Sustainability & Energy Statement

Land off Anyards Road, Cobham

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Executive Summary

This Sustainability and Energy Statement has been prepared in support of an outline planning application for the demolition of the existing buildings and erection of 26 residential dwellings, with layout, scale, access and appearance for consideration, leaving landscaping as a reserved matter on land at Anyards Road, Cobham.

The application seeks outline consent but the planning application document included detailed floor plans and elevations for the proposed units. SAP calculations have therefore been prepared for representative apartments, maisonette apartments and houses, which have been based upon the construction specification set out within the report. When aggregated across similar unit types the calculations provide an assessment of the carbon dioxide emissions arising from the buildings and have allowed different systems to be tested.

It is proposed to enhance the fabric insulation standards of the buildings above the minimum required by the Building Regulations.

In addition, it is proposed to install heat pump hot water cylinders into the apartments and to install air source heat pumps into the maisonette apartments, the flat-over-garage (FOG) and houses.

The SAP Regulations Compliance Reports for the modelled units are attached as Appendix 1 but the reduction in total site emissions can be summarised as follows;

	Total Emissions	% Reduction
	kg CO_2 per year	
Baseline (Building Regulations TER) – baseline	**24,296**	
Be Green – after energy efficiency and Heat Pumps (DER)	**9,868**	**59.38%**

The water efficiency measures incorporated within the apartments, maisonette apartments and houses will ensure the water use is less than 110 litres per person per day and achieves the standard required by the planning policy and the enhanced standard required by the Building Regulations.

1.0 Introduction

This report has been commissioned by Shanly Homes and provides a Sustainability and Energy Statement in support of an outline planning application for the demolition of the existing buildings and erection of 26 residential dwellings, with layout, scale, access and appearance for consideration, leaving landscaping as a reserved matter on land at Anyards Road, Cobham.

The report describes the methodology used in assessing the development and the initiatives proposed.

The buildings have been designed and will be constructed to reduce energy demand and carbon dioxide emissions. The objective is to reduce the energy demand to an economic minimum by making investments in the parts of the buildings that have the greatest impact on energy demand and are the most difficult and costly to change in the future, namely the building fabric.

Once cost effective structures have been designed, low-carbon and renewable technologies have been considered for installation to provide heat and/or electricity.

The following hierarchy has been followed:

- Lean reduce demand and consumption
- Clean increase energy efficiency
- Green provide low carbon renewable energy sources

The report has been prepared by Ivan Ball of Bluesky Unlimited who are sustainability consultants.

2.0 Planning Policy Context

National Policy

The UK Government published its sustainable development strategy in 1999 entitled "A better quality of life: A strategy for sustainable development in the UK". This sets out four main objectives for sustainable development in the UK:

- Social progress that recognises the needs of everyone.
- Effective protection of the environment.
- Prudent use of natural resources.
- Maintenance of high stable levels of economic growth and employment.

Sustainable Communities: Building for the Future, known colloquially as the Communities Plan was published in 2003. The Plan sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in parts of the country, low demand in other parts and the quality of our public spaces. The Communities Plan describes sustainable communities as: Active, inclusive and safe, well run, environmentally sensitive, well designed and built, well connected, thriving, well served and fair for everyone.

The most relevant national planning policy guidance on sustainability is set out in:

- National Planning Policy Framework - 2023

Paragraph 152 states;

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure."

Local Policy

The Elmbridge Borough Council Core Strategy was adopted in July 2011 and is the principal document within the Council's Local Development Framework.

Whilst 'sustainability' is embroiled within the document the policy, which is most relevant to this Statement is;

CS27- Sustainable Buildings

To reduce the carbon foot print of new development the Council will expect, where viable both financially and technically, residential development of 10 or more dwellings to meet level four of the Code for Sustainable Homes in relation to the energy and CO_2 emissions category, or higher as dictated by future legislation and guidance. *

Higher standards will be encouraged where feasible.

The design of all new developments should facilitate the recycling and composting of waste.

All developments should consider the use of sustainable construction techniques that promote the reuse and recycling of building materials.

All applications for new development should include a completed copy of the Council's Climate Neutral Checklist. **

Large scale residential or commercial developments identified in future DPDs that address development management and site allocations will be required to consider the use of community based system for the provision of heat and power.

An Energy Assessment should be submitted with planning applications to demonstrate how these criteria will be met. In the event that these criteria are not met, robust evidence will need to be submitted to show why they are not technically or financially achievable having regard to the type of development involved and its design.

The Council will explore opportunities for decentralised and renewable or low-carbon energy sources.

* The Code for Sustainable Homes has been revoked by the Government and is no longer applicable. The Council has confirmed the first paragraph of the policy no longer carries any weight.

** The Council have confirmed it is no longer needed to complete the Climate Neutral Checklist.

3.0 Assessment Methodology

The baseline carbon dioxide emissions from the buildings have been established using agreed building specifications and an assumed accommodation schedule for the development.

SAP calculations have been prepared for representative units, the results from which have been aggregated across similar unit types to provide an accurate assessment of the total emissions from the site.

Emission Factors

The CO_2 emission factors, where applicable, used throughout this report have been taken from the Building Regulation Approved Document L (2021).

	kg CO_2/kWh
Grid supplied and displaced electricity	0.136
Mains gas	0.210

4.0 Proposal

The energy strategy within this Statement has been based on the following accommodation schedule.

Unit Type	Number	Area	Total Area
		m^2	m^2
1-Bedroom apartment	1	50.1	50.1
1-Bedroom apartment	1	51.5	51.5
1-Bedroom Maisonette apartment	1	53.0	53.0
1-Bedroom apartment	1	55.3	55.3
1-Bedroom apartment	2	56.0	112.0
1-Bedroom Maisonette apartment	1	57.5	57.5
1-Bedroom apartment	2	59.0	118.0
1-Bedroom apartment	1	62.3	62.3
1-Bedroom Flat-over-Garage (FOG) apartment	1	62.9	62.9
2-Bedroom apartment	1	75.2	75.2
2-Bedroom apartment	2	77.6	155.2
2-Bedroom apartment	1	78.4	78.4
2-Bedroom Mid-terrace house	2	80.0	160.0
2-Bedroom End-terrace house	1	81.3	81.3
3-Bedroom Semi-detached house (2½-storey)	2	144.1	288.2
3-Bedroom Semi-detached house (2½-storey)	2	144.7	289.4
3-Bedroom Semi-detached house (2½-storey)	4	145.7	582.8
Total	**26**		**2,333.1**

5.0 Energy Efficiency

5.1 Demand Reduction (Be Lean)

Design

The energy performance of a building is affected by its design, construction and use and whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.

Sustainable design is not just about incorporating renewable technologies; buildings should be designed at the outset to provide suitable environmental conditions for the occupants whilst also consuming as little energy as practical.

Passive Design Measures

The passive design measures proposed include;

Passive Solar Gain

Passive measures include allowing for natural ventilation and exposed thermal mass coupled with high levels of insulation, air tightness and the control of solar gain.

The Site Layout shows the majority of dwellings are positioned generally with either a northwest and southeast orientation or a southwest and northeast orientation. The majority of apartments are designed with dual aspects. There is one apartment with a single aspect, which is towards the west.

All homes have access to direct sunlight at some point throughout the day.

Natural Daylighting

The orientation and the size of the windows have been optimised to maximise the amount of natural daylight and therefore reduce the demand for artificial lighting.

Efficient Building Fabric

Building Envelope

U-values of the building envelope must meet Building Regulations Part L (2021) standards and further improvements to U-values will reduce the building's heating requirements.

The strategy follows a fabric first approach and the specification proposed for the various thermal elements exceeds the limiting U-values required by the Building Regulations (Part L – 2021).

Ground and exposed floors will be insulated with 150mm PIR insulation or similar.

The external walls will be built in traditional cavity wall construction with 102mm facing brick, 150mm fully-filled cavity and 100mm insulating or medium dense blockwork internally. The cavity will be filled with Knauf Earthwool Dritherm 32 insulation or similar.

The (cold) roofs will be insulated with 450mm of mineral wool with 150mm between and 300mm above joists and any sloping ceilings will be insulated with 120mm PIR insulation between rafters and 50mm below.

Windows are proposed as double glazed with Low 'e' soft coat and argon filled.

It is proposed to set maximum limits for the elemental U-values as follows:

Element	Part L Limiting U-values	Proposed U-values	Proposed Improvement
	W/m²K	W/m²K	
Ground Floor	**0.18**	**0.13**	**28%**
External Walls	**0.26**	**0.18**	**23%**
Roofs (cold)	**0.16**	**0.10**	**38%**
Sloping Ceilings	**0.16**	**0.15**	**6%**
Flat Roofs	**0.16**	**0.15**	**6%**
Windows	**1.60**	**1.20**	**25%**
External Doors	**1.60**	**1.20**	**25%**

g' Value for all Glazing	**0.50**

Air Leakage

Large amounts of heat are lost in winter through air leakage from a building (also referred to as infiltration or air permeability) often through poor sealing of joints and openings in the building

The Building Regulations set a minimum standard for air permeability of 8 m^3 of air per hour per m^2 of envelope area, at 50Pa. The apartments, maisonettes and houses will seek to achieve a 50% improvement over Building Regulations and target a permeability of 4.0 $m^3/hr/m^2$.

Thermal Bridging

The significance of Thermal Bridging, as a potentially major source of fabric heat losses, is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the Thermal Bridging is no longer an option and will not achieve the fabric energy efficiency and energy and CO_2 reduction targets set out in this strategy.

The thermal details for the buildings will be modelled at the detailed working drawing stage but for the purposes of this assessment the thermal details formulated by the Concrete Block Association have been used.

These will enable the buildings to achieve the higher energy efficiency requirements of the Building Regulations.

The bridging losses have been based upon the following values;

Reference	Location	PSI Value
		W/mK
E2	Other Lintels (including other steel lintels)	0.058
E3	Sill	0.036
E4	Jamb	0.023
E5	Ground Floor (Normal)	0.165
E6	Intermediate Floor in a Dwelling	0.002
E7	Party Floor	0.035
E10	Eaves (Ceiling)	0.053
E12	Gable (Ceiling)	0.217
E16	Corner (normal)	0.041
E17	Corner (inverted)	-0.062
E18	Party Wall	0.037

Ventilation

As a result of increasing thermal efficiency and air tightness, Building Regulations Approved Document F was also revised in 2021 to address the possibility of overheating and poor air quality. The ventilation to Cloakrooms, En-Suites and Bathrooms will be comprised of continuous extract ventilation as per System 3 criteria. This reduces the number of external penetrations required to the building envelope.

Active Design Measures will include;

Efficient Lighting and Controls

Throughout the scheme natural lighting has been optimised.

Part L of the Building Regulations requires all light fitting to have lamps with a minimum luminous efficacy of 80 light source lumens per circuit-watt.

Space Heating and Hot Water

The SAP modelling has been based upon the installation of heat pump hot water cylinders to the apartments and air source heat pumps to the maisonette apartments, FOG and houses.

5.2 Establishing Carbon Dioxide Emissions

SAP calculations have been prepared for a 1-bedroom ground-floor apartment at 59.0 m^2, which are proposed as representative of the ground-floor apartments at 51.5, 59.0 and 62.3 m^2 and of the top-floor apartments at 55.3 and 56.0 m^2.

SAP calculations have been prepared for a 2-bedroom ground-floor apartment at 77.6 m^2, which are proposed as representative of the ground-floor apartments at 77.6 m^2 and of the top-floor apartments at 78.4 m^2.

SAP calculations have been prepared for a 2-bedroom mid-floor apartment at 77.6 m^2, which are proposed as representative of the mid-floor apartments at 50.1, 75.2 and 77.6 m^2.

SAP calculations have been prepared for a mid-terrace house at 80.0 m^2, which are proposed as representative of the three terrace houses. These calculations are also proposed as representative of the two 2-storey maisonette apartments and of the single flat-over-garages (FOG) apartment.

SAP calculations have been prepared for a 2½-storey, semi-detached unit at 145.7 m^2, which are proposed as representative of all the semi-detached units.

The SAP Regulations Compliance Reports are attached as Appendix 1 but the target dwelling emissions rate (TER) and dwelling emissions rate (DER) can be summarised as follows;

1-Bedroom Ground-floor apartment –59.0 m^2	CO_2 TER	CO_2 DER
	kg/m^2/yr	kg/m^2/yr
Space heating	6.41	4.81
Water heating	8.16	2.13
Electricity for pumps, fans and lighting	0.51	0.22
Energy saving/ generation technologies	-3.45	0.00
Total	**11.63**	**7.16**

2-Bedroom Ground-floor apartment – 77.6 m^2	CO_2 TER	CO_2 DER
	kg/m^2/yr	kg/m^2/yr
Space heating	7.78	5.53
Water heating	6.71	1.84
Electricity for pumps, fans and lighting	0.48	0.23
Energy saving/ generation technologies	-2.29	0.00
Total	**12.68**	**7.60**

2-Bedroom Mid-floor apartment – 77.6 m^2	CO_2 TER	CO_2 DER
	$kg/m^2/yr$	$kg/m^2/yr$
Space heating	5.28	3.57
Water heating	6.76	1.84
Electricity for pumps, fans and lighting	0.48	0.23
Energy saving/ generation technologies	-2.29	0.00
Total	**10.23**	**5.64**

2-Bedroom Terrace house – 80.0 m^2	CO_2 TER	CO_2 DER
	$kg/m^2/yr$	$kg/m^2/yr$
Space heating	6.63	1.58
Water heating	6.76	1.52
Electricity for pumps, fans and lighting	0.44	0.21
Energy saving/ generation technologies	-3.44	0.00
Total	**10.39**	**3.31**

3-Bedroom 2½-storey Semi-detached house – 145.7 m^2	CO_2 TER	CO_2 DER
	$kg/m^2/yr$	$kg/m^2/yr$
Space heating	8.10	1.31
Water heating	3.99	1.37
Electricity for pumps, fans and lighting	0.33	0.17
Energy saving/ generation technologies	-2.69	0.00
Total	**9.73**	**2.85**

Total Site Carbon Dioxide Emissions

Using the above information, the unit emissions following the energy efficiency measures detailed above and the installation of air source heat pumps can be aggregated across the similar unit types to calculate the total site emissions as follows;

Unit Type	Area	CO_2 TER	CO_2 DER
	m^2	kg/yr	kg/yr
1-Bed Ground-floor Apartments (51.5 – 59.0 m^2)	231.8	2,696	1,660
1-Bed Top-floor Apartments (55.3 – 56.0 m^2)	167.3	1,946	1,198
2-Bed Ground-floor Apartment (77.6 m^2)	77.6	984	590
1 & 2-Bed Mid-floor Apartments (50.1 - 77.6 m^2)	202.9	2,076	1,144
2-Bed Top-floor Apartment (78.4 m^2)	78.4	994	596
Terrace houses, Maisonettes & FOG (53.0 – 81.3 m^2)	414.7	4,309	1,373
Semi-detached houses (144.1 – 145.7 m^2)	1,160.4	11,291	3,307
	2,333.1	**24,296**	**9,868**

The total site emissions allowable through the Building Regulations (TER) are calculated as:

- **24,296 kg CO_2 per year**

With total actual site emissions (DER) assessed as:

- **9,868 kg CO_2 per year**

The site carbon dioxide emissions are reduced by 14,428 kg CO_2 per year as a result of the energy efficiency measures and the installation of heat pump hot water cylinders and air source heat pumps, which equates to a reduction of 59.38% of the TER emissions.

The individual reductions to the modelled home types range from 38.44% to 70.71%.

5.3 Low-Carbon and Renewable Technologies (Be Clean and Be Green)

The carbon dioxide emissions established above have been used to test the viability of various renewable and low carbon technologies as follows.

The Government's Renewable Obligation defines renewable energy in the UK. The identified technologies are;

- Small hydro-electric
- Landfill and sewage gas
- Onshore and offshore wind
- Biomass
- Tidal and wave power
- Geothermal power
- Solar

The use of landfill or sewage gas, offshore wind or any form of hydroelectric power is not suitable for the site due to its location. The remaining technologies are considered below;

Wind

Wind turbines are available in various sizes from large rotors able to supply whole communities to small roof or wall-mounted units for individual dwellings.

The Government wind speed database predicts local wind speeds at Anyards Road to be 4.6 m/s at 10m above ground level and 5.4 m/s at 25m above ground level. This is below the level generally required for commercial investment in large wind turbines. In addition the land take, potential for noise and signal interference make a large wind turbine unsuitable for this development.

Roof mounted turbines could be used at the development to generate small but valuable amounts of renewable electricity but the small output and contribution to total emissions means any investment would be small and purely tokenism. In addition the use of wind turbines will have a detrimental aesthetic impact on the appearance of the development.

Combined Heat and Power and Community Heating

Combined heat and power (CHP) also called co-generation is a de-centralised method of producing electricity from a fuel and 'capturing' the heat generated for use in buildings. The plant is essentially a small-scale electrical power station. The production and transportation of electricity via the National Grid is very inefficient with over 65% of the energy produced at the power station being lost to the atmosphere and through transportation.

CHP units are generally gas fuelled and generate electricity with heat being a by-product. The heat is usually used to meet the hot water load, which is fairly consistent throughout the year.

Historically CO_2 savings have been achieved because gas has been used to generate electricity and gas has had a lower emissions factor than electricity, However, with the de-carbonisation of the electricity grid the benefit of CHP is negated.

CHP is not proposed.

Ground Source Heat Pumps

Sub soil temperatures are reasonably constant and predictable in the UK, providing a store of the sun's energy throughout the year. Below London the groundwater in the lower London aquifer is at a fairly constant temperature of 12º C. Ground source heat pumps (GSHP) extract this low-grade heat and convert it to usable heat for space heating.

GSHP operates on a similar principle to refrigerators, transferring heat from a cool place to a warmer place. They operate most efficiently when providing space heating at a low temperature, typically via under floor heating or with low temperature radiators.

Whilst the houses have private garden areas it is unlikely there will be sufficient external ground area to sustain a horizontal collection system for each unit and the installation of a ground source heat pump is likely to require the use of a bore hole collection system.

This would be cost prohibitive and therefore ground source heat pump systems are not appropriate. The installation of ground source heat pumps into apartments is not practical.

Solar

(i) Solar Water Heating

Solar hot water panels use the suns energy to directly heat water circulating through panels or pipes. The technology is simple and easily understood by purchasers. Solar hot water heating panels are based generally around two types, which are available being 'flat plate collectors' and 'evacuated tubes'. Flat plate collectors can achieve an output of up to 1,124 kWh/annum (Schuco) and evacuated tubes can achieve outputs up to 1,365 kWh/annum (Riomay).

The total reduction in emissions from the installation of solar hot water panels to each unit, assuming a 50% reduction (and assuming appropriate orientation) is calculated as **1,866 kg CO_2 per year.**

When combined with the measures already proposed this increase the emissions reduction by **7.68%**.

Whilst the installation of solar hot water panels to the dwellings is feasible, the use of air source heat pumps to all units already reduces emissions significantly and the marginal increase in the reduction from the use of solar hot water panels does not represent good value when considering the additional costs of the panels.

Solar hot water heating panels are not proposed.

(ii) Photovoltaics

Photovoltaic panels (PV) provide clean silent electricity. They generate electricity during most daylight conditions although they are most efficient when exposed to direct sunlight or are orientated to face plus or minus 30 degrees of due south.

The installation of photovoltaic panels is not proposed.

Air Source Heat Pumps (ASHP)

Air sourced heat pumps operate using the same reverse refrigeration cycle as ground source heat pumps, however the initial heat energy is extracted from the external air rather than the ground. These heat pumps can be reversed to provide cooling to an area although this reduces the coefficient of performance of the pumps.

It is proposed to install heat pump hot water cylinders into the apartments and to install air source heat pumps into the maisonette apartments, the flat-over-garages (FOG) and houses.

5.4 Summary of Calculations and Proposals for Low-carbon and Renewable Technologies

The maximum permissible CO_2 emissions as a result of Part L of the Building Regulations are calculated as **24,296 kg CO_2 per year**, with actual DER emissions calculated as **9,868 kg CO_2 per year.**

Various technologies are considered above and whilst wind turbines, combined heat and power, ground source heat pumps and solar hot water heating panels are not considered appropriate the use of photovoltaic panels and air source heat pumps, are considered feasible (albeit the use of photovoltaic panels are not proposed).

Be Lean

The construction standards proposed include U-values, which demonstrate good practice and improve upon those required by the Building Regulations. Air tightness standards are targeted at a 50% improvement upon the minimum required by the Building Regulations.

Be Clean and Be Green

Various technologies are considered above and it is proposed to install air source hot water cylinders into each apartment and air source heat pumps into each maisonette apartment, the flat-over-garages (FOG) and the houses.

As a result of the energy efficiency measures incorporated into the fabric specification of the homes and the installation of heat pumps into the dwellings the emissions are reduced by a total of **14,428 kg CO_2 per year**, which equates to a total site reduction of **59.38%.**

The above analysis confirms that the individual reductions to the dwelling types range from 38.44% to 70.71%.

6.0 Climate change adaption and Water resources

Sustainable Drainage Systems (SUDS)

The site lies within Flood Zone 1 and is classified as being of low risk.

Surface Water Management

The houses have private gardens and discretely located rainwater butts could be provided to store rainwater for use with landscaping maintenance.

Consideration has been given to the use of grey water recycling. However, customer's resistance to the appearance of the recycled water and the cost of the systems does not currently make them a viable option. They have therefore not been included in the proposals.

Water efficiency measures

In excess of 20% of the UK's water is used domestically with over 50% of this used for flushing WCs and washing (source: Environment Agency). The majority of this comes from drinking quality standard or potable water.

The water efficiency measures included will ensure that the water use target of 110 litres per person per day is achieved.

Water efficient devices will be fully evaluated, and installed, wherever possible. The specification of such devices will be considered at detailed design stage and each will be subject to an evaluation based on technical performance, cost and market appeal, together with compliance with the water use regulations.

The following devices will be incorporated within the apartments and houses:

- water efficient taps
- water efficient toilets
- low output showers
- flow restrictors to manage water pressures to achieve optimum levels and
- water meters

Below is a typical specification, which would achieve the 110 Litres per person per day target (including five litres per person per day allowance for external water use).

Schedule of Appliance Water Consumption		
Appliance	Flow rate or capacity	Total Litres
WC	6/3 litres dual flush	17.64
Basin	2.0 litres/min.	4.74
Shower	9.0 litres/min	39.33
Bath	175 litres	19.25
Sink	5.0 litres/min	12.56
Washing Machine	6.75 litres/kg	14.18
Dishwasher	1.25 litres/places	4.50
		112.20
	Normalisation Factor	0.91
	Total Internal Water Consumption	102.10
	External Water Use	5.00
	Total Water Consumption	107.10

7.0 Materials and Waste

The BRE Green Guide to Specification is a simple guide for design professionals. The guide provides environmental impact, cost and replacement interval information for a wide range of commonly used building specifications over a notional 60-year building life. The construction specification will prioritise materials within ratings A+, A or B.

Preference will be given to the use of local materials & suppliers where viable to reduce the transport distances and to support the local economy. A full evaluation of these suppliers will be undertaken at the next stage of design.

In addition, timber would be sourced, where practical, certified by PEFC or an equivalent approved certification body and all site timber used within the construction process would be recycled.

All insulation materials to will have a zero ozone depleting potential

Construction waste

Targets will be set to promote resource efficiency in accordance with guidance from WRAP, Envirowise, BRE and DEFRA.

The overarching principle of waste management is that waste should be treated or disposed of within the region where it is produced.

Construction operations generate waste materials as a result of general handling losses and surpluses. These wastes can be reduced through appropriate selection of the construction method, good site management practices and spotting opportunities to avoid creating unnecessary waste.

The Construction Strategy will explore these issues, some of which are set out below:

- Proper handling and storage of all materials to avoid damage.
- Efficient purchasing arrangements to minimise over ordering.
- Segregation of construction waste to maximise potential for reuse/recycling.
- Suppliers who collect and reuse/recycle packaging materials.

Appendix 1 – SAP Regulation Compliance Reports for Modelled Units

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 10 Beta program, Version: 1.0.0.37
Printed on 09 October 2023 at 17:59:33

Project Information:

Assessed By: Bluesky Unlimited **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 59m²

Site Reference : Anyards Road, Cobham **Plot Reference:** 1BF GND 59 HWHP

Address :

Client Details:

Name: Shanly Homes

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: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	11.63 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	7.16 kg/m²	**OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	36.4 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	34.8 kWh/m²	
		OK

1c TPER and DPER

Target Primary Energy Requirement (TPER)	45.9
Dwelling Primary Energy Requirement (DPER)	79.0

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.18 (max. 0.70)	**OK**
Party wall	0.00 (max. 0.20)	-	**OK**
Floor	0.13 (max. 0.18)	0.13 (max. 0.70)	**OK**
Roof	(no roof)		
Openings	1.20 (max. 1.60)	1.20 (max. 3.30)	**OK**
	Roof lightsNaN (max. 2.20)		**OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	8.0	**OK**

4 Heating efficiency

Main Heating system: Electric storage systems - electric
Modern (slimline) storage heaters with Celect-type control

Regulations Compliance Report

Secondary heating system:	None	

5 Cylinder insulation

Hot water Storage:	No cylinder	

6 Controls

Space heating controls	Celect-type controls	**OK**
Hot water controls:	No cylinder thermostat	
	No cylinder	

7 Low energy lights

Minimum luminous efficacy of 75 (lm/W)	80.0 (lm/W)	
		OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

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

Based on:

Overshading:	Average or unknown
Windows facing: South West	6m²
Windows facing: West	1.44m²
Windows facing: South	1.44m²
Windows facing: South East	0.61m²
Ventilation rate:	4.00
Blinds/curtains:	None

Party Walls U-value	0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 10 Beta program, Version: 1.0.0.37
Printed on 09 October 2023 at 18:00:33

Project Information:

Assessed By: Bluesky Unlimited **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 77.6m²

Site Reference : Anyards Road, Cobham **Plot Reference:** 2BF GND 78 HWHP

Address :

Client Details:

Name: Shanly Homes

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: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	12.68 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	7.60 kg/m²	**OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	43.0 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	39.6 kWh/m²	
		OK

1c TPER and DPER

Target Primary Energy Requirement (TPER)	58.0
Dwelling Primary Energy Requirement (DPER)	83.9

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.18 (max. 0.70)	**OK**
Party wall	0.00 (max. 0.20)	-	**OK**
Floor	0.13 (max. 0.18)	0.13 (max. 0.70)	**OK**
Roof	(no roof)		
Openings	1.20 (max. 1.60)	1.20 (max. 3.30)	**OK**
	Roof lightsNaN (max. 2.20)		**OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	8.0	**OK**

4 Heating efficiency

Main Heating system: Electric storage systems - electric
Modern (slimline) storage heaters with Celect-type control

Regulations Compliance Report

Secondary heating system:	None	

5 Cylinder insulation

Hot water Storage:	No cylinder	

6 Controls

Space heating controls	Celect-type controls	**OK**
Hot water controls:	No cylinder thermostat	
	No cylinder	

7 Low energy lights

Minimum luminous efficacy of 75 (lm/W)	80.0 (lm/W)	
		OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames valley):	Not significant	**OK**

Based on:

Overshading:	Average or unknown
Windows facing: West	3m²
Windows facing: South West	0.72m²
Windows facing: North West	0.72m²
Windows facing: North	3.24m²
Windows facing: North East	1.62m²
Ventilation rate:	4.00
Blinds/curtains:	None

Party Walls U-value	0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 10 Beta program, Version: 1.0.0.37
Printed on 09 October 2023 at 18:01:08

Project Information:

Assessed By: Bluesky Unlimited **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 77.6m²

Site Reference : Anyards Road, Cobham **Plot Reference:** 2BF MID 78 MID hwhp

Address :

Client Details:

Name: Shanly Homes

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: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	10.23 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	5.64 kg/m²	**OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	30.0 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	26.5 kWh/m²	
		OK

1c TPER and DPER

Target Primary Energy Requirement (TPER)	44.8
Dwelling Primary Energy Requirement (DPER)	62.3

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.18 (max. 0.70)	**OK**
Party wall	0.00 (max. 0.20)	-	**OK**
Floor	(no floor)		
Roof	(no roof)		
Openings	1.20 (max. 1.60)	1.20 (max. 3.30)	**OK**
	Roof lightsNaN (max. 2.20)		**OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	8.0	**OK**

4 Heating efficiency

Main Heating system: Electric storage systems - electric
Modern (slimline) storage heaters with Celect-type control

Regulations Compliance Report

Secondary heating system:	None	

5 Cylinder insulation

Hot water Storage:	No cylinder	

6 Controls

Space heating controls	Celect-type controls	**OK**
Hot water controls:	No cylinder thermostat	
	No cylinder	

7 Low energy lights

Minimum luminous efficacy of 75 (lm/W)	80.0 (lm/W)	
		OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

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

Based on:

Overshading:	Average or unknown
Windows facing: West	3m²
Windows facing: South West	0.72m²
Windows facing: North West	0.72m²
Windows facing: North	3.24m²
Windows facing: North East	1.62m²
Ventilation rate:	4.00
Blinds/curtains:	None

Thermal bridging	0.033 W/m²K
Party Walls U-value	0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 10 Beta program, Version: 1.0.0.37
Printed on 09 October 2023 at 18:01:38

Project Information:

Assessed By: Bluesky Unlimited **Building Type:** Mid-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 80m²

Site Reference : Anyards Road, Cobham **Plot Reference:** 2BH MID 80 ASHP

Address :

Client Details:

Name: Shanly Homes

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: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	10.39 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	3.31 kg/m²	**OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	37.2 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	38.0 kWh/m²	

Excess energy = 0.75 kg/m² (02.0 %)

Target Primary Energy Requirement (TPER)	39.0	
Dwelling Primary Energy Requirement (DPER)	36.6	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.18 (max. 0.70)	**OK**
Party wall	0.00 (max. 0.20)	-	**OK**
Floor	0.13 (max. 0.18)	0.13 (max. 0.70)	**OK**
Roof	0.10 (max. 0.16)	0.10 (max. 0.35)	**OK**
Openings	1.20 (max. 1.60)	1.20 (max. 3.30)	**OK**
	Roof lightsNaN (max. 2.20)		**OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	8.0	**OK**

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Regulations Compliance Report

Secondary heating system:	None	

5 Cylinder insulation

Hot water Storage:	Measured cylinder loss: 1.20 kWh/day	
	Permitted by DBSCG: 2.06 kWh/day	OK
Primary pipework insulated:	Yes	OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Minimum luminous efficacy of 75 (lm/W)	80.0 (lm/W)	
		OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames valley):	Not significant	OK

Based on:

Overshading:	Average or unknown
Windows facing: South East	1.8m²
Windows facing: South East	0.72m²
Windows facing: North West	1.8m²
Windows facing: North West	3.78m²
Windows facing: South East	3.24m²
Windows facing: North West	0.92m²
Windows facing: North West	1.62m²
Ventilation rate:	8.00
Blinds/curtains:	None

10 Key features

Roofs U-value	0.1 W/m²K
Party Walls U-value	0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 10 Beta program, Version: 1.0.0.37
Printed on 09 October 2023 at 18:02:05

Project Information:

Assessed By: Bluesky Unlimited **Building Type:** Semi-detached House

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 147.46m²

Site Reference : Anyards Road, Cobham **Plot Reference:** 3BH 146 SEMI ASHP

Address :

Client Details:

Name: Shanly Homes

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: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	9.73 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	2.85 kg/m²	**OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	43.6 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	41.9 kWh/m²	
		OK

1c TPER and DPER

Target Primary Energy Requirement (TPER)	39.0	
Dwelling Primary Energy Requirement (DPER)	31.5	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.18 (max. 0.70)	**OK**
Party wall	0.00 (max. 0.20)	-	**OK**
Floor	0.13 (max. 0.18)	0.13 (max. 0.70)	**OK**
Roof	0.11 (max. 0.16)	0.15 (max. 0.35)	**OK**
Openings	1.20 (max. 1.60)	1.20 (max. 3.30)	**OK**
	Roof lights1.20 (max. 2.20)		**OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	8.0	**OK**

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 8kW

Regulations Compliance Report

Secondary heating system:	None	

5 Cylinder insulation

Hot water Storage:	Measured cylinder loss: 1.20 kWh/day	
	Permitted by DBSCG: 2.22 kWh/day	**OK**
Primary pipework insulated:	Yes	**OK**

6 Controls

Space heating controls	Time and temperature zone control by device in database	**OK**
Hot water controls:	Cylinderstat	**OK**
	Independent timer for DHW	**OK**
Boiler interlock:	Yes	**OK**

7 Low energy lights

Minimum luminous efficacy of 75 (lm/W)	80.0 (lm/W)	
		OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames valley):	Not significant	**OK**

Based on:

Overshading:	Average or unknown
Windows facing: South West	1.35m²
Windows facing: North	0.72m²
Windows facing: South	0.72m²
Windows facing: North East	7.56m²
Windows facing: South West	3.24m²
Windows facing: North East	2.43m²
Windows facing: North West	0.63m²
Windows facing: North West	2.16m²
Windows facing: South West	1.08m²
Roof windows facing: North East	1.08m²
Ventilation rate:	8.00
Blinds/curtains:	None

10 Key features

Roofs U-value	0.1 W/m²K
Party Walls U-value	0 W/m²K