2 - bedroom 85	NO (-29%)	NO
2 - bedroom 86	NO (-29%)	NO
1 - lounge/dining room	NO (-29%)	NO
1 - private dine/activity	NO (-52%)	NO
1 - dining room	NO (-33%)	NO
1 - lounge	NO (-71%)	NO
1 - care station 1	N/A	N/A
1 - care station 2	N/A	N/A
1 - med store 1	N/A	N/A
1 - med store 2	N/A	N/A
1 - garden room	NO (-17%)	NO
2 - staff room	NO (-5%)	NO
2 - laundry	NO (-56%)	NO
2 - lounge/activity	NO (-51%)	NO
2 - lounge	NO (-45%)	NO
2 - garden room	NO (-14%)	NO
2 - dining room	NO (-42%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2 - comms	N/A	N/A
2 - care station	N/A	N/A
2 - cinema	NO (-50%)	NO
2 - med store	N/A	N/A
2 - chefs office	NO (-54%)	NO
0 - bedroom 28	NO (-24%)	NO
1 - bedroom 34	NO (-53%)	NO

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?	NO
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]	4385	4385
External area [m ²]	5699	5699
Weather	SOU	SOU
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	1436	1797
Average U-value [W/m ² K]	0.25	0.32
Alpha value* [%]	30.4	15.4

* 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/m²]

	Actual	Notional
Heating	4.85	5.56
Cooling	1.73	2.61
Auxiliary	11.4	7.39
Lighting	16.2	13.5
Hot water	27.52	31.04
Equipment*	82.5	82.5
TOTAL **	61.69	60.1

* 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	3.34	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>3.34</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	88.52	99.11
Primary energy [kWh _{PE} /m ²]	88.65	88.92
Total emissions [kg/m ²]	8.19	8.2

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] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	----	----	----
[ST] Central heating using water: floor heating, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	33.1	0	3	0	3.3	3.04	0	3.2	0
	Notional	31.9	0	3.4	0	2.1	2.64	0	----	----
[ST] Central heating using water: floor heating, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	153.1	0	14	0	10	3.04	0	3.2	0
	Notional	148.7	0	15.6	0	14.7	2.64	0	----	----
[ST] Central heating using water: floor heating, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	0.3	215.6	0	10.5	26.1	5	5.7	5	6
	Notional	0.4	269.7	0	17	15.8	2.64	4.4	----	----
[ST] Central heating using water: floor heating, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	80.3	0	7.3	0	18.1	3.04	0	3.2	0
	Notional	73.2	0	7.7	0	18.2	2.64	0	----	----
[ST] Central heating using water: floor heating, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	17.6	0	1.6	0	332.9	3.04	0	3.2	0
	Notional	17.1	0	1.8	0	133.9	2.64	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	0.1	380.7	0	18.6	0	5	5.7	5	6
	Notional	134.4	389.4	14.1	24.6	0	2.64	4.4	----	----

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