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Energy Statement

Project: 5 houses at 101 Brookmans Avenue, Hatfield, AL9 7QG
Client: Alan Cox Associates
Date: 25/02/2019

Contents

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1. General

This energy statement has been prepared by Energytest Ltd. in support of a planning application for the development of 5 dwellings at 101 Brookmans Avenue, Hatfield, AL9 7QG.

The statement provides an initial assessment of the CO2 emissions of the dwelling using approved standard calculation methods (SAP 2012), reviews the various option for renewable technologies and demonstrate how the planning condition will be met by implementing appropriate fabric efficiency measures and renewable and/or low energy technologies. The statement will also assess water usage and how to reduce it as per the planning condition below.

2. Planning Condition

Welwyn Hatfield Borough Council is currently using is District Plan to assess proposals. Policy R3 - Energy Efficiency expects all development to maximise energy conservation through the design of buildings, site layout and provision of landscaping.

The district is also in the stages of preparing a new Local Plan; Policy SP10 Sustainable Design and Construction and SADM13 Sustainability Requirements should be given weight.

Policy SP10 states:

Energy and climate change

- Layout and design of the site and building(s) reflect the energy hierarchy to maximise opportunities to reduce carbon emissions.
- The use of renewables and low carbon energy infrastructure is used where it is appropriate and consistent with other policies.

Policy SADM 13 requires all newly constructed dwellings to achieve an estimated water consumption of no more than 110 litres/person/day, with water reuse and recycling and rainwater harvesting incorporated wherever feasible to reduce demands on mains water supply.

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3. Development

The site involves the demolition of the current dwelling and associated outbuildings and the construction of 5 x 3 storey dwellings and associated landscaping. The dwellings are to be constructed traditionally with concrete slab floors, brick block cavity walls and hipped roofs with dormers.

Heating will be provided via mains gas system boilers for each dwelling.

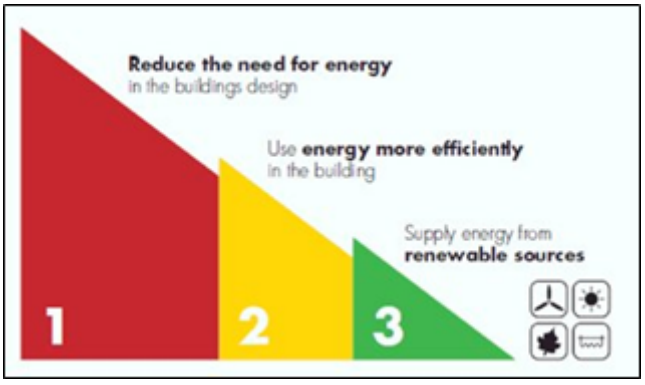
The whole development is to be built to exceed the requirements of the 2013 version of Approved Document L1A of the Building Regulations.

4. Baseline Emissions

The baseline emissions for this development have been calculated as per the minimum requirements of 2013 Approved Document L1A of the Building Regulations, with primary heating and hot water to be provided by a mains gas-fired condensing boiler. Results of which can be seen on the TER calculation sheet (page 9 onwards in the SAP documentation).

5. The Energy Hierarchy

The principle of the energy hierarchy is demonstrated by the diagram below:



Research by the Building Research Establishment (BRE) has found improvement to building fabric and services to be the most cost effective way of reducing energy consumption.

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Results of the study indicated that:

- The cost per tonne of achieving a 1% reduction in CO_2 emissions with renewables was approximately 4 times higher than building fabric improvement; and
- Combining improvements to building fabric and services to achieve approximately a 20% reduction in energy use was cheaper per tonne of CO_2 emissions reduced than by achieving a 10% reduction by using renewables alone.

Following this research BRE have concluded that improvements to building fabric and services should be implemented first with additional renewable energy installations to follow.

Enhancing the thermal performance of the building envelope helps to future-proof the structure and yields the greatest CO_2 savings. Adding renewable technologies will then yield maximum emissions reductions with lower long-term costs for the developer.

5.1 Reduce the need for energy

The proposed development will incorporate levels of insulation above those required by Approved Document L1A of the Building Regulations.

Thermal Element	Building Regulations U Values (W/m^2K)	Achieved U Values (W/m^2K)	Specification
Ground Floor	0.13	0.16	65mm screed on 100mm PIR insulation on concrete slab
External Walls	0.18	0.27	100mm brick outer, 50mm PIR in 100mm cavity, 100mm Hemelite Standard block
Dormer Walls	0.18	0.29.	100mm PIR insulation in 100mm timber studs
Main Flat Roof	0.13	0.09	200mm PIR between joists, SF40 Superfoil below
Rafter Roof	0.13	0.11	150mm PIR between rafters, SF40 Superfoil below
Dormer Flat Roof	0.13	0.13	100mm PIR between joists, SF40 Superfoil below
Openings	1.4	Glazing - 1.4 Doors - 1.4 Roof Lights - 1.3	Double glazed, low E units

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Air Leakage	5 $m^3/h.m^2$	5 $m^3/h.m^2$	An air pressure test is required upon completion
Thermal Bridging	Accredited Construction Details	Concrete Block Association Details specified	A Hemelite Standard block (0.47 W/mK) specified. http://www.cba-blocks.org.uk/walls-with-partially-filled-cavities/

This specification ensures that the Dwelling Fabric Energy Efficiency (DFEE) is better than the Target Fabric Energy Efficiency (TFEE).

Plot No.	TFEE (kWh/m^2/year)	DFEE (kWh/m^2/year)	% Improvement
1	53.58	44.27	17.38
2	53.95	44.52	17.47
3	56.07	47.79	14.77
4	54.25	46.13	14.97
5	54.25	46.13	14.97

5.2 Use energy more efficiently

- Each dwelling will be heated via a mains gas system boiler with a SEDBUK efficiency rating of 89.5% or higher.
- The space heating will be emitted through underfloor heating and radiators. There will be advanced controls incorporating independent time/temperature zone control.
- Hot water will be provided via an efficient hot water cylinder so to limit standing heat loss.
- A wood burning stove is specified in each dwelling as secondary heating.
- All light fittings within each dwelling will be low energy.

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5.3 Supply energy from renewable sources

The developers are going to be installing solar photovoltaic panels to be inline with the Energy Hierarchy and planning conditions.

Based on the specification outlined above and without any PV, the dwellings are achieving between 4-7% improvement over Building Regulations.

A 2kWp array of PV laid horizontal on the flat roof is considered to be of adequate size to produce sufficient electricity to the dwellings as well as reducing the DER by a substantial amount (over 10%).

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6. Results

6.1 Energy Use

Plot No.	TER ($kgCO_2/year/m^2$)	DER ($kgCO_2/year/m^2$)	% Improvement
1	12.45	10.05	19.25
2	12.53	10.07	19.66
3	13.41	10.67	20.40
4	12.92	10.35	19.92
5	12.92	10.35	19.92

As the table shows, each dwelling achieves over 19% improvement. *Please refer to the SAP documentation for a full breakdown of the calculations.*

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6.2 Water Use

The following water usage rates are to be adhered to. Inline flow limiters can be fitted to the pipework should any fittings not achieve the desired flow rate:

- Basin, utility and kitchen taps to have a flow rate of 5 litres per minute (or less);
- Showers to have a flow rate of 8 litres per minute (or less);
- Baths to have a capacity of 180 litres to overflow (or less);
- WCs to have a full flush volume of 5 litres and a part flush volume of 3 litres;
- Washing machines to use 6.5 litres per Kg dry load; and
- Dishwashers to use 0.8 litres per place setting.

These water usage rates ensure the dwellings water usage is below 110 litres per person per day. Please see the table below. Other ways to reduce this further would be grey or rainwater harvesting.

Plot No.	Water Usage (litres per person per day)
1	104.68
2	104.68
3	104.68
4	104.68
5	104.68

Please refer to the water calculations for a full breakdown.