

**1 CASTLE HILL
KENILWORTH
WARWICKSHIRE CV8 1NB**

SUSTAINABILITY BUILDING STATEMENT

Design and Layout /Maximising Energy Efficiency The proposed layout has been designed to accommodate the plot parameters together with the position of the adjoining properties and the internal layout of rooms to best relate to the environs relative to sustainability.

To the north is placed the bedroom which faces Castle Hill with a large window and thick wall for insulation. The east elevation has small areas of fenestration on walls that will receive the least amount of sun, but allow light and ventilation naturally to flow through the building. The south and west elevations where the living areas are, have substantial amounts of glazing which will capture the heat of the sun, yet using the flat roof as an overhang, the direct midday rays will be shaded from the extremes. It also allows for natural ventilation to allow the escape of overheating. The fenestration on the northern, western and eastern side however also allows for ventilation to flow across the rooms again by natural air movement, manually controlled.

The walls will be built from a timber frame construction such as SIPS (structural insulated panels) with levels of insulation to the most up to date standards to exceed building regulations. The external boarding will also retain warmth and will be from sustainable managed sources.

To the roof the 'green' roof will act not only as a heat retainer/ excluder but also as an active water attenuation system to control flows for reuse. The building can be used to save energy by its low carbon footprint with not only the construction but with water reuse for WC and laundry areas.

All external areas will be hand dug to the level above the existing ground as the Arboriculture Report details and be formed by a SUDs compliant system to retain water for potential reuse.

Sustainable materials The walls and roof will be formed using timber framed technology and using the modern systems of SIPs to achieve very low U values. These systems using fabric first provide not only energy efficiency but air permeability and environmental targets to gain A plus rating EPC's and combining energy savings and carbon neutrality. There are several manufacturers of these 'PassivHaus' type systems now whose constructions well exceed building regulation requirements and are accepted by institutions including the NHBC.

Transport would be as minimal as is practical and it would be delivered in one visit and erected on site quickly. Using local trades and suppliers reduces carbon footprint.

Preparing for Climate Change The whole building will take account for potential climate change as is evidenced from the way the materials are selected and used for this site. With summer heat gains the overhanging roofs help protect from the sun's rays, and windows are placed where build up of heat – or lack of heat – is required. With cooler winters and increased rainfalls there is provision for the much increased insulation standards of a much more eco friendly nature and storage of water to offset risk of surcharging drains

Water Conservation The proposal has no on site car parking so restricting the use of hard surfaces. The pedestrian path to the site will be of SUDs type to minimise the flows and allow the rain water to infiltrate the ground. The roof as described will be 'green' to attenuate the water for reuse in the property, and in itself will aid considerably the energy savings required within the building. It will also prevent underground water retention as this affects the ground eco systems and of course RPA's

Renewable Energy and the Historic Environment. The installation of solar panels, tiles, slates and solar collectors (for solar thermal systems) can have an unacceptable impact on listed buildings and unlisted buildings in Conservation Areas which can detract from the historic integrity of the building area. The site and adjoining building have a historic significance and this should not be disturbed by the visual intrusion of 'renewable clutter'. Policy is about what is reasonable in the context of

Heritage assets. The appropriateness is key and whilst there are many renewable systems available for use many are clearly not appropriate for use on this site.

Our view is that we should use fabric first to achieve the lowest U values possible by the design construction, thus rendering the energy use and cost again as low as is achievable with MMC's. The intention is to build a dwelling that requires the least amount of energy to heat the home whether it be by traditional means or by more later alternative renewable ideas and technologies. These are briefly discussed before concluding with a preference

- a) Biomass Boilers. Due to the capital costs of the boilers which are six times those of a domestic boiler are therefore financially not viable. The cost of the pellets is not too dissimilar to that of heating oil and the sustainability of the source is questionable too with delivery high costs and storage requirements.
- b) Ground Source Heat Pumps. There is not enough ground to use this type of system due to tree root systems, either horizontal or vertically
- c) Air Source Heat Pumps. As above this is above ground solution but is restricted as an allocated space is required for air flow through the unit which ideally should be slightly away from the building due to potential noise.
- d) Photovoltaic and Solar Panels. The roof is not suitable for panels of any type being flat and of 'green' design. There is also no large area away from trees to erect such panels to get sufficient sun light to be financially viable or produce sufficient reliable energy even for water heating.

Fabric first. A 'fabric first' approach to building design involves maximising the performance of the components and materials that make up the building fabric itself, before considering the use of mechanical or electrical building services systems. This can help to reduce capital and operational costs, improve energy efficiency and reduce carbon emissions whilst reducing ongoing maintenance costs. Buildings designed and constructed using a fabric first approach aim to minimise the need for energy consumption through methods such as:

- a) Maximising air-tightness
- b) Increased levels of insulation
- c) Optimising solar gain through the provision of openings and shading
- d) Optimising natural ventilation
- e) Using the thermal mass of the building fabric

The proposed design allows for the above methods to be included and by the PassivHaus or Passive House approach the use of additional energies will be very low. Using the building fabric is more sustainable than relying on energy saving products, or renewable technologies, which can be expensive and often cannot be used efficiently by occupants. They also may have an impact on the Wantage and the setting next door so careful selection is required.

Therefore integrating energy efficiency into the building envelope can decrease the requirement for occupant interaction with complex controls and new technologies, reducing the reliance on the end user to achieve the desired energy performance of buildings.

Our preferred route of material selection, U-value performance, tight efficient build, thermal bridging and overall energy performance to develop a highly efficient, cost effective fabric design is first with secondary heating such as a small highly rated boiler or log burner will be all that is required.

Measuring Performance. Performance will be determined by what is actually a legislative requirement when any property is designed. A SAP rating is obtained statutorily for building regulations and when the post build SAP is calculated the performance is given. However, by this fabric first ideal and the reduced reliance on external energy provision there is a stronger belief that this route will provide a lower carbon footprint not only initially but over time also.

Going Forward. Once approved the design of the building and final specifications of the component parts will be feed into the SAP calculation to prove its efficiency. It will detail all the necessary advantages of the fabric first approach which is now the preferred main pathway with renewable or traditional highly efficient energy sources as a necessary top up only. The setting will dictate in the main the route to use and this will be agreed with the LPA as it will be conditioned.