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Sustainability & Energy Statement

Land South of Holt Cottages, Ashford Hill

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Executive Summary

This Sustainability and Energy Statement has been prepared in support of an outline planning application for up to 45 dwellings on land south of Holt Cottages, Ashford Hill.

The Statement includes an energy demand assessment showing how selected energy efficiency, low carbon and renewable energy measures have been considered and those, which may be incorporated into the scheme.

Detailed drawings have yet to be produced but the total site energy demand and carbon emissions have been estimated by preparing SAP calculations based upon an agreed construction specification, the Site Layout drawing and an assumed accommodation mix.

The adopted planning policy does not require a specific reduction in carbon emissions but the Applicant is committed to creating a sustainable development and has set a target of achieving at least a 31% reduction in emissions (over Part L 2013).

The fabric insulation standards and the construction specification of the dwellings will exceed the minimum required by the Building Regulations and the calculations have allowed a variety of different technologies to be tested.

It is proposed to provide space heating and hot water to all houses using air source heat pumps and air source heat pump hot water cylinders will be installed to the apartments (with space heating provided by high efficiency storage heaters).

Therefore the heat provided to all units comes from low-carbon technologies.

The reduction in emissions can be summarised as follows;

	Emissions	% Reduction
	kg CO_2 per year	%
Baseline Site Carbon Dioxide Emissions (TER)	115,007	
Emissions following the Installation of ASHPs to all houses (DER)	76,803	
Reduction in Emissions	**38,204**	**33.22%**

The water efficiency measures incorporated within the homes will ensure the water use is less than 110 litres per person per day (including 5 litres per person per day allowance for external water use).

1.0 Introduction

This report has been commissioned by JPP Land Limited, Rosemary Pelham and Timothy Pyper and provides a Sustainability and Energy Statement for the construction of 45 dwellings on land south of Holt Cottages, Ashford Hill.

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

The homes will be designed and 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, renewable technologies will be 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 - 2021

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 local policy framework is provided by the Basingstoke and Deane Local Plan (2011 to 2029), which was adopted in May 2016. The Council have commenced work on an updated local plan but it is early in its development and is not considered as part of this Statement.

The Council published a supplementary planning document entitled Design and Sustainability in July 2018.

The following policies and guidance have been edited from the above documents and are of particular relevance to the topic area of this Statement.

Basingstoke and Deane Local Plan (2011 to 2029)

Policy SD1 – Presumption in favour of sustainable development

When considering development proposals, the council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will always work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

Planning applications that accord with the policies in this Local Plan (and, where relevant, with polices in neighbourhood plans) will be approved without delay, unless material considerations indicate otherwise.

Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the council will grant permission unless material considerations indicate otherwise – taking into account whether:

- *Any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or*
- *Specific policies in that Framework indicate that development should be restricted.*

Policy EM9 – Sustainable Water Use

Development will be permitted provided that:

a) New homes (including replacement dwellings) meet a water efficiency standard of 110 litres or less per person per day;

b) New non-residential development of 1000sqm gross floor area or more meet the BREEAM 'excellent' standards for water consumption.

The above applies unless it can be clearly demonstrated that it would not be feasible on technical or viability grounds.

Compliance with the BREEAM requirement will need to be demonstrated through the submission of a post construction BREEAM certificate as appropriate.

Where new national standards exceed those set out above, the national standards will take precedence.

Design and Sustainability SPD

Sustainable urban design principles

Layout:

- *provide permeable layouts, with high quality footpaths and cycle routes in order to encourage sustainable modes of travel*
- *respond to local climatic conditions*
- *provide and protect green and open spaces*
- *minimise loss of planting/natural features*
- *make generous provision for new planting*
- *use sustainable drainage systems*
- *retain and enhance habitat linkages and corridors.*

Buildings:

- *provide energy efficient buildings*
- *incorporate renewable energy technologies in a contextually sensitive manner*
- *use environmentally friendly materials (i.e. low embodied energy), from sustainable and/or local sources*
- *incorporate suitable features for the enhancement of biodiversity*
- *re-use existing buildings wherever possible, especially those of historic significance.*

Key design principles – high quality buildings

HQB10 – Ensure that the layout of new development and the design of buildings supports passive solar gain.
HQB11 – Incorporate renewable energy technologies where possible, in a manner which is sympathetic to the character of the area and the design of the proposed development.
HQB12 – Utilise water efficiency technologies and techniques.
HQB13 – Employ sustainable drainage systems wherever feasible.

3.0 Assessment Methodology

The baseline carbon dioxide emissions and energy demand from the homes have been established using agreed building specifications and SAP calculations from similar home types.

Emission Factors

The CO_2 emission factors, where applicable, used throughout this report have been taken from the Building Regulation Approved Document L - 2013.

	kg CO_2/kWh
Grid supplied and displaced electricity	0.519

4.0 Proposal

The application seeks outline consent for 45 dwellings.

However, for the purposes of this Statement an accommodation schedule needs to be assumed and therefore the statement has been based on the mix of units provided on the Site Layout and assumed floor areas, as follows;

Unit Type	Number	Area	Total Area
		m^2	m^2
1-Bedroom apartments	6	65.0	390.0
2-Bedroom Terraced houses	3	74.0	222.0
2-Bedroom Semi-detached houses	8	79.0	632.0
2-Bedroom Detached houses	4	94.0	376.0
3-Bedroom Detached houses	3	108.0	324.0
3-Bedroom Detached houses	6	110.0	660.0
3-Bedroom Detached houses	6	130.0	780.0
4-Bedroom Detached houses	6	135.0	810.0
4-Bedroom Detached houses	3	180.0	540.0
	45		**4,734.0**

5.0 Energy Efficiency

5.1 Demand Reduction (Be Lean and Be Clean)

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. It is possible to exceed Building Regulations requirements (Part L - 2013) through demand reduction measures alone, which typically include a combination of passive design measures (e.g. building design and efficient building fabric) and active design measures (e.g. variable speed motors).

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 indicative Site Layout provides all dwellings with at least dual aspects and therefore all units will 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 L1A standards and further improvements to U-values will reduce the home's heating requirements. There is a commitment to exceed the minimum U-values required by the Building Regulations.

The modelling has been based upon external walls built in traditional cavity wall construction with 100mm internal block, fully filled cavity wall insulation and 100mm brickwork externally.

Ground floors have been assumed to be insulated with 120mm 'Kingspan' PIR insulation or similar and roofs (lofts) with 400mm of mineral wool insulation.

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/m^2K	W/m^2K	
Ground Floors	**0.20**	**0.13**	**35%**
External Walls	**0.30**	**0.22**	**27%**
Roofs	**0.20**	**0.10**	**50%**
Windows	**2.00**	**1.40**	**30%**

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 10 m^3 of air per hour per m^2 of envelope area, at 50Pa.

Air tightness standards for the homes will target a 55% improvement over Building Regulations and will seek to achieve a permeability of 4.5 $m^3/hr/m^2$ or better.

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.

Accredited Construction Details (ACD's) have been developed to provide the performance standards required to achieve the higher energy efficiency requirements of the Building Regulations. The bridging losses have been calculated using SAP Appendix K Table 1.

Ventilation

As a result of increasing thermal efficiency and air tightness, Building Regulations Approved Document F was also revised in 2006 to address the possibility of overheating and poor air quality.

Active Design Measures will include;

Efficient Lighting and Controls

Throughout the scheme natural lighting will be optimised.

Approved Document L1A requires three in four light fittings (75%) to be dedicated low energy fittings. The homes will exceed this and all light fittings will be of a dedicated energy efficient type.

External lighting will be fitted with time controls and light sensors to ensure illumination is restricted to required times. External lighting will be limited to a maximum fitting output of 150w.

Heating

The SAP modelling below has been based upon air source heat pumps being installed to all houses and air source heat pump hot water cylinders being installed to apartments. These are regarded as a low-carbon technology.

5.2 Establishing Energy Demand and Carbon Dioxide Emissions

A number of SAP calculations have been used based upon typical house type drawings and the agreed specification as set out above in order to estimate the emissions from the site.

There are six, 1-bedroom apartments and SAP calculations have been prepared for a unit at 65.0 m² which is presented as representative of these six units.

There are three, 2-bedroom terraced and eight, 2-bedroom semi-detached houses of 74.0 m² and 79.0 m² respectively and SAP calculations have been prepared for one of these, which is presented as representative of all 11 units.

There are 28 detached units in a range 94.0 m² - 180.0 m² and SAP calculations have been prepared for a 3-bedroom house at 135.0 m², which is presented as representative of all detached units.

The calculations have been based upon the use of a Vaillant aroSTOR air source heat pump hot water cylinder to the apartments and a Vaillant aroTHERM air source heat pump to the houses.

1-Bedroom apartment – 65.0 m²	CO_2 TER	CO_2 DER
	kg/m²/yr	kg/m²/yr
Space heating	8.23	18.58
Water heating	7.76	6.45
Electricity for pumps, fans & lighting	2.99	2.61
Total	**27.78***	**27.64**

2-Bedroom Semi-detached house – 79.0 m²	CO_2 TER	CO_2 DER
	kg/m²/yr	kg/m²/yr
Space heating	8.17	8.91
Water heating	6.86	5.20
Electricity for pumps, fans & lighting	2.81	2.35
Total	**26.11***	**16.46**

4-Bedroom Detached house – 135.0 m²	CO_2 TER	CO_2 DER
	kg/m²/yr	kg/m²/yr
Space heating	9.48	9.24
Water heating	4.25	3.74
Electricity for pumps, fans & lighting	2.17	1.91
Total	**23.46***	**14.89**

Using the above the results can be aggregated across all similar unit types to arrive at the total site CO_2 emissions as follows;

	Area	CO_2 TER	CO_2 DER
	m^2	kg/yr	kg/yr
Apartments	390	10,834	10,780
Terraced & Semi-detached houses	854	22,298	14,057
Detached houses	3,490	81,875	51,966
Total	**4,734**	**115,007**	**76,803**

The reduction in emissions as a result of the energy efficiency measures and the installation of air source heats incorporated into the dwellings is calculated as **38,204 kg CO_2 per year**.

This equates to a reduction in emissions of **33.22%.**

* The sum of the individual emissions will not total the TER figure because the calculation applies a carbon factor for the fuel used.

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. This section determines the appropriateness of each renewable technology and considers the ability of each technology to comply with the planning requirements.

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 Ashford Hill to be 5.0 m/s at 10m above ground level and 5.8 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.

Consequently CHP can demonstrate significant CO_2 savings and although not necessary classed as renewable energy (depending on the fuel used) the technology is low carbon.

For a CHP plant to be economic it needs to operate for as much of the time as possible (usually deemed to be in excess of 14 hours per day) and therefore the size of the unit are usually based upon the hot water load of the building (s) with additional boilers meeting the peak space heating demand.

There is insufficient energy demand to efficiently run a CHP unit. In addition the density of the site is not appropriate to efficiently sustain a communal heating system with or without a CHP units.

The technology is not appropriate and is therefore 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 12° 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 will have private garden areas it is unlikely there will be sufficient external ground area to sustain a horizontal collection system and the installation of ground source heat pumps is likely to require the use of a bore hole collection system to each house.

The use of ground source heat pumps with bore-hole collection systems to the houses would be cost prohibitive and the installation into apartments is not practical.

Ground-source heat pumps are not proposed.

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).

Panels are traditionally roof mounted and for highest efficiencies should be mounted plus or minus 30 degrees of due south. Evacuated tubes can be laid horizontally on flat roofs but flat plate collectors are recommended for installation at an incline of 30 degrees. It is assumed solar panels could reduce the energy demand of the hot water requirements by 50%.

The total reduction in the hot water demand from a solar hot water panel installation to all dwellings is calculated as **19,284 kWh per year**, which equates to a further reduction in emissions **10,008 kg CO_2 per year**.

The use of solar hot water panels is feasible but their use is dependent upon the architecture of the dwellings and the orientations of roofs.

(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.

PV panels can be integrated into many different aspects of a development including roofs, walls, shading devices or architectural panels. The panels typically have an electrical warranty of 20-25 years and an expected system lifespan of 25-40 years.

The use of photovoltaic panels is feasible but their use is dependent upon the architecture of the dwellings and the orientations of roofs.

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.

ASHP tend to have a lower coefficient of performance (CoP) than GSHP but are considerably less costly to install. They work well where there is a large low temperature demand.

An air source heat pump installation could be installed in all homes to provide space heating and hot water and meet the requirements of the planning policy.

The calculations above demonstrate a reduction in emissions of **33.22%** from the use of ASHP.

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

The total emissions from the site based upon the maximum permissible by the Building Regulations (TER) are calculated as **115,007 kg CO_2 per year**, with DER emissions calculated as **76,803 kg CO_2 per year**.

The adopted planning policy does not require a specific reduction in carbon emissions but the Applicant is committed to creating a sustainable development and has set a target of achieving a 31% reduction in emissions (over Part L 2013).

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

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 55% improvement upon the minimum required by the Building Regulations.

Be Green

It is proposed to future proof the homes and to install an air source heat pump into all units.

This provides all houses with heat from a low-carbon source and the calculations above demonstrate a reduction in emissions of **38,204 kg CO_2 per year**, which equates to a reduction of **33.22%.**

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. It is understood that surface water run-off will be dealt with on site and will discharge to infiltration trenches, the SUDs Pond and/or swales.

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 homes:

- 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 – Regulations Compliance Reports for Modelled Houses

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 29 July 2021 at 17:27:14

Project Information:

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

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 79.0m²

Site Reference : Ashford Hill **Plot Reference:** 2BH SEMI 79

Address :

Client Details:

Name: JPP Land/ Rosemary Pelham & Timothy Pyper

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)	26.11 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.46 kg/m²	**OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	49.4 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	46.0 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.22 (max. 0.30)	0.22 (max. 0.70)	**OK**
Party wall	0.00 (max. 0.20)	-	**OK**
Floor	0.13 (max. 0.25)	0.13 (max. 0.70)	**OK**
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	**OK**
Openings	1.36 (max. 2.00)	1.40 (max. 3.30)	**OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.50 (design value)	
Maximum	10.0	**OK**

4 Heating efficiency

Main Heating system:

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

Secondary heating system: None

5 Cylinder insulation

Hot water Storage:	Measured cylinder loss: 1.42 kWh/day	
	Permitted by DBSCG: 2.24 kWh/day	**OK**

Regulations Compliance Report

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

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	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	5.67m²
Windows facing: North West	0.5m²
Windows facing: North West	1.26m²
Windows facing: North West	2.88m²
Windows facing: South East	2.16m²
Ventilation rate:	8.00
Blinds/curtains:	None

10 Key features

Doors U-value	1.1 W/m²K
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 2012 program, Version: 1.0.4.26
Printed on 29 July 2021 at 17:26:48

Project Information:

Assessed By: Bluesky Unlimited
Building Type: Detached House

Dwelling Details:

NEW DWELLING DESIGN STAGE
Total Floor Area: 135.5m²
Site Reference : Ashford Hill
Plot Reference: 3BH DET 135
Address :

Client Details:

Name: JPP Land/ Rosemary Pelham & Timothy Pyper
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)	23.46 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	14.89 kg/m²	**OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	53.9 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	50.8 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.22 (max. 0.30)	0.22 (max. 0.70)	**OK**
Floor	0.13 (max. 0.25)	0.13 (max. 0.70)	**OK**
Roof	0.10 (max. 0.20)	0.16 (max. 0.35)	**OK**
Openings	1.38 (max. 2.00)	1.40 (max. 3.30)	**OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.50 (design value)	
Maximum	10.0	**OK**

4 Heating efficiency

Main Heating system:
Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 5kW

Secondary heating system: None

5 Cylinder insulation

Hot water Storage:	Measured cylinder loss: 1.42 kWh/day	
	Permitted by DBSCG: 2.56 kWh/day	**OK**
Primary pipework insulated:	Yes	**OK**

Regulations Compliance Report

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

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

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames valley):	Not significant	OK

Based on:

Overshading:	Average or unknown
Windows facing: North East	2.16m²
Windows facing: North East	6.3m²
Windows facing: South West	2.7m²
Windows facing: West	0.72m²
Windows facing: South	0.72m²
Windows facing: South West	0.5m²
Windows facing: North East	4.32m²
Windows facing: South West	1.44m²
Windows facing: South West	2.16m²
Windows facing: South East	0.63m²
Ventilation rate:	8.00
Blinds/curtains:	None

10 Key features

Doors U-value	1.1 W/m²K
Roofs U-value	0.1 W/m²K