



SUSTAINABILITY STATEMENT FOR
PROPOSED DWELLING
ON LAND ADJACENT TO,
2MEADOW APPROACH,
COPTHORNE,
WEST SUSSEX, RH10 3RF.



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This report provides a brief overview of the range of opportunities for sustainable energy and is not intended as detailed design advice. As such data and information should only be treated as indicative at this stage of the process. Further investigation can be undertaken when more accurate and detailed information is required on specific measures.

Whilst Arcadian Architectural Services Ltd (AAS Ltd) has endeavoured to ensure that all information contained within this document is correct, it cannot be held responsible for any inaccuracies within or problems arising out of the use of the document.

INTRODUCTION

This Statement has been prepared in support of a planning application for the erection of a detached dwelling on land adjacent to 2 Meadow Approach, Copthorne, West Sussex. The Statement sets out how the dwelling's thermal envelope will be designed to reduce the predicted energy load, and therefore carbon emissions, using the improvement to the thermal element 'U' values, air permeability, heating and hot water systems. The overall aim of the dwelling design is to ensure maximum possible reduction in carbon emissions within the constraints set by the nature and form of the development and the individual site characteristics.

SAP 10 (Standard Assessment Procedure) calculations will be carried for the dwelling based upon detailed Building Regulation working drawings and the construction specification set out within this report and detailed on the drawings. These calculations will provide an accurate assessment of the carbon dioxide emissions arising from the dwelling. A unique SAP calculation will be produced for dwelling to demonstrate compliance with all the requirements of Part L (2021) of the Building Regulations. Regulation 25 requires the Secretary of State to approve minimum energy performance requirements. These requirements are in the form of a target primary energy rate, a target emission rate and a target fabric energy efficiency rate. The targets are set out in Section 1 of the approved document.

The report demonstrates the sustainability credentials of the development to address Mid Sussex District Council's Policies of the Adopted Core Strategy Local Plan.

This report will ensure that this development takes full account (by mitigation or adaptation) of the likely forecast impacts of climate change including minimising the emissions of greenhouse gases, the use of non-renewable energy and natural resources, and by encouragement of construction using sustainable techniques.

The development seeks to encourage the development of high quality, safe and attractive living environments in both towns and villages with an emphasis on sustainable development.

The development has been assessed under following categories: -

- Minimise energy consumption and carbon emissions and achieve compliance with Part L (2021) of the Building Regulations. Consideration and appraisal of renewable energy technologies.
- Achieve a maximum water consumption of 125 litres per person per day.
- Environmental impact of materials
- Health and well being
- Management
- Provision of electric vehicle charging points.

Minimise energy consumption and carbon emissions and achieve compliance with Part L (2021) of the Building Regulations. Consideration and appraisal of renewable energy technologies.

Energy assessment calculations will be carried to establish the energy requirements and fuel use, for the proposed dwelling using the information provided on detailed working drawings. For the purposes of these calculations the performance for the thermal elements, controlled fittings, heating and hot water were chosen so that compliance with the all the criterion of Part L (2021) of the Building Regulations will be achieved.

The dwelling will be 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 investment in the parts of the dwelling that have the greatest impact on energy demand and are the most difficult and costly to change in the future, namely the building fabric. Low-carbon and/or renewable technologies have been considered to provide or supplement the heating and hot water.

The following assumptions have been made for the thermal elements, controlled fittings, heating and hot water for the dwellings: -

Ground floor - 'U' value 0.13 W/m²K

External walls - 'U' value 0.18 W/m²K

Roof – insulation at ceiling level - 'U' value 0.11 W/m²K

Windows and fully glazed doors – 'U' value 1.20 W/m²K

Front entrance door – 'U' value 1.00 W/m²K

Space heating – Air source heat pump serving underfloor heating & radiators.

Heating controls – Time and temperature zone control.

Thermal bridging – Calculated Psi values specific to each thermal bridge.

Air permeability – 5m³/hm² (@50pa)

Secondary heating – No secondary heating.

Water heating – Indirect insulated hot water cylinder from air source heat pump.

Ventilation – Individual extract fans to all wet rooms.

Lighting – All light fitting to be low energy to satisfy the requirements of Part L1A (2021)

The target CO₂ emission rate (TER), as defined in Part L (2021) of the Building Regulations, sets a minimum allowable standard for the energy performance of a building, and is defined by the annual CO₂ emissions of a notional building of same type, size and shape to the proposed building. TER is expressed in kg of CO₂ per sq. m per year. The dwelling emission rate (DER) is the actual CO₂ emission rate of an individual dwelling or flat (excluding common areas) based on

their actual specification. To achieve compliance under Part L (2021) of the Building Regulations the DER for the proposed building must not exceed the TER.

Using the assumptions made for the thermal elements, controlled fittings, heating and hot water for the dwellings, set out above, it is anticipated that there will be a minimum 40% reduction in carbon emissions, below that which will achieve compliance with Part L (2021) of the Building Regulations. This is a significant improvement, and as mentioned above achieves a balance between seeking to ensure that no harm occurs to the character and appearance whilst maximising CO₂ emission reduction.

Renewable energy technologies considered.

District Heating

A review of local maps shows that no district heating networks currently exist within proximity to the site.

Combined Heat and Power and Community Heating

We consider that for such a small development with no year-round heat demand that this technology would not be appropriate. A CHP plant is usually gas, biomass or coal driving a turbine to create electricity. The problem with this system is that you create a large amount of heat for a smaller amount of electricity. In the summer therefore creating the required electricity will mean dumping the manufactured heat.

Community heating schemes are similar but seek to supply heat only without the electricity production. Therefore, unless using a biomass or biofuel, a community heating system will not demonstrate significant CO₂ reductions. Communal heating with CHP is therefore not proposed.

Solar Photovoltaic

Photovoltaic panels convert energy from the sun into electricity through semi-conductor cells mounted in solar panels. The panels are connected to an inverter to turn DC output into AC for use in the building to which they are attached, and to be fed back into the grid when not required. This technology is considered suitable. However, the client's preference is for an air source heat pump for the dwelling.

Solar Hot Water Systems

Solar water heating systems use energy from the sun to heat water stored in a hot water cylinder via solar collectors on the roof of the building. Whilst, theoretically solar hot water heating panels could be used, additional technologies would be required to achieve a sufficient reduction in carbon emissions. Therefore, solar hot water heating is not proposed.

Biomass Heating

Domestic scale boilers such as woodchip fed systems remain very costly and very large and the requirements for locating both the boiler and the fuel source are considered impractical for this development.

Ground Source Heat Pumps

Ground Heat pumps are used to extract heat from the ground to provide both space and water heating. Heat pumps take in heat at a certain temperature and release it at a higher temperature, using the same process as a refrigerator. Fluid is circulated through pipes buried in

the ground which passes through a heat exchanger in the heat pump which extracts heat from the fluid. The heat pump raises the temperature of the fluid via the compression cycle to supply hot water to the building. The ground pipe system can be horizontal or vertical via boreholes. This technology is not being considered for this development as there is insufficient space for a ground pipe system and the installation cost of boreholes would be prohibitive.

Air Source Heat Pumps

Air source heat pumps are used to extract heat from the air to provide both space and water heating. Heat pumps take in heat at a certain temperature and release it at a higher temperature, using the same process as a refrigerator. Air passes through a heat exchanger in the heat pump which extracts heat from the fluid. The heat pump raises the temperature of the fluid via the compression cycle to supply hot water to the building. This technology is considered suitable for this development and is proposed.

Conclusion

The dwellings thermal envelope will be designed to reduce the predicted energy load of the building using the improvement to the thermal element 'U' values, air permeability and heating systems. The overall aim of the dwelling design is to ensure maximum possible reduction in carbon emissions within the constraints set by the nature and form of the development and the individual site characteristics.

Achieve a maximum water consumption of 125 litres per person per day.

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 in this dwelling will ensure that the water use target of 125 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 dwelling:

- Water efficient taps.
- Water efficient toilets.
- Low output showers.
- Flow restrictors to manage water pressures to achieve optimum levels.
- Water meter with guidance on water consumption and savings.

Water consumption calculations have been carried out using the Water Efficiency Calculator and the results are included in the appendix. Below is a typical specification which will achieve 125 litres per person per day.

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<u>Appliance</u>	<u>Flow rate or capacity</u>	<u>Total Litres</u>
WC's	6/4 litres dual flush	17.64
Wash hand basin	6.00	9.48
Shower	10.00	24.00
Bath	185.00	23.60
Sink	8.00	13.00
Washing machine	8.17	16.80
Dishwasher	1.25	4.50
		<u>124.40</u>

Environmental impact of materials

The following five key elements of the construction will achieve a BRE Green Guide 2006 rating between. A+ and D

- Roof structure and finishes
- External walls
- Upper floor
- Internal Walls
- Windows and doors

Subject to planning conditions external materials will be locally sourced to reduce transport mileage and environmental impact, where reasonably practicable.

Health and well-being.

Adequate day lighting to the kitchen, living room, dining area and office will be provided in accordance with the CIBSE Day Light Monitoring Groups recommendations, where possible.

The garden will be provided as compliant open space with a rotary washing line and secure shed in the rear garden for bicycle storage.

Part O of the Building Regulations will be complied with to mitigate the risk of overheating.

Management.

A home user guide will be provided.

Consideration will be given to energy usage and water consumption on site to minimise impact to the environment.

Part Q of the Building Regulations will be complied with for security.

Provision of electric vehicle charging points.

An electric vehicle charging point will be provided in accordance with Part S of the Building Regulations.

Mark Pelling.

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