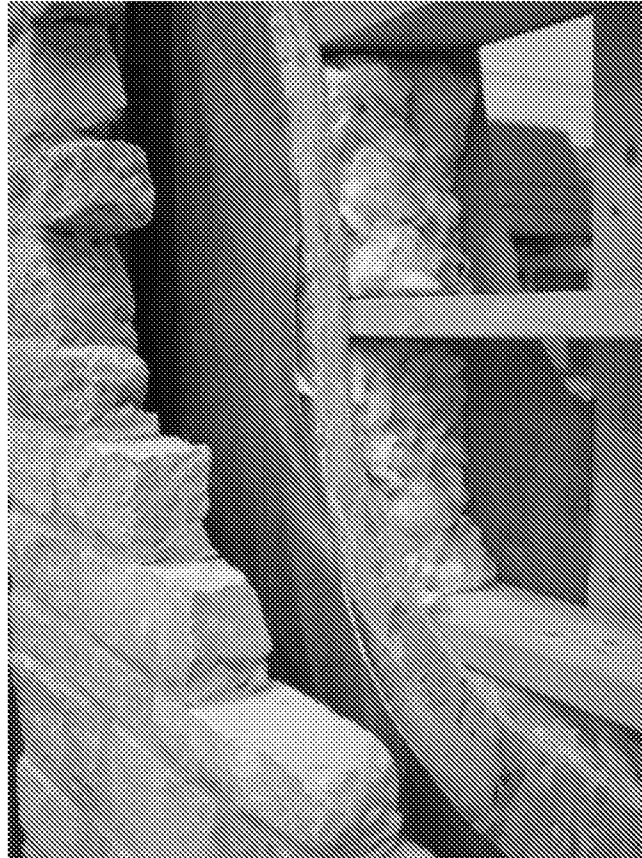


The Mill Site, Climping, West Sussex



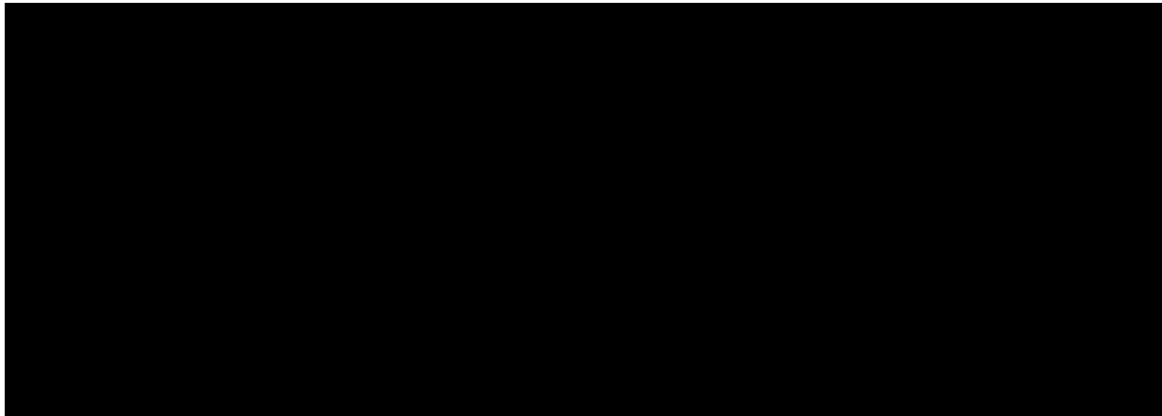
Sustainability Statement

1st December 2017

DRAFT v.3

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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 a new dwelling and upgrades/refurbishment to the exiting dwellings and mill building on site at The Mill, Climping, West Sussex. As licensed BREEAM, Code for Sustainable Homes and energy assessors of several years standing, Blewburton Limited has considerable expertise in all issues of sustainability.

1.2 The existing site location is shown in Figure 1 below, with Figure 2 showing the current site layout.



Figure 1: Site location

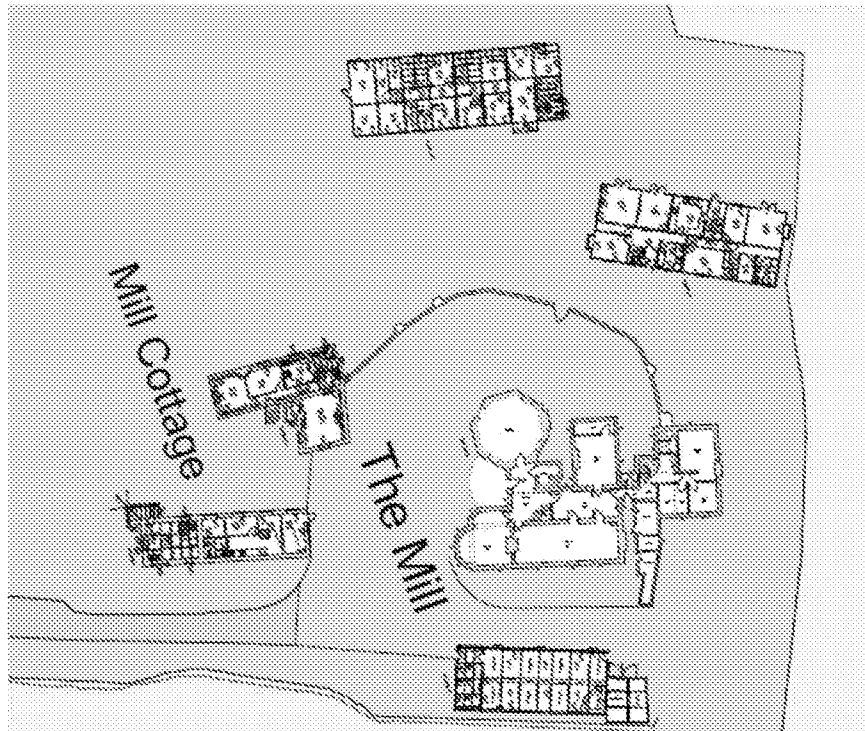


Figure 2: Existing site layout

1.3 As can be seen, the site is located on the coast and is some distance from neighbouring settlements.

1.4 The site currently hosts the disused Mill building, two single story dwellings and various outbuildings and was, until recently, a residential centre.

1.5 The Mill and two dwellings are Grade 2 listed, with evidence of the mill on the site dating back to Elizabethan times and the current structure to 1799. Images of the site taken in July 2017 are shown below in Figures 3-6.

1.6 It is proposed to undertake a thorough refurbishment of the Mill to bring it up to modern standards as a dwelling (and in keeping with its listed status) and to ultimately replace the missing portion of the mill structure and mill blades.

1.7 The two additional dwellings on site will also be upgraded and refurbished in keeping with their listed status and the additional structures on site will either be demolished (in the case of the prefabricated units) or adapted for use as stores etc. (in the case of the older buildings).

1.8 Finally, and most pertinent to this document, a new seven bedroom, three story house will be constructed on site, to feature a basement, ground and first floors. This will be a unique, architect designed dwelling and feature many new and innovative sustainability measures and approaches to the issues that this site presents.

1.9 A proposed site layout is shown below in Figure 7, with floor plans and elevations for the proposed new dwelling shown in Figures 8 & 9.



Figure 3 – Front of Mill building



Figure 4: Mill Lodge



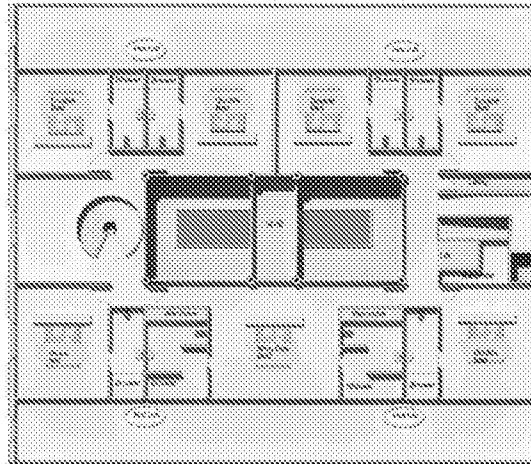
Figure 5: Mill Cottage



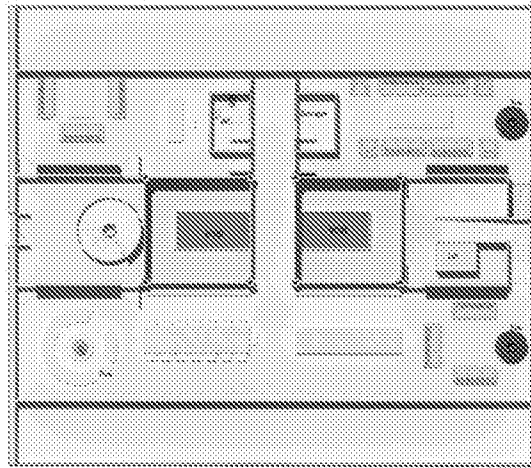
Figure 6 – View to North-west of site and potential location of new dwelling



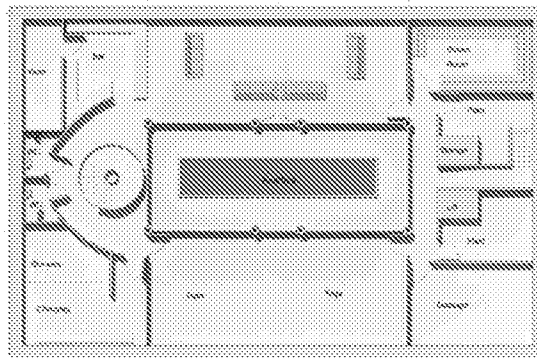
Figure 7: Proposed site plan



First floor



Ground floor



Basement

Figure 8: Proposed floor Plans

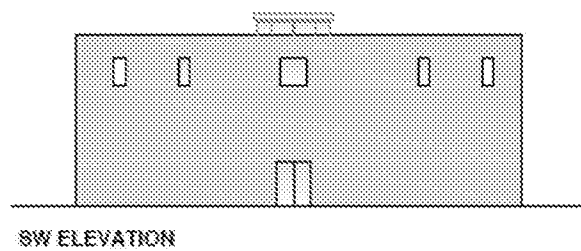
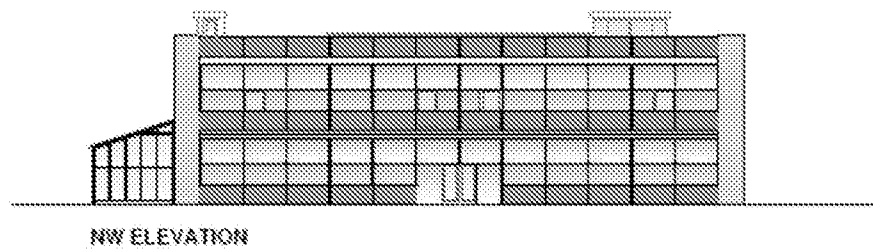
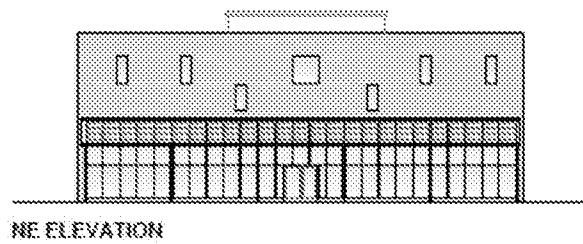
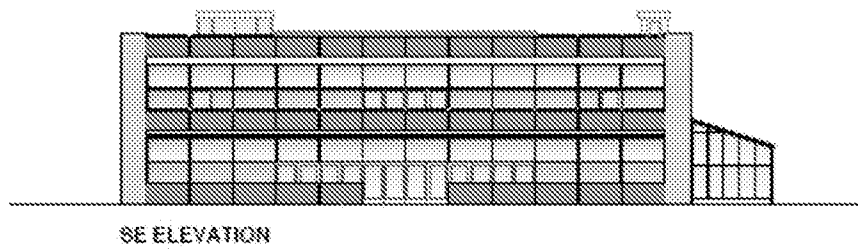


Figure 9: Proposed elevations

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 project proposed 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 & waste water management
- Ecology & biodiversity
- Waste & pollution
- Materials selection and sustainable construction methods

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 CO₂ emissions of the UK. Part L1A (Conservation of Fuel and Power) of the Building Regulations requires a minimum standard of energy efficiency in new development, however, it is the intention with this development to go significantly beyond this and to aim for a building that is as close to carbon neutral as possible when measured against the Building Regulations.

3.2 Part L1B of the Building Regulations, which applies to refurbishment and upgrades within the domestic building sector, also has minimum standards that need to be adhered to with regards thermal elements, controlled fixtures and services and in this context, all work also has to meet the standards commensurate with the listed status of the buildings involved.

3.3 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 the building.

3.4 Initial comment below will focus on the proposed new build dwelling, before discussion of proposed approaches to the existing buildings.

3.5 Reduction of heat loss is a key element in approach to any energy efficient building and it is proposed that insulation within floors, roofs and walls will exceed the minimum standards required under Part L1A, as will the U-values for glazing and doors.

3.6 Initial thoughts are to aim for the following U-values and these will be confirmed once detailed design commences, should planning permission be granted –

- Ground floors – 0.10 (Part L compliance is 0.25)
- External walls – 0.13 (Part L compliance is 0.3)
- Roofs – 0.10 (Part L compliance is 0.2)
- Windows – 0.80 (Part L compliance is 2.0)

3.7 An air tight building will also play a major part in the reduction of heat loss via the external envelope and coupled with adequate ventilation to ensure internal air quality, is an important element in energy efficient building design. 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 2.00m³/hm² (@50Pa) or lower being the intention (Part L requires a maximum target of 10m³/hm² (@50Pa).

3.8 Attention will also be paid to the designing out of thermal bridges and this will involve the use of a standard such as Accredited Construction Details and/or Enhanced Construction Details, where applicable. It is increasingly recognised that as standards of insulation improve, this issue, in conjunction with air leakage, plays an increasingly important 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.

3.9 In essence, the approach outlined above is not far off the innovative Passiv Haus standard, which seeks to reduce annual energy demand in a domestic building to under 15kWh/m² which is internationally recognised as the leading standard in domestic energy efficient design and specification.

3.10 With regards the thermal upgrades proposed to the existing buildings, the approach taken and materials used will very much be governed by the need for the buildings to be able to 'breathe', meaning that they exchange moisture readily with the indoor and outdoor environment. Where insulation is introduced it is important that this characteristic is taken fully into consideration as a failure to do so can lead to moisture build up, which in turn can affect the building structure and the internal living environment.

3.11 The above should not be a major issue for ground floors and it is expected that this element can be upgraded in all three buildings to offer a significant improvement over minimum standards under Part L1B (u-value 0.25).

3.12 Guidance will be taken from a heritage professional with regards applicable solutions to walls and roofs for compliance with minimum Part L1B standards (u-values of 0.3 and 0.16 respectively) and this will also include any restrictions related to the listed status of the buildings. The aim will be to exceed minimum Part L1B standards where possible.

3.13 Window upgrades and replacements will also be undertaken for the three listed buildings and again, the extent to which the minimum Part L1B u-value requirement of 1.60 or lower can be met will be dictated by that which is permissible under the requirements of the listed status of the buildings.

3.14 The exact heating and hot water system for the proposed new-build dwelling will be established once the heat demand is established following the finalisation of the approach to the thermal envelope, however, current thought is to install a ground source heat pump (GSHP) to feed underfloor heating, with full time and temperature zone controls for both heating and hot water delivery, meaning energy is only used as and where required. Additional smart control systems such as a weather compensation unit will also be incorporated into the heating specification.

3.15 A GSHP system is favoured at this stage as the alternatives are to heat with oil or LPG due to the lack of a main gas connection and these are carbon-heavy options, which go against the high sustainability aims of this development.

3.16 Secondary heating within the dwelling will be supplied by locally sourced wood to supply a log burning stove. The use of local wood has a strong impact as it is a low carbon fuel.

3.17 As with the new-build dwelling, the heating and hot water system for the existing dwellings will be established once the heat demand is established following the finalisation of the approach to the thermal envelope, however, current thought is to install a communal

heating system, operating from a central boiler plant located in an outbuilding next to the Mill. This would be powered by either logs and/or wood pellets to feed radiators in all three dwellings, with full time and temperature zone controls for both heating and hot water delivery, meaning energy is only used as and where required. Additional smart control systems such as weather compensation units will also be incorporated into the heating specification.

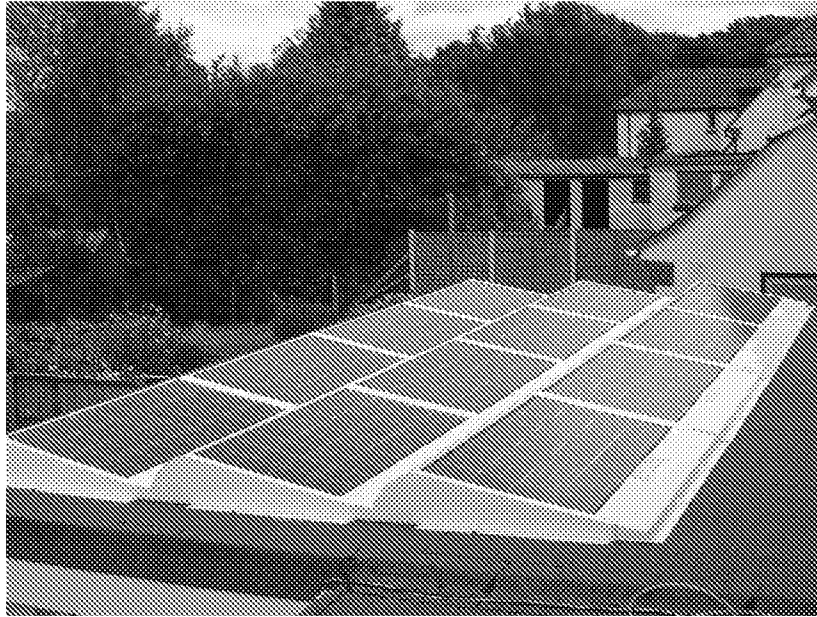
3.18 This proposed approach is broadly carbon neutral and would be a vast improvement on the oil fired system currently in place for the Mill.

3.19 The ventilation strategy for the proposed new-build dwelling will see the installation of a Mechanical Ventilation Heat Recovery Unit and it is proposed to install a highly efficient model commensurate with house size and approach to air tightness, with an attention on fan power and heat recovery rates. Utilisation of this technology has strong benefits within the carbon neutrality strategy when coupled with the low air test previously mentioned in 3.7 above.

3.20 The use of passive solar design has been considered for the proposed new build dwelling and where possible good levels of glazing have been designed in to 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.

3.21 The option to utilise solar energy technologies has also been considered in the new-build dwelling – thermal for water heating and photovoltaics (PV) for electricity generation (see images below) – with the conclusion that a focus on PV will yield better results and as such a large 30kWp array is proposed to be located unobtrusively on the flat roof, facing due south to maximise electricity generation. This array will generate approximately 27,000kWhs of electricity per annum and will be a significant contributor to carbon offset for this property.

3.22 The option to include battery storage back-up from the electricity generated by the PV array will also be explored to allow for full utilisation of electricity generated on the site at a later date when production exceeds demand.



Figures 10: Flat roof solar PV installation

3.23 Finally, all 'White Goods' – fridge-freezer, washing machine and dishwasher – for all the dwellings on site 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 dwelling.

3.24 The use of energy conscious design principles and a fabric first approach means that the building should remain energy efficient for its entire lifetime and the overall requirement for energy input will be sharply reduced heating and hot water. The requirement for energy input for the heating and hot water is further reduced by the use of a heat pump system and the electricity required is significantly offset by that generated by the proposed PV array.

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 actual specifications of the water using products are yet to be established, however, the following notional specification is considered realistic for this type of development in both the new build and existing properties and an assessment of the efficiency of the buildings domestic water-consuming components has been undertaken using the Building Research Establishment's water calculator.

4.3 The water consumption (L/person/day) for the proposed new dwelling and existing units shows a figure of 111.6l/p/d with the following proposed specification (which is below the 125.00l/p/d allowed under Building Regulations):

- Dual 4.0/3.0 litre flush WCs
- Shower average flow rates of 10.0L/min
- Basin average tap flow rates of 3.0L/min
- Kitchen tap average flow rates of 5.0L/min
- Bath average overflow capacities of 165 litres
- Water efficient washing machines and dishwashers

4.4 Should a more generous specification for internal water using products be decided upon (and this may well be the case in the new build dwelling), then thought will be given to the installation of grey-water harvesting systems, such as the EcoPlay unit pictured below, however, to supply the WCs, which account for approximately 35% of standard domestic water use in the UK.

4.5 Rainwater harvesting is currently not being considered for internal water usage (although it is for external usage – see section 5.0) as the carbon footprint arising from the pumps involved with such a system is heavy and it is more efficient to specify the low flush WCs detailed above in 3.3.

4.6 The provision of water meters is also recognised as an important tool in reducing water usage and in a domestic context they can encourage people to monitor and reduce their water consumption by an average of 10% to 15%. Therefore, the dwelling will have an individual, easily accessible water meter installed as part of the specification.



Figure 11: EcoPlay unit above WC

5.0 Flood Risk, Surface & Waste Water Management

5.1 The Environment Agency's (EA) Flood Map for Planning (Rivers and Seas) shows the site is liable to flood from the coast in the 0.5% (1 in 200 years) event. This places the site in Flood Zone 3A, High Probability (FZ3A).

5.2 Expert advice suggests that the effects of climate change will see the risk of flooding from the sea increase in the coming years and local government policy appears to be to not provide flood defences to deal with the issue of coastal flooding to this area of the coast.

5.3 Existing flood defences, in the form of embankments and swales will be retained, maintained and enhanced to supply overall protection to the site as far as possible and evacuation procedures will be established and put in place for flooding events in the future.

5.4 The proposed new build dwelling will be constructed to be flood resilient in that it will be built to 'float' in the event of exceptional flood conditions – see image below. The building will be situated in its own 'dock' and will be designed to allow the natural movement of rising floodwaters over the site, while the house structure itself floats harmlessly on the surface. Whilst not an entirely new concept, it is certainly a highly unusual and innovative way to deal with the flood risk from the sea on this site

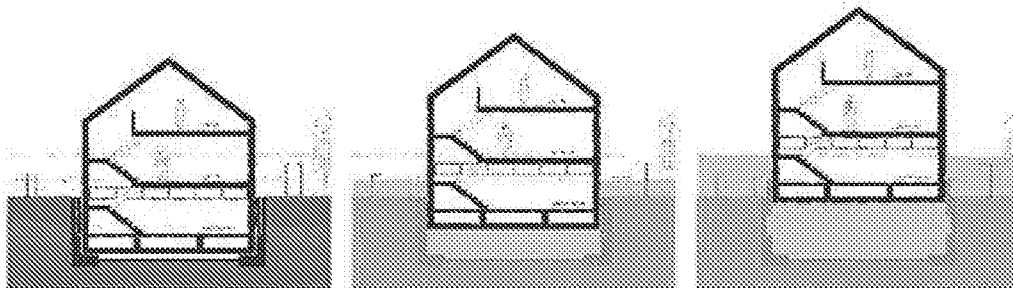


Figure 12 – Diagram showing the concept of a 'floating' house in its own dock

5.4 Notwithstanding the threat from flooding from the sea, a full surface water-runoff strategy will be developed in compliance with Building Regulations thereby minimising the risk and impact of localised flooding on and off-site, watercourse pollution and other environmental damage. The solution implemented will ensure there is less or equal runoff from the developed site when compared to the existing site and will also lead to an improvement in the quality of the rainwater discharged from the site.

5.5 SUDS options will be employed on site, such as permeable paving, to contain surface water runoff and where hard landscaping is installed, attention will be given to the opportunity for a porous surfacing, such as that shown below in Figure 13, to aid infiltration.



Figure 13: Permeable paving solution on a housing development

5.6 A Kingspan Klargester BioDisc or similar product will be installed for sewage treatment as there is no mains drainage to site. This is probably the most sustainable solution where no mains drainage exists and offers inherent cost and performance benefits with a low carbon footprint.

6.0 Ecology & Biodiversity

6.1 The site is currently a mix of listed buildings and temporary structures set amidst semi-managed grassland with trees, shrubs and hedging to the borders. The sea is located a few hundred meters to the south, south-east, creating a maritime setting for the ecology of the site.



Figure 14: An aerial image of the site

6.2 The proposed redevelopment of the site, would see removal of the temporary structures and the refurbishment of the Mill building and upgrades to the two cottages, with the proposed new dwelling to be located to the west of the site, as detailed in Figure 7 (page 8).



Figure 15: The western area of the site

6.3 A landscaping strategy has been developed and aims to deliver a serious enhancement on the current site's ecological situation.

6.4 The landscaping strategy focuses on native and wildlife enhancing species and will see the specific planting of wildflower meadow area, the enhancement of the existing woodland, with a focus on the introduction of disease resistant elm trees and the development of a pond and its associated ecology.

6.5 Additional recommendations will also be sought and where practicable, implemented, such as the provision of bird or bat boxes and other options to enhance local site fauna.

6.6 The landscaping plan is shown below.



Figure 16: Landscaping plan for the site

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, a comprehensive site waste management plan (SWMP) will be developed 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 It is already anticipated that a large amount of soil waste will be generated by the scheme and this can be recycled on site within the landscape plan associated with the project.

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

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

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

7.7 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 policies to facilitate against air and water pollution from their activities and to have procedures in place should an accident occur.

7.8 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 The final material specification has not yet been confirmed for this project and will be subject to planning considerations with regards the new-build dwelling and heritage considerations for the existing buildings, however, the developer is committed to ensuring that all materials score as highly as possible in the Building Research Establishment's Green Guide to specification – see Figure 16 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 in to the supply chain as possible.

8.3 At this stage it is likely that Insulated Concrete Formwork (ICF) will be utilised for much of the new-build external wall element, which will have the benefit of adding thermal mass to the building and will reduce waste through specification.

8.4 The concrete used will be expected to have an element of ground-granulated blast-furnace slag (GGBS) or fly ash, which reduces the carbon footprint of concrete significantly and is important as after coal-powered electricity, cement manufacture is the next biggest emitter of greenhouse gases, accounting for approximately 5% of annual global CO₂ production.

8.4 All insulation materials selected for this project will have a Global Warming Potential of below 5 and where possible be made from natural products.

8.5 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.

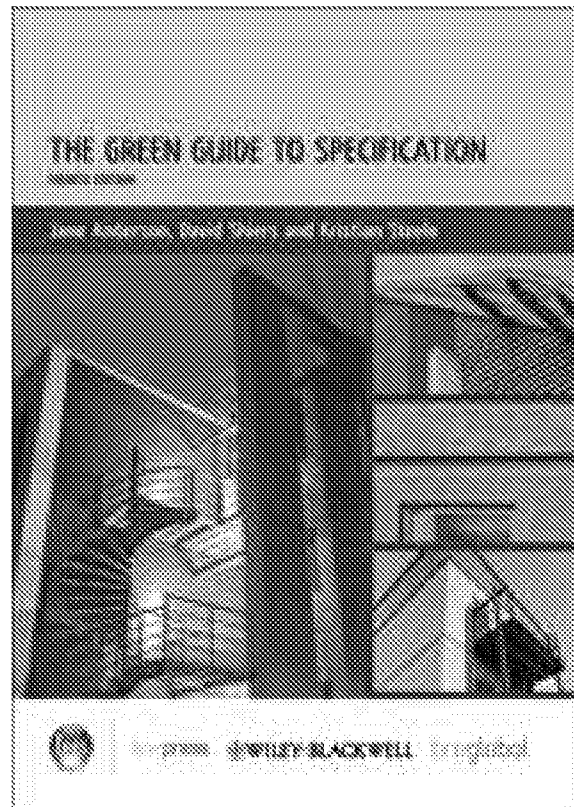


Figure 17: BRE's Green Guide to Specification

9.0 Summary

9.1 In summary, this development demonstrates a strong commitment to sustainability as befits a development being assessed against Paragraph 55 of the National Planning Policy Framework.

9.2 It incorporates many sustainable features that are consistent with achieving a high level of overall sustainability.

9.3 Most impressively, the dwelling has aspirations to be carbon neutral when assessed against Part L of the Building Regulations and when more detailed design and specification occurs, it is hoped to make it 100% 'carbon neutral'.

9.4 Other areas of strong and/or innovative approach involve the plans for water efficiency, flood management, waste arising and the approach to ecology and materials and where issues have standards to be met under the Building Regulations, the proposed approach is to exceed these minimum standards.

9.5 In short, given the nature of the scheme, along with the intentions outlined within this report, the proposed development is deemed to meet high levels of sustainability.