MOUNTVIEW LODGE, SWISS COTTAGE – ENERGY STRATEGY STATEMENT






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ENERGY STRATEGY STATEMENT

MOUNTVIEW LODGE, SWISS COTTAGE

Ref: 758/25/1/1 rev 01 1st Draft

Rev	Date	Prepared by	Checked by	Approved by
00	04th Sept 2018	Steve Harris	Vejay Patel	David Croft
01	29th Oct 2018	Steve Harris	Steve Harris	David Croft
02	14th Feb 2019	Steve Harris	Steve Harris	Steve Harris

Comments/Purpose

Revised to suit comments from the council

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EXECUTIVE SUMMARY

This Energy Strategy supports the application for the proposed extension to Mountview Lodge, at 9 Swiss Terrace, Swiss Cottage to provide an additional three storeys of residential accommodation comprising eight new one and two bedroom apartments.

The objective of this document is to establish the energy strategy for the development, and demonstrate its compliance with local and national energy policies.

The following key 'energy' requirements are considered as applicable for the development;

- Minimum compliance with Approved Document L1B: Conservation of fuel and power in existing dwellings (2010 Edition with amendments to 2018).
- Demonstrate how the design of the development minimises overheating and reduces reliance on air conditioning systems.
- Maximise energy efficiency and the use of low carbon energy.
- Use of LTZ technologies on site, for example solar photovoltaics or thermal systems, wind turbines.

It is proposed that the thermal performance of the building envelope will be better that the Building Regulations, minimum requirements, as these passive elements will be there for the life of the building.

Baseline

The TER has been calculated for the Mountview lodge extension as 17.73 $kgC0_2/m^2$ per annum. This is broken down between uses as indicated on the graph below, and equates to an overall emission of 8.24 tonnes of $C0_2$ per annum.

Passive and Active Measures for Energy Efficiency

Target U-values are as scheduled here:

	Proposed	Part L1B 2010 Limiting Factor
Building Element	**U-Value (W/m2C)**	**U-Value (W/m2C)**
Glazing	1.1 (g= 0.63)	1.6
Walls/ Cladding	0.11	0.28
Roof	0.12	0.18
Ground Floor	N/A	0.22

The façade has been adapted in line with an overheating analysis. The accommodation complies with the building regulations criteria for overheating.

Air tightness

	Proposed	Part L1B 2010 Limiting Factor
Air Permeability ($m^3/hr/m^2$@50Pa)	3	10

Building Services Systems

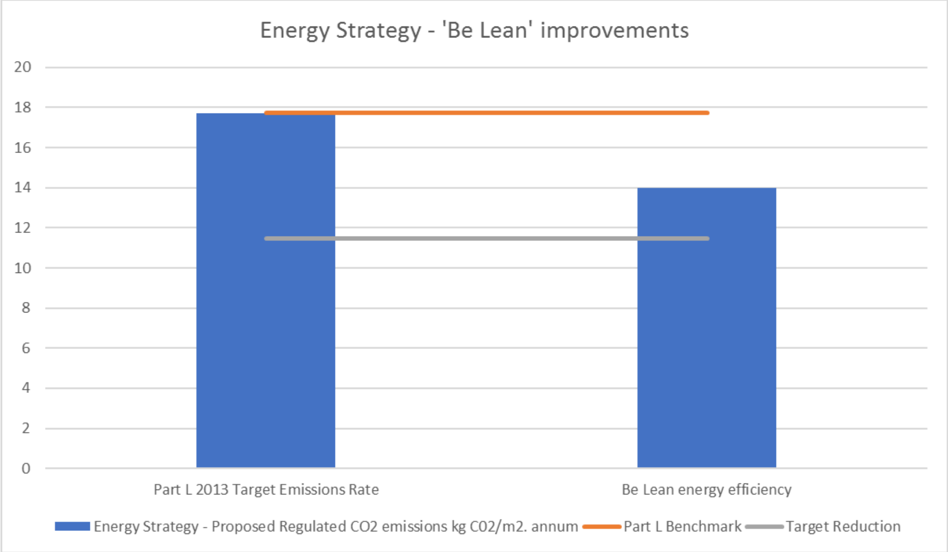
The table below summarises the key proposals for the development;

	Proposed	Indicative Part L 2010 compliance values
Ventilation		
Specific Fan Power (for whole house MVHR units)	0.4W/l/s	1.9 W/l/s
Heat Recovery	<90%	<50%
Lighting		
LED Lighting (where applicable) throughout		
Lighting Controls		
	PIR control to landlords circulation	
Space Heating		
Gas Boiler	92%	86%
DHW Heating	Instantaneous, no storage	
Gas Boiler	92%	80%

As a result of the application of the technologies described for passive and active efficiency, the energy performance of the proposed development has improved by 21.2% when compared to the notional dwelling target emissions rate.

The Dwelling Emissions Rate has fallen from the 17.73 TER, to 13.97 $kgC0_2/m^2$ per annum. This equates to an overall emission of 6.5 tonnes of $C0_2$ per annum.

The table below summarises the improvement in relation to the baseline scheme and the target performance.



Be Clean

The increased performance of the building envelope will reduce the loads on the internal building services systems. The development is provided with communal high efficiency condensing boilers, which maximise the economy of scale inherent in combined plant.

Heat is delivered 'on demand' to each dwelling via high efficiency plate heat exchangers, and the plant will be weather compensated to ensure maximum efficiency from the boiler plant, as the lower operating temperatures achieved during mid-season, ensure the boiler operates in condensing mode more often.

Supply and extract ventilation from bathrooms, kitchens and living spaces will be matched to demand. Individual heat recovery ventilation units will be provided to each dwelling. Local controls and sensors ensure operation only when required.

Lighting throughout will be predominantly from LED and other low energy sources. A simple lighting control system will be used to give flexibility of use whilst minimising energy use.

An energy display device is being provided for each dwelling, so that the occupants can monitor power and heat consumption. The dwellings will be designed with smart meters in mind, to make full use of emerging technology on the national grid.

Proposed Specification - Dwellings

- Roof mounted Photovoltaic Cells
- Communal gas boiler efficiency = 92%
- Mechanical ventilation with heat recovery
- Specific Fan Power: 0.7 W/l/s Heat Recovery efficiency: 90% domestic
- 100% energy efficient lighting

Renewable Energy

The table below summarises how each technology may be appropriate for the Mountview lodge scheme.

Design approach/technology	Viable for Mountview Lodge?	Details	Tonnes $C0_2$/annum reduction	Percentage regulated $C0_2$/annum reduction after all other energy efficiency measures taken into account
Wind Power	No	Considered inappropriate due to visual, safety and accoustic implications	N/A	N/A
Solar Electricity	Yes	Space on the roof can be used for solar photovoltaic panels. We have determined that there is sufficient space to install 16 no. 250W panels at roof level, allowing 500W to be connected to each of the additional dwellings.	1.55	23.91%
Small-scale hydo-electric power	No	No local source of power	N/A	N/A
Solar water heating (solar thermal)	Potentially	Although there is space available at roof level to provide a solar water system, the existing system installations do not provide any hot-water storage within the appartments. This would require changing the existing heating and hot water distribution philosophy at the expense of roof space that can be allocated for PV panels.	N/A	N/A
CHP	No	The existing site does not have space available to provide a CHP plant	N/A	N/A
Biomass	No	The existing site does not have space available to provide Biomass boilers or storage of biomas fuel	N/A	N/A
Anaerobic Digestion	No	Insufficient fuel availability to establish a viable system	N/A	N/A
Ground-source heat pumps	No	A combination of the following factors would make the adoption of Ground-source heat pumps unviable; 1. No building cooling load 2. The sites footprint is small 3. There are technical and commercial issues in establishing an extract license. 4. Insufficient electrical supply; building heat source needs to be gas	N/A	N/A
Air-source heat pumps	No	Although space could be allocated at roof level to enable the provision of air-source heat pumps, the existing electrical supply to the building is insufficient to allow the building to be heated via an electrical source.	N/A	N/A

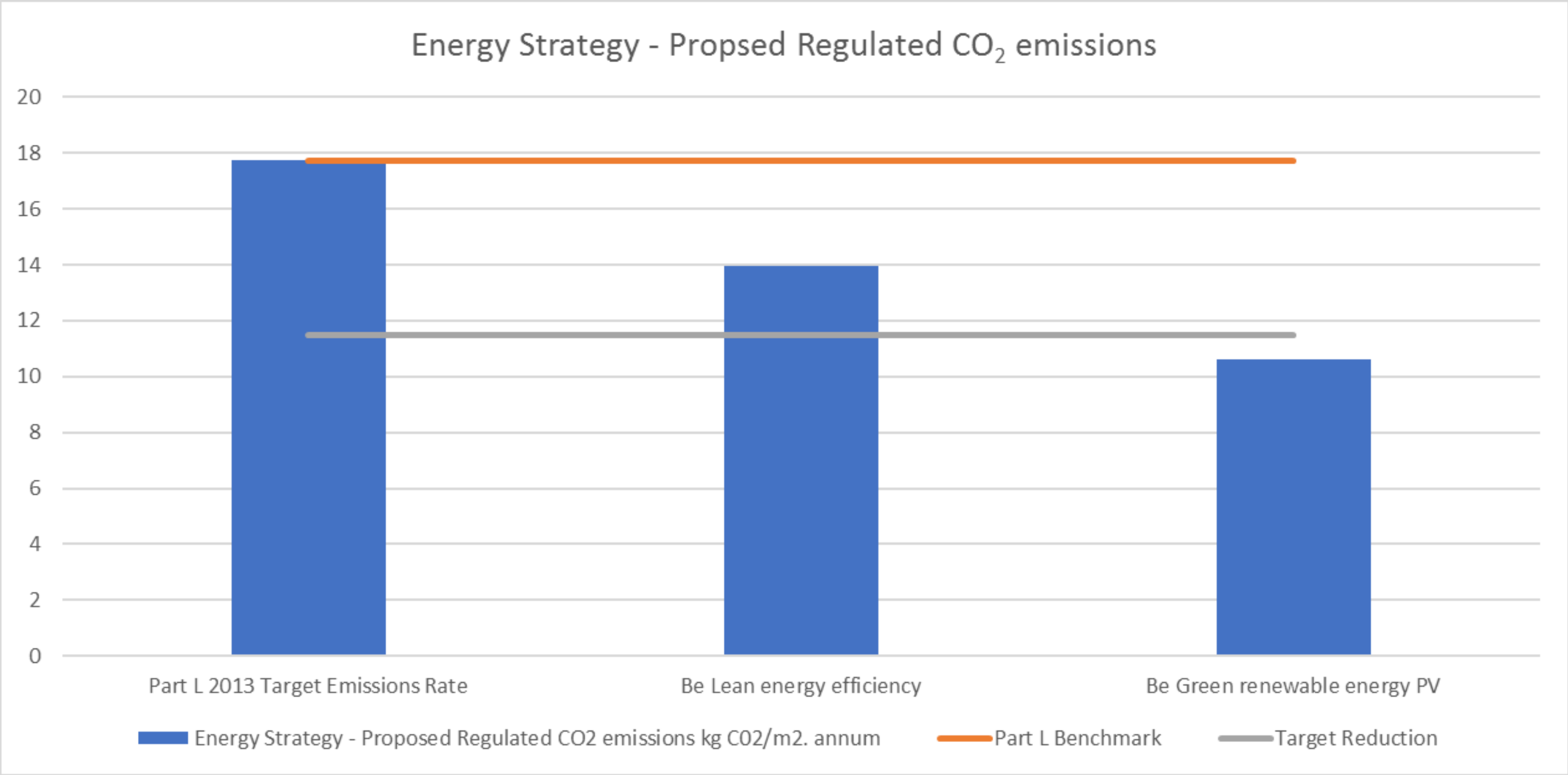
Our initial calculations show that provision of 500W (2-panels) of PV to each unit will provide the 20% on-site renewable target. This will require 16 panels at roof level, which we have verified is achievable whilst minimising the impact on the green roof.

The Dwelling Emissions Rate has fallen from the 13.97kg$C0_2$/m^2 of the previous (be lean) section, to 10.63kg$C0_2$/m^2 per annum. This equates to an overall emission of 4.94 tonnes of $C0_2$ per annum.

A total reduction of 40% has been achieved when compared to the TER..

The table below details how the proposed energy strategy has evolved to meet the requirements set out in this study. Overall the scheme is achieving an energy reduction of over 40% when compared to the current Part L requirements.

Emissions are estimated to be reduced by 3.3 Tonnes of CO_2 per year.



	Residential New-Build			
	Total tCO_2	Stage reduction, tCO_2	Stage reduction from baseline, %	Reduction of CO_2 from on-site renewables after all other energy efficiency measures taken into account, %
Baseline	8.24	N/A	N/A	N/A
Be Lean	6.50	1.75	21.21%	N/A
Be Clean	6.50	0	0.00%	N/A
Be Green	4.94	1.55	18.84%	23.91%
TOTAL	**4.94**	**3.30**	**40.05%**	N/A

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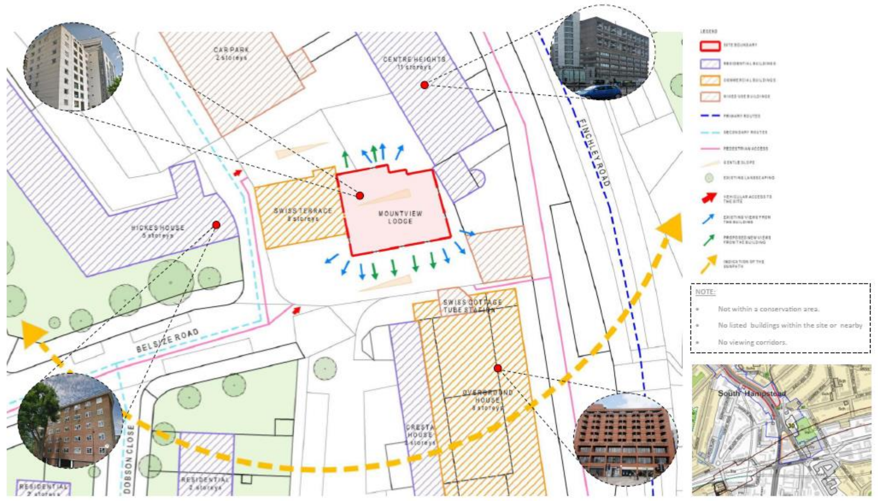
INTRODUCTION

Background



Mountview Lodge, is located on Belsize Road in Swiss Cottage set back from the A41 Finchley Road. The building at 9 Swiss Terrace (which forms the base for the proposed extension referenced in this document), adjoins 8 Swiss Terrace which is under separate ownership. To the east of the building is Centre Heights which borders onto Finchley Road and is an 11 storey mixed use building. It currently being extended to pro-vide an additional two floors of accommodation. To the rear of the building is an existing multi storey car park associated with Centre Heights.

The proposed extension will provide an additional three storeys of residential accommodation comprising eight new one and two bedroom apartments.

This Energy Strategy has generally been prepared in the structure set out by the GLA Energy Planning Guidance (March 2016), and includes;

- Estimated site-wide regulated CO2 emissions and reductions after each stage of the energy hierarchy
- Energy emissions saving in comparison with Part L 2010 of the Building Regulations
- Evidence that the risk of overheating has been mitigated through passive design
- Investigation into the feasibility of utilising renewable energy technologies

It is proposed that the thermal performance of the building envelope will be better that the Building Regulations, minimum requirements, as these passive elements will be there for the life of the building.

Area Schedule

	GIA		BALCONY	
	m²	ft²	m²	ft²
SIXTH FLOOR				
Apartment 01	62.4	671.6		
Apartment 02	52.2	561.8		
Apartment 03	45.5	489.7		
SEVENTH FLOOR				
Apartment 04	70.8	762		
Apartment 05	61.3	659.8		
Apartment 06	45.5	489.7		
EIGHTH FLOOR				
Apartment 07	64.3	692.1	17.6	189.4
Apartment 08	63	678.1	22.6	243.2
TOTAL AREAS	TOTAL GIA		TOTAL GEA	
6th Floor	220.2	2370.2	242.5	2610.2
7th Floor	221.9	2388.5	243.3	2618.8
8th Floor	158.3	1703.9	177.3	1908.4
Roof	16.6	178.6	21.3	229.2
Total	617	6641.3	684.4	7366.8

18086 - Mountview Lodge New Floor Areas _ 2018-10-17

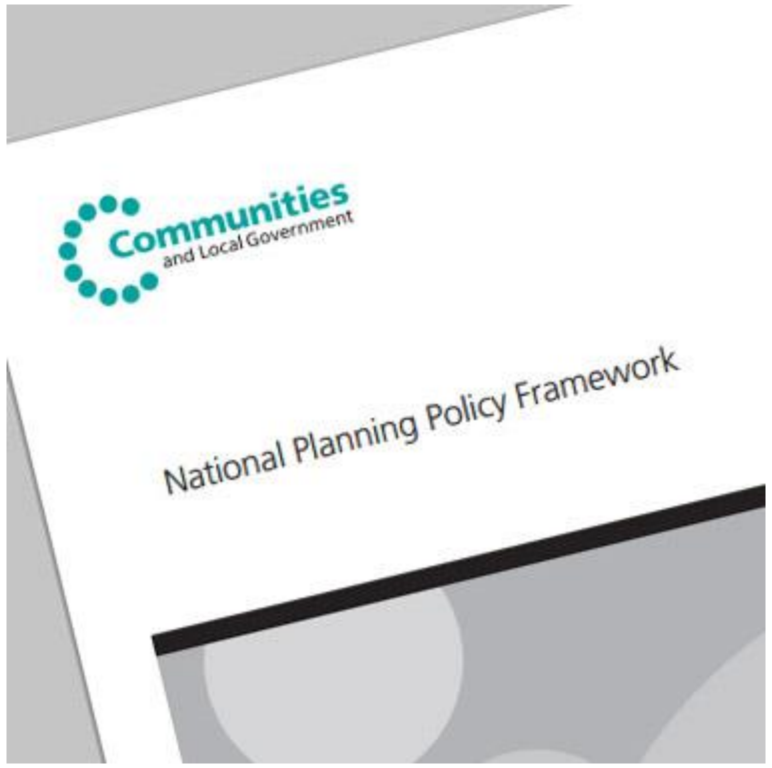
(Subject to change through design development)

Objective

The objective of this document is to establish the energy strategy for the development, and demonstrate its compliance with local and national energy policies.

RELEVANT POLICY AND LEGISLATION

National Planning Policy Framework



The National Planning Policy Framework sets out the Governments Planning Policies for England and how these are expected to be applied, informing Local Councils and communities.

The 2018 update includes the following four key sections;

151. To help increase the use and supply of renewable and low carbon energy and heat, plans should:

a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

152. Local planning authorities should support community-led initiatives for renewable and low carbon energy, including developments outside areas identified in local plans or other strategic policies that are being taken forward through neighbourhood planning.

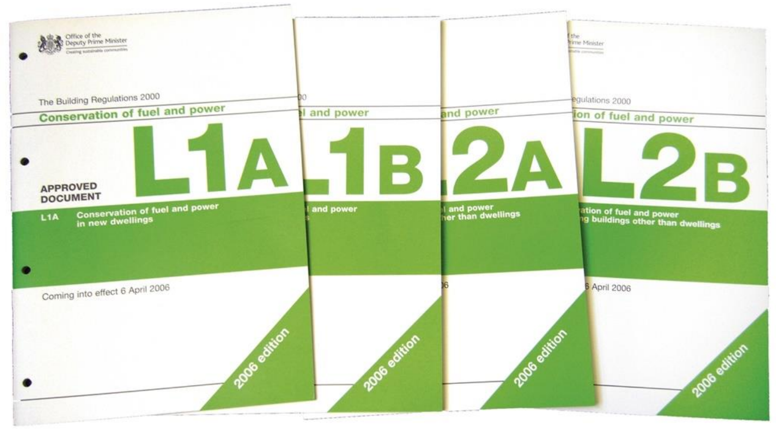
153. In determining planning applications, local planning authorities should expect new development to:

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

154. When determining planning applications for renewable and low carbon development, local planning authorities should:

a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and
b) approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.

Building Regulations Approved Document Part L



The Building Regulations are used by the UK Government to set out requirements for specific aspects of building design and construction.

Regulation 26 of the building regulations states that "Where a building is erected, it shall not exceed the target CO2 emission rate for the building…", and Schedule 1 – Part L Conservation of fuel and power states that provision for conservation of fuel and power shall be made by: limiting heat gain and losses and providing building service which are efficient, have effective controls and are properly commissioned and that information is provided so that the building can be operated efficiently.

Regulations 24, 25 and 26 set out the requirements for the minimum energy performance of buildings and the requirement for CO2 emission rates demonstrating compliance with the regulations. The regulations set out the terms for asset ratings and operational ratings for energy over a period of time.

Regulation 25A: 'Must analyse and take into account the technical, environmental and economic feasibility of using high efficiency alternative systems (such as the following systems) in the construction, if available:

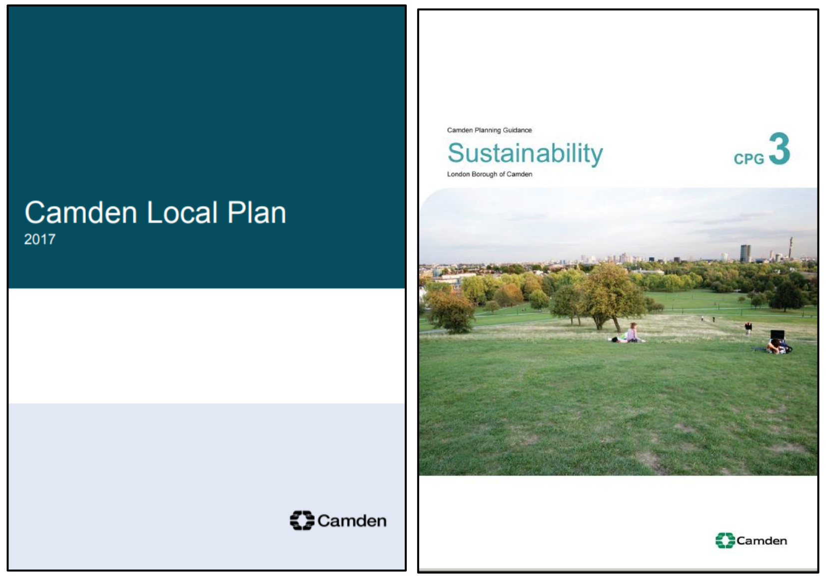
a. Decentralised energy supply systems based on energy from renewable sources
b. Co-generation
c. District or block heating or cooling, particularly where it is based entirely or renewable sources.
d. Heat pumps

Energy from renewable sources means energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment, plant gas and biogases.

Minimum fabric efficiency requirements have been updated (Regulation 26, 26A) and require that buildings achieve or better a fabric energy efficiency target in addition to the carbon dioxide target.

Regulation 29 sets out the requirement for energy performance certificate

Camden Development Plans



The Camden Plan sets out a spatial vision and strategy for the sustainable growth of Camden for the period 2016 to 2031, and will be used to guide decisions on planning, development and regeneration.

Section 8 of the plan sets out policies for sustainability and climate change. Camden's Validation checklist for Energy Statements references policy CC1 and Camden Planning Guidance on Sustainability.

This scheme is not defined as being a "major development" under the Mayor's London Plan, and is therefore not required to be "zero carbon".

Policy CC1 – Climate Change Mitigation, sets out the council's aims to tackle the causes of climate change in the borough by ensuring developments use less energy and assess the feasibility of decentralised energy and renewable energy technologies. It requires:

8.8 All new residential development will also be required to demonstrate a 19% CO2 reduction below Part L 2013 Building Regulations (in addition to any requirements for renewable energy). This can be demonstrated through an energy statement or sustainability statement.

8.14 The Council will expect developments of five or more dwellings and/or more than 500 sqm of any gross internal floorspace to achieve a 20% reduction in carbon dioxide emissions from on-site renewable energy generation (which can include sources of site related decentralised renewable energy), unless it can be demonstrated that such provision is not feasible. This is in line with stage three of the energy hierarchy 'Be green'. The 20% reduction should be calculated from the regulated CO2 emissions of the development after all proposed energy efficiency measures and any CO2 reduction from non-renewable decentralised energy (e.g. CHP) have been incorporated.

Energy Targets for Mountview Lodge, Swiss Cottage

Having reviewed the documents highlighted within this section, the following key 'energy' requirements are considered as applicable for the development;

- Minimum compliance with Approved Document L1B: Conservation of fuel and power in existing dwellings (2010 Edition with 2018 amendments).
- Demonstrate how the design of the development minimises overheating and reduces reliance on air conditioning systems.
- Maximise energy efficiency and the use of low carbon energy.
- New developments will be expected to incorporate the provision of low and zero carbon forms of energy generation or to connect into low and zero carbon energy generation networks where they exist

TECHNICAL APPRAISAL

The following technical appraisal draws on data generated via approved software packages, including Stroma FSAP 2012, to assess the benchmark energy consumption and therefore carbon emissions generated.

The steps highlighted below, as generally referred to as the 'Energy Hierarchy' are then followed through to drive the predicted emissions down.

Use Less Energy
Be Lean
- Reduce consumption through behavioural change
- Improve insulation
- Incorporate passive heating and cooling
- Install energy efficient lighting and appliances

Supply energy efficiently
"Be Clean"
- Introduce low carbon technologies
- Use combined heat and power, and community heating
- Cut transmission losses through local generation

Use renewable energy
"Be Green"
- On site: install renewable energy technologies, such as solar water heating, photovoltaics, wind turbines
- Off site: Import renewable energy generated elsewhere

Carbon Factors are based on those published within Part L of the building regulations, ie;

Fuel	Emissions Factor ($kgC0_2/kWh$)
Natural Gas	0.216
Grid Supplied Electricity	0.519
Grid Displaced Electricity	-0.519

BE LEAN (USE LESS ENERGY)

Passive efficiency Measures

Building Construction

Although the final construction materials for the scheme have not been finalised, the following describe the principles that shall be encouraged.

High mass Components

The use of a structural frame for a building making use of reinforced concrete would not only provide the structural stability, but act as a “heat sink”, which would help to reduce the peak summer and minimum winter temperatures.

U-Values

It is proposed that the thermal performance of the building envelope will be better that the Building Regulations, minimum requirements, as these passive elements will be there for the life of the building.

Target U-values are as scheduled here:

	Proposed	**Part L1B 2010 Limiting Factor**
Building Element	**U-Value (W/m2C)**	**U-Value (W/m2C)**
Glazing	1.1 (g= 0.63)	1.6
Walls/ Cladding	0.11	0.28
Roof	0.12	0.18
Ground Floor	N/A	0.22

Air tightness

	Proposed	**Part L1B 2010 Limiting Factor**
Air Permeability ($m^3/hr/m^2$@50Pa)	3	10

Overheating Study

The façade has been adapted in line with an overheating analysis. The accommodation all complies with the building regulations criteria for overheating.

Active efficiency Measures

Heat Recovery

Mechanical Ventilation with Heat Recovery (MVHR) units will, wherever applicable, incorporate heat reclaim technology to recover upward of 90% of waste heat from the building exhaust air systems and use it to pre-warm the building fresh air supply. System resistances will be carefully controlled to ensure that excessive energy is not consumed by the introduction of the heat exchange system.

Inverter Driven Fans / Pumps

Some 40% of industrial electricity consumption is utilised as the motive power for pumps and fans. The vast majority of these motors are driven at constant speed by squirrel cage machines, and any variation in system output is generally achieved by throttling or damping in the system.

However, a substantial amount of this energy is wasted. This is because most fan and pump systems are oversized, usually because of too much contingency planning in the system design, and then rounding up to the next standard motor size.

Consequently, significant amounts of energy are expended unnecessarily, and the operating cost of the system is as much as 50% more than it should be.

The overall savings to be made in energy and indirect costs rely upon the effective application of variable speed AC inverter drives; for example, a 15% reduction in fan or motor speed will achieve a 40% energy saving.

Substantial overall savings in energy and indirect costs can be realised relatively simply with the effective application of variable speed AC inverter drives. There are also significant indirect cost savings available by extending motor life, reducing maintenance time and cutting overall noise levels.

It is proposed that individual ventilation fans for each residential unit, along with the main central plant pumps and fans, will be inverter driven.

This will allow savings in fan power energy values as well as significant indirect cost savings available by extending motor life, reducing maintenance time and cutting overall noise levels.

Lighting and Controls

Low energy lighting has become an essential feature of building design in recent years. New concepts of lamp and ballast design have lead to higher efficiency fluorescent T5 and LED lamps and higher frequency control gear becoming standard in most new commercial installations.

Changes to standards such as Part L1 Building Regulations have pushed the standards for efficiency in lighting installations and promote the use of lighting controls systems.

Lighting controls for landlords areas will be simple presence detection to switch luminaires on/off automatically.

Where appropriate the development will incorporate LED lighting with presence detection lighting controls.

The interior lighting scheme designs will recognise the need to provide good lighting in an energy conscious and cost effective manner.

Proposals for Mountview Lodge

The table below summarises the key proposals for the Mountview Lodge development;

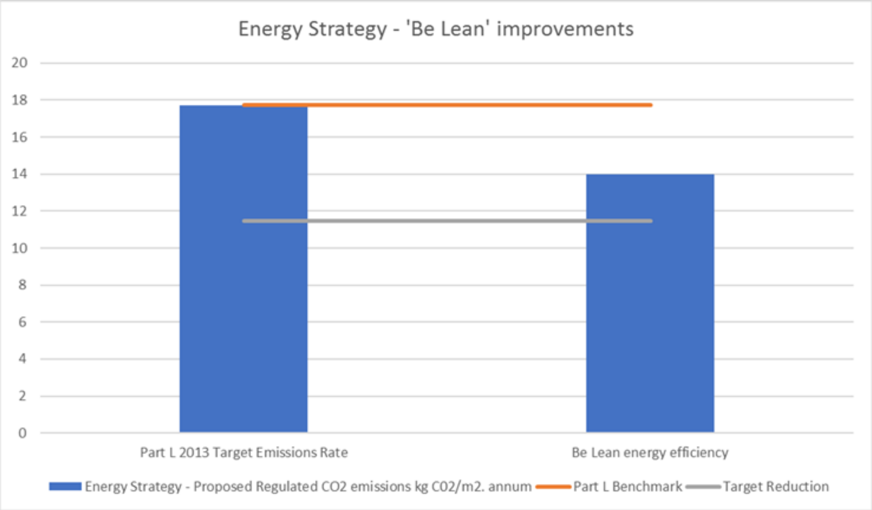
	Proposed	**Indicative Part L 2013 compliance values**
Ventilation		
Specific Fan Power (for whole house MVHR units)	0.4 W/l/s	1.9 W/l/s
Heat Recovery	<90%	<50%
Lighting		
LED Lighting (where applicable) throughout		
Lighting Controls		
	PIR control to landlords areas	
Space Heating		
Gas Boiler	92%	86%
DHW Heating	Instantaneous, no storage	
Gas Boiler	92%	80%

Overall building performance due to the application of 'Be Lean' measures

As a result of the application of the technologies described for passive and active efficiency, the energy performance of the proposed development has improved by 21.2% when compared to the notional dwelling target emissions rate.

The Dwelling Emissions Rate has fallen from the 17.73 TER, to 13.97 $kgC0_2/m^2$ per annum. This equates to an overall emission of 6.5 tonnes of $C0_2$ per annum.

The table below summarises the improvement in relation to the baseline scheme and the target performance.

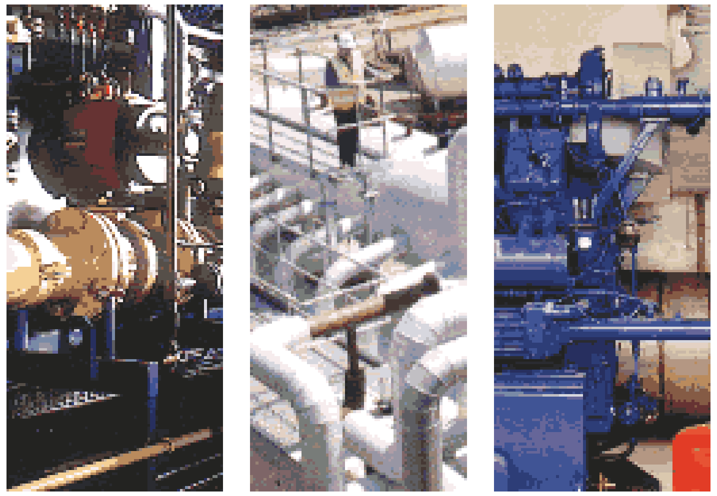


BE CLEAN (SUPPLY ENERGY EFFICIENTLY)

Local District Heating Networks

Although the development is within 500m of a potential heating network at Swiss Cottage, the project involves the extension of the building at 6th 7th and 8th floors to incorporate 8 new flats. There is currently no riser space available within the existing building to be able to bring district heating pipework into the plant room sited at 6th floor. As such, this option has currently been discarded as impractical for the relatively low heating demands associated with the scheme.

Combined Heat and Power



Combined Heat and Power (CHP), also known as cogeneration, is the simultaneous generation of thermal and electrical energy from a single stream of fuel. In the case of Biomass CHP, this source is a biomass fuel. More often gas is used as the fuel.

Due to the lack of available space within the building, and given the generally low heating and electrical requirements for the eight additional dwellings, the use of CHP has been deemed impractical for this development. This is in accordance with guidance stated within the Camden Plan

> 8.27 The Council does not support the installation of stand-alone CHP units in small developments where there is neither the potential nor the intention for that development to form part of a wider network. The administrative burden of managing small scale CHP electricity sales, and the low unit price available for small volumes of exported CHP electricity, means it is generally uneconomic for developers to pursue. This can lead to CHP being installed but not operated

BE GREEN (USE RENEWABLE ENERGY)

The Carbon Trust divides renewable energy into two categories, those that generate electricity, and those that generate heat. They are;

Renewable electricity generation

- Wind power (small scale wind energy)
  Wind turbines are used to produce electricity. They are attached to outside of buildings - require a structural survey and planning permission.

- Solar electricity (photovoltaics)
  Solar photo voltaic (solar PV) panels or cells convert sunlight into electricity. They are attached to outside of buildings - require a structural survey and may require planning permission.

- Small-scale hydro-electric power
  An immersed turbine uses flowing water to produce electricity. This technology is highly site-specific. It requires a near body of water that is flowing and has a drop in level that can be exploited.

Renewable heat generation

- Solar water heating (solar thermal)
  Uses energy from the sun to heats water up to 55-65ºC. Systems should be roof-mounted and ideally integrated into your current immersion-heated, hot-water system.

- Biomass
  Generating power by burning organic material, such as wood, straw, dedicated energy crops, sewage sludge and animal litter. Lots of space is required for the boiler and storage of fuel. Site access is also important for deliveries of fuel.

- Anaerobic Digestion (AD)*
  Bacteria break down organic material in the absence of oxygen, producing a combustible methane-rich biogas. Requires access to large amounts of high-strength liquid organic wastes. Planning permissions will be required and you should consult a specialist about odour control.

  *Note: output can be for heating, combined heat and power (CHP) or fuel for transport.

- Ground-source heat pumps (GSHPs)**
  Using naturally-occurring underground low-level heat. Most suitable for 'new builds' with appropriate geological features.

- Air-source heat pumps (ASHPs)**
  Converting low-level heat, occurring naturally in the air, into high-grade heat. System must be attached to outside of buildings - planning permission may be required

**Note: Ground- and Air- source heat pumps are not completely 'renewable' as they require electricity to drive their pumps or compressors.

The table below summarises how each technology may be appropriate for the Mountview Lodge scheme.

Design approach/technology	Viable for Mountview Lodge?	Details	Tonnes CO_2/annum reduction	Percentage regulated CO_2/annum reduction after all other energy efficiency measures taken into account
Wind Power	No	Considered inappropriate due to visual, safety and accoustic implications	N/A	N/A
Solar Electricity	Yes	Space on the roof can be used for solar photovoltaic panels. We have determined that there is sufficient space to install 16 no. 250W panels at roof level, allowing 500W to be connected to each of the additional dwellings.	1.55	23.91%
Small-scale hydo-electric power	No	No local source of power	N/A	N/A
Solar water heating (solar thermal)	Potentially	Although there is space available at roof level to provide a solar water system, the existing system installations do not provide any hot-water storage within the appartments. This would require changing the existing heating and hot water distribution philosophy at the expense of roof space that can be allocated for PV panels.	N/A	N/A
CHP	No	The existing site does not have space available to provide a CHP plant	N/A	N/A
Biomass	No	The existing site does not have space available to provide Biomass boilers or storage of biomas fuel	N/A	N/A
Anaerobic Digestion	No	Insufficient fuel availability to establish a viable system	N/A	N/A
Ground-source heat pumps	No	A combination of the following factors would make the adoption of Ground-source heat pumps unviable; 1. No building cooling load 2. The sites footprint is small 3. There are technical and commercial issues in establishing an extract license. 4. Insufficient electrical supply; building heat source needs to be gas	N/A	N/A
Air-source heat pumps	No	Although space could be allocated at roof level to enable the provision of air-source heat pumps, the existing electrical supply to the building is insufficient to allow the building to be heated via an electrical source.	N/A	N/A

Overall building performance due to the application of 'Be Green' measures

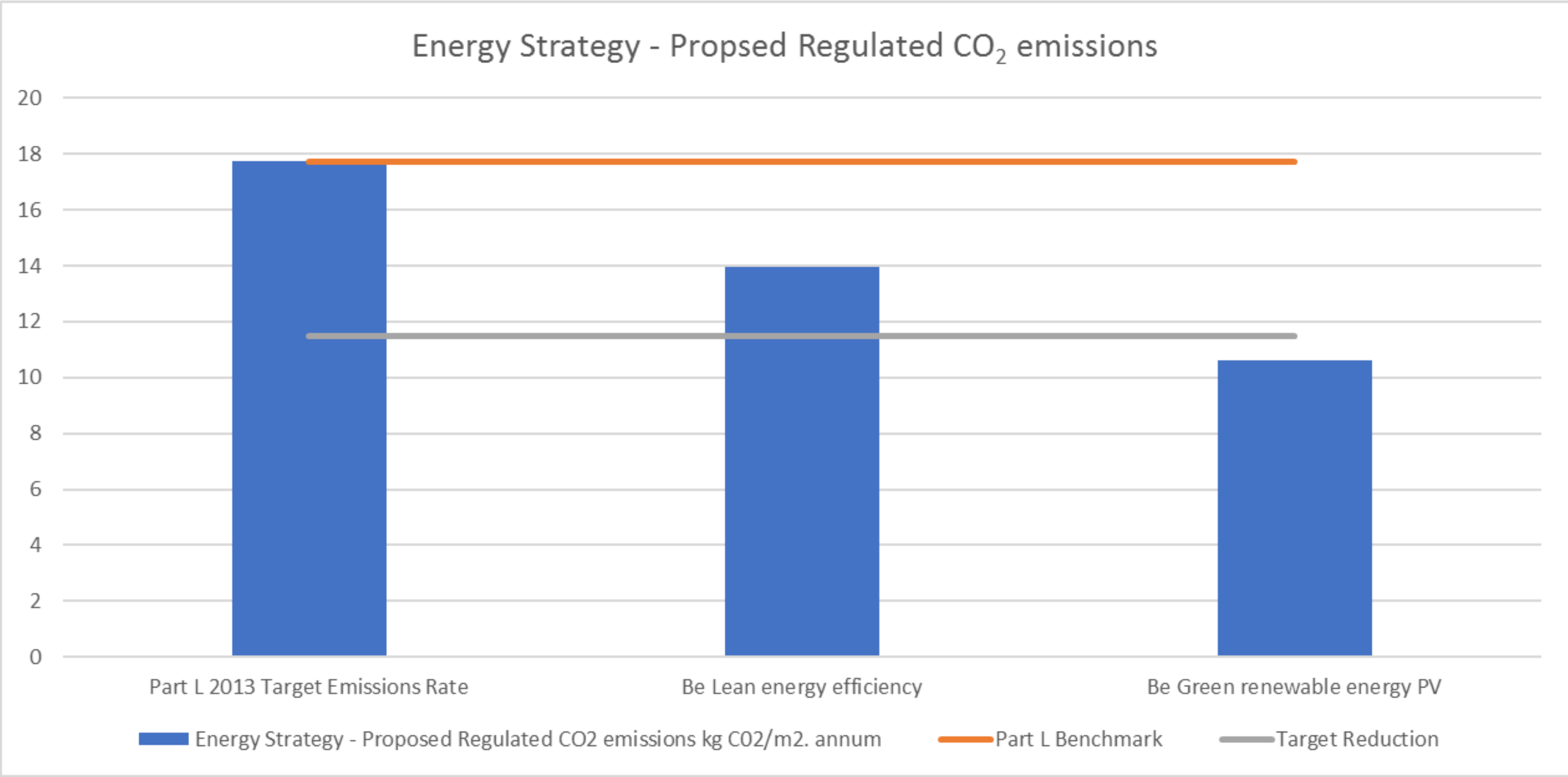
Our initial calculations show that provision of 500W (2-panels) of PV to each unit will provide the 20% on-site renewable target. This will require 16 panels at roof level, which we have verified is achievable whilst minimising the impact on the green roof.

The Dwelling Emissions Rate has fallen from the 13.97kgCO_2/m^2 of the previous (be lean) section, to 10.63kgCO_2/m^2 per annum. This equates to an overall emission of 4.94 tonnes of CO_2 per annum.

A total reduction of 40% has been achieved when compared to the TER..

Emissions are estimated to be reduced by 3.3 Tonnes of CO2 per year.

	Residential New-Build			
	Total tCO_2	Stage reduction, tCO_2	Stage reduction from baseline, %	Reduction of CO_2 from on-site renewables after all other energy efficiency measures taken into account, %
Baseline	8.24	N/A	N/A	N/A
Be Lean	6.50	1.75	21.21%	N/A
Be Clean	6.50	0	0.00%	N/A
Be Green	4.94	1.55	18.84%	23.91%
TOTAL	**4.94**	**3.30**	**40.05%**	N/A



APPENDIX A – SAP CALCULATIONS

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16
Printed on 14 February 2019 at 17:12:03

DRAFT

Project Information:

Assessed By: ()

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 62.4m²

Site Reference : Mountview Lodge

Plot Reference: Apartment 1

Address : Mountview Lodge

Client Details:

Name: SHAPIRO SHULMAN PROPERTIES

Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas (c)
Fuel factor: 1.00 (mains gas (c))

Target Carbon Dioxide Emission Rate (TER)	17.63 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	10.21 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	41.9 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	32.6 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.11 (max. 0.30)	0.11 (max. 0.70)	OK
Floor	(no floor)		
Roof	(no roof)		
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated using user-specified y-value of 0.15

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system: Community heating schemes - mains gas

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls	Charging system linked to use of community heating, programmer and at least two room thermostats	OK
Hot water controls:	No cylinder No cylinder	

Regulations Compliance Report

7 Low energy lights		
Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	**OK**
8 Mechanical ventilation		
Continuous supply and extract system		
Specific fan power:	0.4	
Maximum	1.5	**OK**
MVHR efficiency:	94%	
Minimum	70%	**OK**
9 Summertime temperature		
Overheating risk (Thames valley):	Slight	**OK**
Based on:		
Overshading:	Average or unknown	
Windows facing: North	7.8m²	
Ventilation rate:	4.00	
Blinds/curtains:		
	Closed 80% of daylight hours	
10 Key features		
Air permeablility	3.0 m³/m²h	
Windows U-value	1.1 W/m²K	
External Walls U-value	0.11 W/m²K	
Community heating, heat from boilers – mains gas		
Photovoltaic array		

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SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 14 February 2019

Property Details: Apartment 1

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	No
Number of storeys:	1
Front of dwelling faces:	North
Overshading:	Average or unknown
Overhangs:	None
Thermal mass parameter:	Indicative Value Medium
Night ventilation:	False
Blinds, curtains, shutters:	
Ventilation rate during hot weather (ach):	4 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	238.87	**(P1)**
Transmission heat loss coefficient:	21	
Summer heat loss coefficient:	259.88	**(P2)**

Overhangs:

Orientation:	**Ratio:**	**Z_overhangs:**
North (North)	0	1

Solar shading:

Orientation:	**Z blinds:**	**Solar access:**	**Overhangs:**	**Z summer:**	
North (North)	1	0.9	1	0.9	**(P8)**

Solar gains:

Orientation		**Area**	**Flux**	**g_**	**FF**	**Shading**	**Gains**	
North (North)	0.9 x	7.8	81.19	0.76	0.8	0.9	311.86	
						Total	311.86	**(P3/P4)**

Internal gains:

	June	**July**	**August**	
Internal gains	416.72	401.92	409.3	
Total summer gains	754.12	713.78	662.86	**(P5)**
Summer gain/loss ratio	2.9	2.75	2.55	**(P6)**
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	0.25	0.25	0.25	
Threshold temperature	19.15	20.9	20.6	**(P7)**
Likelihood of high internal temperature	**Not significant**	**Slight**	**Slight**	

Assessment of likelihood of high internal temperature: Slight

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Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16
Printed on 14 February 2019 at 17:12:02

Project Information:

Assessed By: ()
Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE
Total Floor Area: 52.2m²

Site Reference : Mountview Lodge
Plot Reference: Apartment 2

Address : Mountview Lodge

Client Details:

Name: SHAPIRO SHULMAN PROPERTIES
Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas (c)
Fuel factor: 1.00 (mains gas (c))

Target Carbon Dioxide Emission Rate (TER)	17.18 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	9.28 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	34.4 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	24.7 kWh/m²	
		OK

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2 Fabric U-values

Element	Average	Highest	
External wall	0.11 (max. 0.30)	0.11 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	(no roof)		
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated using user-specified y-value of 0.15

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system:	Community heating schemes - mains gas
Secondary heating system:	None

5 Cylinder insulation

Hot water Storage:	No cylinder

6 Controls

Space heating controls	Charging system linked to use of community heating, programmer and at least two room thermostats	OK
Hot water controls:	No cylinder No cylinder	

Regulations Compliance Report

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	**OK**

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.4	
Maximum	1.5	**OK**
MVHR efficiency:	94%	
Minimum	70%	**OK**

9 Summertime temperature

Overheating risk (Thames valley):	Slight	**OK**
Based on:		
Overshading:	Average or unknown	
Windows facing: South	4.4m²	
Windows facing: West	2m²	
Ventilation rate:	4.00	
Blinds/curtains:		
	Closed 80% of daylight hours	

10 Key features

Air permeablility	3.0 m³/m²h
Windows U-value	1.1 W/m²K
External Walls U-value	0.11 W/m²K
Party Walls U-value	0 W/m²K
Community heating, heat from boilers – mains gas	
Photovoltaic array	

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SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 14 February 2019

Property Details: Apartment 2

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	No
Number of storeys:	1
Front of dwelling faces:	South
Overshading:	Average or unknown
Overhangs:	None
Thermal mass parameter:	Indicative Value Medium
Night ventilation:	True
Blinds, curtains, shutters:	
Ventilation rate during hot weather (ach):	4 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	199.82	**(P1)**
Transmission heat loss coefficient:	17.2	
Summer heat loss coefficient:	217.01	**(P2)**

Overhangs:

Orientation:	**Ratio:**	**Z_overhangs:**
South (South)	0	1
West (West)	0	1

Solar shading:

Orientation:	**Z blinds:**	**Solar access:**	**Overhangs:**	**Z summer:**	
South (South)	1	0.9	1	0.9	**(P8)**
West (West)	1	0.9	1	0.9	**(P8)**

Solar gains:

Orientation		**Area**	**Flux**	**g_**	**FF**	**Shading**	**Gains**	
South (South)	0.9 x	4.4	112.21	0.76	0.8	0.9	243.14	
West (West)	0.9 x	2	117.51	0.76	0.8	0.9	115.74	
						Total	358.88	**(P3/P4)**

Internal gains:

	June	**July**	**August**	
Internal gains	372.53	359.63	366.28	
Total summer gains	747.43	718.51	707.99	**(P5)**
Summer gain/loss ratio	3.44	3.31	3.26	**(P6)**
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	0.25	0.25	0.25	
Threshold temperature	19.69	21.46	21.31	**(P7)**
Likelihood of high internal temperature	**Not significant**	**Slight**	**Slight**	

Assessment of likelihood of high internal temperature: Slight

DRAFT

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16
Printed on 14 February 2019 at 17:12:02

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 63m²

Site Reference : Mountview Lodge **Plot Reference:** Apartment 8

Address : Mountview Lodge

Client Details:

Name: SHAPIRO SHULMAN PROPERTIES

Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas (c)
Fuel factor: 1.00 (mains gas (c))

Target Carbon Dioxide Emission Rate (TER)	18.29 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	12.18 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	47.8 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	40.4 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.11 (max. 0.30)	0.11 (max. 0.70)	OK
Floor	(no floor)		
Roof	0.12 (max. 0.20)	0.12 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated using user-specified y-value of 0.15

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system: Community heating schemes - mains gas

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls: Charging system linked to use of community heating, programmer and at least two room thermostats — OK

Hot water controls: No cylinder
No cylinder

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Regulations Compliance Report

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	**OK**

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.4	
Maximum	1.5	**OK**
MVHR efficiency:	94%	
Minimum	70%	**OK**

9 Summertime temperature

Overheating risk (Thames valley):	Slight	**OK**

Based on:

Overshading:	Very Little
Windows facing: South	19.2m²
Ventilation rate:	4.00
Blinds/curtains:	Closed 80% of daylight hours

10 Key features

Air permeablility	3.0 m³/m²h
Windows U-value	1.1 W/m²K
Roofs U-value	0.12 W/m²K
External Walls U-value	0.11 W/m²K
Community heating, heat from boilers – mains gas	
Photovoltaic array	

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SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 14 February 2019

Property Details: Apartment 8

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	No
Number of storeys:	1
Front of dwelling faces:	South
Overshading:	Very Little
Overhangs:	as detailed below
Thermal mass parameter:	Indicative Value Medium
Night ventilation:	False
Blinds, curtains, shutters:	
Ventilation rate during hot weather (ach):	4 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	241.16	**(P1)**
Transmission heat loss coefficient:	53.2	
Summer heat loss coefficient:	294.39	**(P2)**

Overhangs:

Orientation:	**Ratio:**	**Z_overhangs:**
South (South)	0.15	0.85

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Solar shading:

Orientation:	**Z blinds:**	**Solar access:**	**Overhangs:**	**Z summer:**	
South (South)	1	0.9	0.85	0.75	**(P8)**

Solar gains:

Orientation		**Area**	**Flux**	**g_**	**FF**	**Shading**	**Gains**	
South (South)	0.9 x	19.2	112.21	0.63	0.8	0.75	729.86	
						Total	729.86	**(P3/P4)**

Internal gains:

	June	**July**	**August**	
Internal gains	418.3	403.31	410.42	
Total summer gains	1174.85	1133.17	1130.52	**(P5)**
Summer gain/loss ratio	3.99	3.85	3.84	**(P6)**
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	0.25	0.25	0.25	
Threshold temperature	20.24	22	21.89	**(P7)**
Likelihood of high internal temperature	**Not significant**	**Slight**	**Slight**	

Assessment of likelihood of high internal temperature: Slight