The Hermitage, Parthings Lane, Tower Hill, Horsham, RH13 0JS

Energy & Sustainability Statement

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Report produced by -

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1.0 Introduction

1.1 Blewburton Limited has been commissioned to prepare a Sustainability Statement to support the application for planning permission for the construction of a new residential dwelling.

1.2 As licensed BREEAM, Home Quality Mark, Code for Sustainable Homes and energy assessors of several years standing, Blewburton Limited has considerable expertise in all issues of sustainability.

1.3 The proposed scheme at The Hermitage, Parthings Lane, Tower Hill, Horsham, RH13 0JS will see the construction of a 3-bedroom house on land next to the existing house with associated access, parking space, garden and general landscaping.

1.4 The site is roughly square in shape, covering an area of approximately 0.17ha. It comprises of a garden area, scrub, several trees, fencing and an old, small shed. The site is located within a community of similar sized properties. The centre of Horsham, the closest main residential area, is approximately 2.5km northeast of the site. The existing site area and location is shown in the aerial photo in Figure 1 below, with the proposed site location and layout plan shown in Figures 2 & 3.

Figure 1: Aerial photo of site location and area

Figure 2: Proposed site location

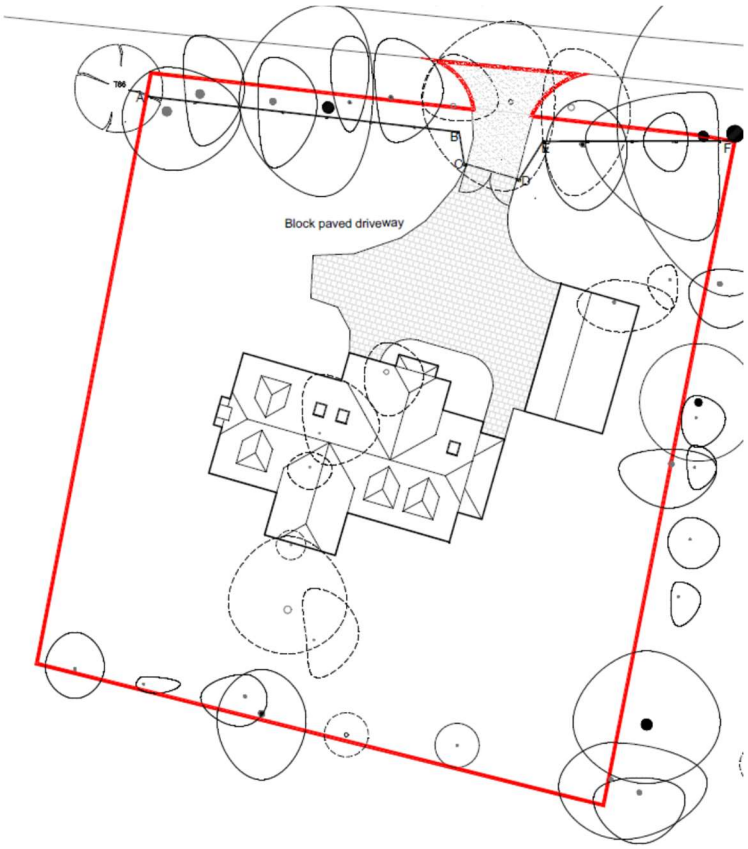

Figure 3: Site layout plan

2.0 Proposed Approach to Sustainability

2.1 This statement sets out the approach that the applicant is proposing to adopt to ensure that the proposal meets high standards of sustainability. The report includes a discussion of the full range of sustainability issues as shown below:

- Energy & carbon emissions;
- Water conservation;
- Flood risk & surface water management;
- Ecology & biodiversity;
- Waste & pollution;
- Materials selection and sustainable construction methods;
- Future needs.

3.0 Energy Conservation and Carbon Emissions

3.1 It is recognised that the generation of energy to heat, light and cool buildings is responsible for approximately half of the total CO_2 emissions of the UK. Part L of the Building Regulations requires a minimum standard of energy efficiency in new development and refurbishments, however, it is the intention with this development to go beyond this.

3.2 As a first step in dealing with carbon emissions arising from energy use within buildings it is important to consider designing in energy efficiency measures as part of the construction of the buildings as these will be difficult to retrofit in the future and this will also reduce the amount of energy required by a building. This is known as being 'lean' in the energy hierarchy.

3.3 Reduction of heat loss is a key element of this and it is proposed that insulation within floors, roofs and walls will exceed the minimum standards required under Part L1 (Conservation of Fuel and Power) of the Building Regulations, as will the U-values for glazing and doors.

3.4 U-values attained for similar projects suggest the following is realistic for this proposed development –

- Ground floors – 0.11 (Part L compliance is 0.18)
- External walls – 0.19 (Part L compliance is 0.26)
- Roofs – 0.11 for the loft areas & 0.15 for insulated pitched areas (Part L compliance is 0.16)
- Windows and doors – 1.4 double glazed (Part L compliance is 1.4)

3.5 An airtight building will also play a major part in the reduction of heat loss via the external envelope. Accordingly, an improvement on the minimum Building Regulations requirement for building air permeability rate within the building will be sought, with an initial target of 4.00m^3/hm^2 (@50Pa) or lower being the intention (Part L requires a maximum target of 8.00m^3/hm^2 (@50Pa).

3.6 Attention will also be paid to the designing out of non-repeat thermal bridges and this will involve the use of a standard such as Recognised Construction Details. It is increasingly recognised that as standards of insulation improve, this issue, in conjunction with air leakage, plays a vital role in the energy efficiency of a building and getting both right at design stage and ensuring they are then implemented during construction is considered to be important for this development.

3.7 The heating and hot water requirement for the proposed dwelling will be supplied by an Air Source Heat Pump (ASHP) to a mix of underfloor heating on the ground floor and radiators on upper floor, with full time and temperature zone controls, meaning energy is only used as and where required. This technology is a recognised low and zero carbon option and will become increasingly more carbon efficient as the UK electricity grid becomes 'greener'.

3.8 The use of passive solar design has been considered and where possible good levels of glazing have been designed into the proposals to allow for natural light penetration. Where artificial light is required, the focus will be on the provision of the energy efficient lighting systems as appropriate to locational requirements.

3.9 The option to utilise solar energy technologies has also been considered – thermal for water heating and photovoltaics (PV) for electricity generation (see images below) – with the conclusion that PV is the most logical technology to install as it will provide the larger carbon offset. A PV array of 5.28kWp (based on 12 x 440Wp panels) is proposed for the east and west facing roof area of the dwelling, linked to an 11.6kW battery store and this will also tie into the proposed electric car charging point.

Figures 4 & 5: Solar thermal and solar PV installations on roofs

3.10 When modelled on Elmhurst SAP software, the specification outlined above sees the dwelling exceed minimum Part L1 of the Building Regulations requirements by 84.17%. This is a significant uplift and reflects well on the proactive approach to this issue proposed.

3.11 Not all energy use is controlled by the Building Regulations and with this in mind, all 'White Goods' supplied – fridge-freezer, washing machine and dishwasher – will be rated as minimum 'A' under the EU Energy Labelling Scheme and attention will be paid to the energy specification of all electrical equipment to be installed within the dwellings.

3.12 Finally, an OWL "Standalone" Electricity Monitor will be installed to allow the householders to monitor and understand their electricity consumption – see image, right. The monitor shows consumption or cost per hour (or kwh if preferred) and has a CO_2 equivalent reading too. Because the monitor is wireless and portable, the householder can easily walk around the house and observe, by switching on and off, how much energy particular devices are using. They can also see the overall consumption by day / week / month and compare periods to see if savings have been made.

Figure 6: Image of OWL monitor

4.0 Water Resource Management

4.1 The UK has a poor record in being profligate with its abundant water resource and the South-East of England is recognised as suffering from water stress, therefore, on this site only water efficient products will be specified.

4.2 The issue has been further amplified by Natural England stating that developments within Sussex North must not add to this impact and that they should demonstrate water neutrality. Accordingly, a Water Neutrality Report has been prepared for the proposed development by CGS Civils.

4.3 The actual specifications of the water using products are yet to be confirmed, however, the following specification is suggested as realistic for this type of development and an assessment of the efficiency of the building's domestic water-consuming components has been undertaken using the Building Research Establishment's water calculator and allowing for a rainwater harvesting system.

4.4 The water consumption for the proposed dwelling shows a figure of 85.0l/p/d with the following proposed specification (which is below the 125.0l/p/d allowed under Building Regulations):

- Dual 4.0/2.6 litre flush WCs
- Shower average flow rates of 7.0L/min
- Basin average tap flow rates of 2.5L/min
- Kitchen tap average flow rates of 5.0L/min
- Bath average overflow capacities of 145 litres
- Water efficient washing machine and dishwasher

4.5 It is proposed to connect the dwelling to the water main, but only for emergency use, with all day-to-day water requirements to be supplied through rainwater harvesting technology to enable total self-sufficiency within the building, including drinking water.

4.6 The Water Neutrality Report from CGS Civils supplies full calculations, design suggestions, along with maintenance and safety information for such a system and how it would operate at this site and it is proposed to follow these through once/if planning permission is granted. A schematic of how a rainwater harvesting system works is shown below in Figure 7.

Figure 7: Schematic of domestic rainwater harvesting system

5.0 Flood Risk & Surface Water Management

5.1 The Environment Agency's Flood Mapping for the area shows the site is not located within an area considered to be at risk from flooding – see https://check-long-term-flood-risk.service.gov.uk/map?easting=516025.98&northing=129709.3&map=RiversOrSea

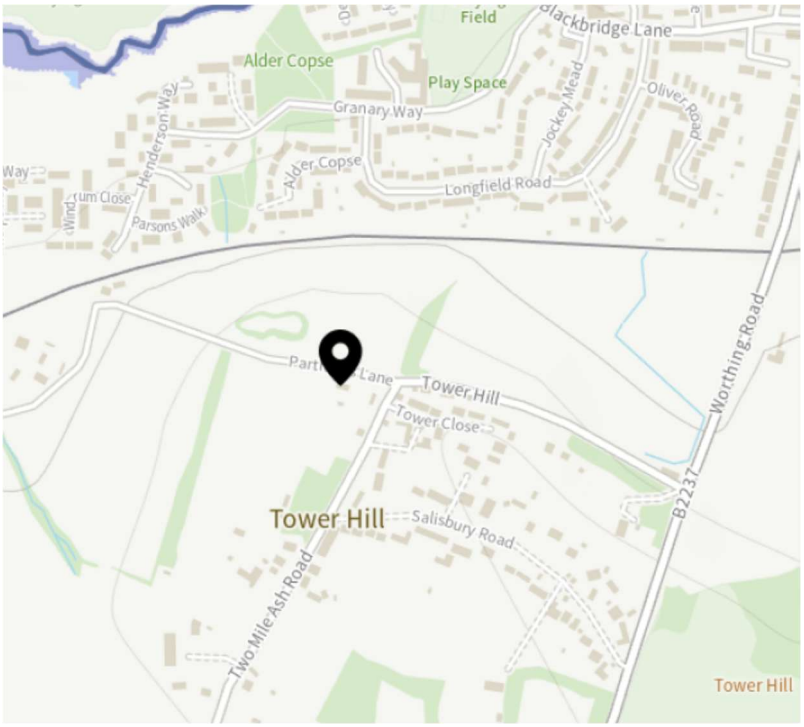

Figure 8: Flood risk map from the EA for the area

5.2 As detailed in Section 4.0 the property will have a rainwater harvesting tank, allowing for surface water runoff from the building to be reused as appropriate, with any external hardstanding constructed to allow for a positive drainage system for external hardstanding, such as 'Aquacell' (or similar) soakaways, in line with a standard SUDS approach.

6.0 Ecology & Biodiversity

6.1 A Preliminary Ecological Appraisal (PEA) has been undertaken for the site by Ecology & Habitat Management Ltd and this work informs the approach required with regards ecology and biodiversity for this site.

6.2 The PEA states that the site comprises of a garden area, scrub, several trees, fencing and an old, small shed. The site is located within a community of similar sized properties. The local landscape is somewhat rural in nature with large areas of woodland and grassland dominating the surrounding area. However, residential properties dominate the north/northeast of the surrounding area. Images of the site from ground level are shown below in Figures 9 & 10.

Figure 9: General view from Southwest corner of the site

6.3 The proposed development will involve the removal of some of the grassland, scrub and several trees. The trees that will be removed have been accessed by an arboriculturist as category 'U' poor quality or low-grade category 'C'. The impact on site flora is therefore regarded as low.

6.4 The PEA covers a range of protection measures for the site with regards flora and fauna and these will be implemented in full, as detailed.

6.5 A number of specific recommendations have been made in the report for enhancement and this will be adopted in full and include:

- Installation of appropriately located bat and bird boxes;
- Installation of appropriately located hedgehog homes on the boundaries of the site;
- Creation of log piles near areas of retained scrub or nearby trees and compost heaps in areas of retained hedgerow or nearby trees;

- The planting of native species as part of the overall landscaping plans, to replace areas lost and to enhance where possible.

Figure 10: View of middle site scrub

7.0 Waste & Pollution

7.1 Waste arising from the construction process has been an area of focus for some years now, with the industry making good strides in re-use and reduction of materials, which not only helps the environment, it also engenders significant cost savings to developers.

7.2 With this in mind, the appointed contractor for the scheme will be encouraged to develop a site waste management plan (SWMP) prior to the start of construction reflecting the recognition that reduction of waste begins in the design and ordering stage of a project and carries on through to the sign-off of the building. This SWMP will set targets and procedures for the sorting, reusing and recycling of construction waste into defined waste groups, either on site or through a licensed contractor.

7.3 The generation of waste does not stop at the end of the construction process and adequate provision will be supplied to the proposed dwelling, both internally and externally, to allow for the sorting of general waste from recyclable materials.

7.4 Provision for composting of food waste arising from the kitchen will also be supplied in the form of a compost cone to the exterior, along with information on how to successfully compost, to further reduce waste streams arising from the new dwelling.

7.5 Pollution can occur in various guises and attempts will be made to design out or mitigate against a number of issues identified below.

7.6 At the construction stage there can potentially be noise nuisance for neighbouring properties and all contractors will be made aware of and expected to comply with policies to prevent this issue. They will also be expected to have and operate polices to facilitate against air and water pollution from their activities and to have procedures in place should an accident occur.

7.7 Light pollution will be countered by the use of external lighting which only involves energy efficient fittings, daylight detectors and angling/capping to prevent unnecessary glare.

8.0 Materials Selection and Sustainable Construction Methods

8.1 This precise material specification for this project is yet to be confirmed, however, for new materials there is a commitment to ensure they score as highly as possible in the Building Research Establishment's Green Guide to specification – see Figure 11 below.

8.2 In addition, wherever possible, all building and finishing materials will be sought from local suppliers and manufacturers registered to an environmental management scheme such as FSC, BES6001, ISO14001 or EMAS. This will ensure that the materials have been sourced from suppliers certified as ethical and responsible as far into the supply chain as possible.

8.3 All insulation materials selected for the building will have a Global Warming Potential of below 5 and where possible be made from natural products.

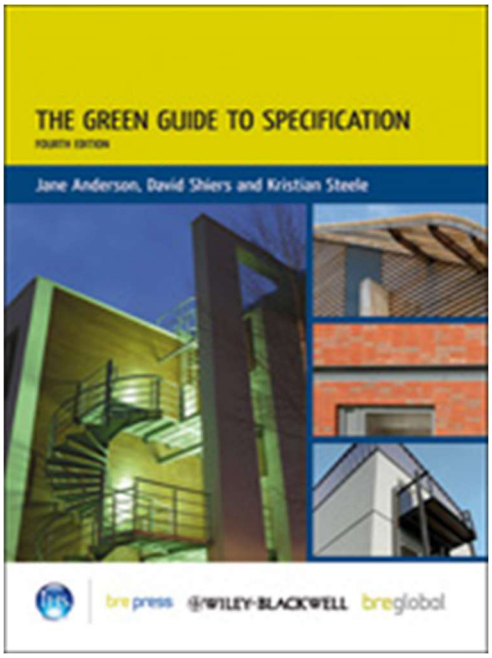

Figure 11: BRE Green Guide to Specification

8.4 Finally, attention will also be paid to materials specified for the internal environment, with a focus on materials/finishes containing low/no volatile organic compounds (VoCs) in an effort to improve the internal environment for occupants as internal air pollution is increasingly recognised as having negative impacts on health.

9.0 Future Needs

9.1 All buildings will have a lifetime of several decades, if not centuries, so more than ever it is important that they are flexible in use and adaptable to future occupier needs.

9.2 It is felt that the proposed design for this project maximises the useable space within the dwelling, through functional layout, and provides scope to adapt and modify the housing to meet future requirements.

9.3 The scheme has also been developed to meet the majority of the Lifetime Homes standards, which ensures a flexible blueprint for accessible and adaptable housing in any setting.

9.4 The dwelling will be fully fitted with the latest broadband access technology and fittings will be installed to facilitate home working.

9.5 An electric vehicle charging point will be installed, should future occupants have an electric vehicle requirement.

10.0 Summary

10.1 In summary, this development incorporates many sustainable features that are consistent with achieving a high level of overall sustainability and once/if planning permission is granted, the developer will consider further options for enhancement, as appropriate.

10.2 Areas of strong approach involve the plans for energy and water efficiency (both of which go significantly beyond standard Building Regulations requirements), ecological enhancement and mitigation and the approach to materials and future proofing.