

Land at Woodcroft Farm

Energy and Sustainability Statement

Land at Woodcroft Farm

Wecock, Hampshire

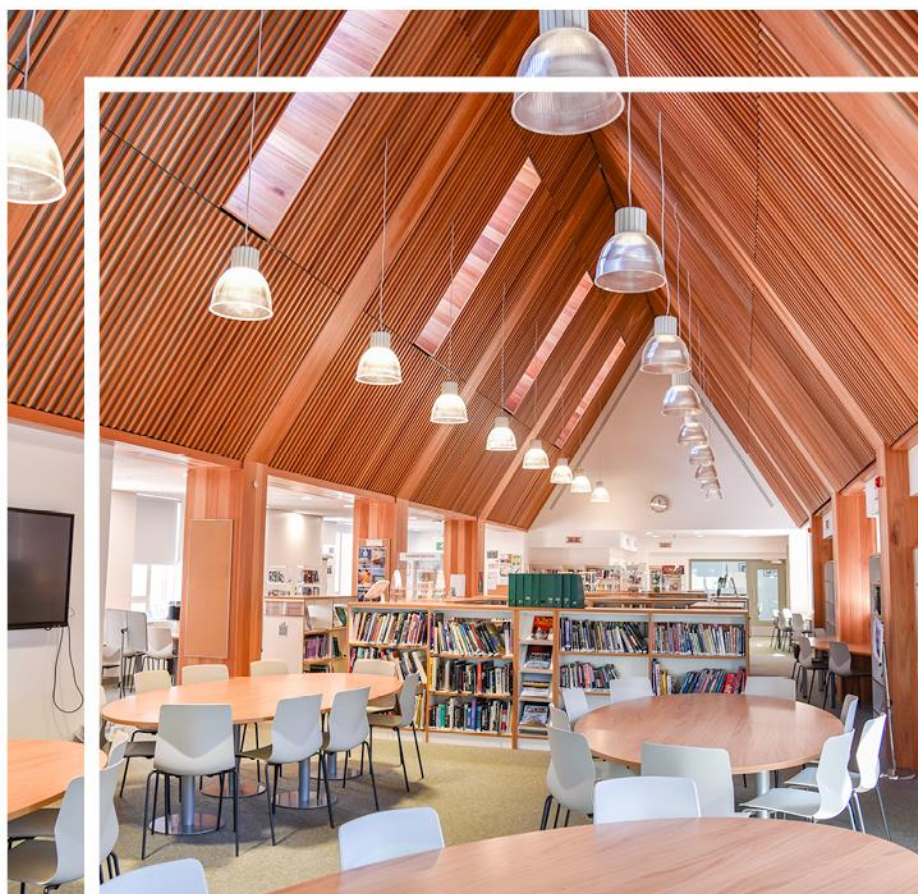
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1. Introduction

1.1. Proposed development

Hilson Moran have been appointed by Grainger Plc. to prepare an Energy and Sustainability statement for Land at Woodcroft Farm to support an outline planning application. The development located on Land at Woodcroft Farm is a residential development of up to 190 dwellings, as shown in Figure 2. It is situated within approximately 8.61 hectares of grazing land at the Southern boundary of East Hampshire District Council (EHDC).

The proposed development aims to create social, environmental, and economic value through sustainable development. It will contribute to the local economy by creating job opportunities during construction and operation stages. Additionally, 40% of the scheme will be affordable housing to positively impact the community. The development promotes healthy lifestyle through green spaces and sustainable modes of transport to reduce carbon emissions. It also safeguards biodiversity and enhances green spaces. Design decisions involve stakeholders to create a masterplan that prioritizes physical and mental health, safety, and security. The proposal aims to comply with new building regulations by reducing energy demand, incorporating renewable energy technologies, and achieving low carbon emissions. The design supports migration and adaptation to anticipate the effects of climate change, in line with planning policy.



Figure 2 Illustrative diagram of the proposed Land at Woodcroft Farm development.

1.2. Background

The site, shown in Figure 1, is bordered by Clarendon Farm to the West and residential units to the East and Catherington Park to the South. To the North, the development is separated from a solar farm, residential development and grazing land by James Copes. James Copes is a site that forms part of the Sites of Importance for Nature Conservation as an Ancient Replanted Woodland.

1.3. Purpose of the report

This report highlights the direction of the Energy and Sustainability strategy of the RIBA stage 1 and sets guidelines and projections for upcoming stages. It is constructed in line with the goals of the development to deliver an environmentally and socially cantered developed, by incorporating the industry's best practices.



Figure 1 Ariel view of highlighting the boundary of the proposed development.

The Energy and Sustainability statement provides a summary of how the proposed development is responding to key sustainability policies, relating to:

- Energy and Carbon
- Ecology and green spaces
- Water conservation and flood risk
- Transportation
- People & Socioeconomics

In line with East Hampshire District Council Policy, an energy assessment has been undertaken to demonstrate best practice in reducing energy demand, optimising energy use as a resource and implementing new renewable energy technologies onsite. The Statement aims to identify opportunities for the proposed development to increase energy efficiency through site layout, building design and energy supply. The purpose of this document is also to report on the process and design route of the Energy Strategy for the Proposed Development and to present energy efficiency and CO₂ emissions reduction targets and opportunities.

The statement will highlight how the masterplan has built in flexibility to respond to the anticipated regulatory changes that will occur related to national policies and local planning policies, as well as technology advancements and changes in consumer needs.

2. Policy review

This section outlines the key national, regional, and local regulatory and planning policy context related to energy and sustainability that should be considered within the design of the proposed development.

2.1. National Regulation

2.1.1. Climate Change Act 2008¹

In June 2019, the Climate Change Act (2008) has been amended to mandate that “the net UK carbon account for the year 2050 is at least 100% lower than 1990 baseline.”

The Act outlines the requirements and framework to help the UK tackle and respond to climate change, as recommended by the Committee on Climate Change. The carbon budgets, under the Act, are legally binding and intended to act as steppingstones towards the net zero target by 2050.

2.1.2. Net Zero Strategy: Build Back Greener (October 2021)²

The Government has set out a strategy, with supporting policies, for the decarbonisation of all sectors of the UK economy to meet the net zero target by 2050. It outlines a 10-point plan for a green industrial revolution laying out the foundations for a green economic recovery from the COVID-19 pandemic and positioning the UK at the forefront of the growing green economy. The key energy policies relevant to this statement include:

- “By 2035, the UK will be powered entirely by client electricity, subject to security to supply
- An ambition that by 2035, no new gas boilers will be sold.
- A new £60 million Heat Pump Ready programme that will provide funding for pioneering heat pump technologies and will support the government’s target of 600,000 installations a year by 2028.
- Further funding of £620 million for zero emission vehicle grants and EV Infrastructure, including further funding for local EV Infrastructure, with a focus on local on street residential charging.”

The Net Zero Strategy highly relies on the widespread of low carbon and renewable technologies, such as heat pumps and solar PVs, and their integration with the built environment. The electrification of heating and transportation is key element of this strategy that should be considered in the development proposals brought forward.

¹ Climate Change Act 2008: <http://www.legislation.gov.uk/ukpga/2008/27/contents>

² Net Zero Strategy: Build Back Greener: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf

2.1.3. National Planning Policy Framework (NPPF) 2023³

The National Planning Policy Framework (NPPF) sets out the Government’s planning policies for England and how these are expected to be applied. These policies articulate the Government’s vision of sustainable development, which should be interpreted and applied locally to meet local aspirations. Responding to climate change, conserving, and enhancing the natural environment form important sections of this document. The NPPF 2023 supports developments that apply a presumption in favour of sustainable development, as per Paragraph 11.

2.1.4. Building Regulations Part L 2021

The Building Regulations Approved Documents Part L 2010 (2013 edition incorporating 2016 amendments) set out the requirements for the *conservation of fuel and power*. It outlines the minimum energy and carbon dioxide emissions performance standards for all elements of the built environment along with assessment methodologies necessary to meet compliance within new developments.

In December 2021, the Building Regulations was revised to help UK delivery net zero. The new Approved Documents for Part L now include Volumes 1 (dwellings) and 2 (buildings other than dwellings). The documents set out new limiting U-Values for improved fabric performance and introduced design submissions as well as built submissions. Volume 1 specifications set a provision for new dwellings to produce 30% less CO₂ than current standards, while Volume 2 mandates a 27% reduction in emissions for new non-domestic buildings, including offices and shops. The limiting u-values for new fabric elements and air permeability are defined in Tables 4.1 of both Volumes 1 and 2. New developments coming forward are expected to comply with specified parameters in order to be granted planning consent. In addition, further criteria must be met:

- **Applicable to all new buildings:** Requirement to achieve a minimum energy performance against a target CO₂ emission rate that shall not be exceeded.
- **Applicable to all new buildings:** Requirement for new buildings to achieve or better a fabric efficiency target, in addition to the CO₂ target.
- **Applicable to all new buildings:** Requirement to achieve minimum energy performance against a target primary energy rate that shall not be exceeded, in addition to the CO₂ target.

The Approved Documents came into effect on the 15 June 2022 for use in England. It does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work for each building started before 15 June 2023. Therefore, transitional arrangements do not apply to this scheme and the proposed development should comply with Part L 2021.

³ National Planning Policy Framework 2023:

https://assets.publishing.service.gov.uk/media/65829e99fc07f3000d8d4529/NPPF_December_2023.pdf

Part L 2021 regulations are a stepping-stone for the Future Homes Standard (FHS), which is anticipated to come into effect in 2025. FHS will ensure that all new homes built from 2025 will produce 75-80% less CO₂ compared to current standards. FHS will imply all future homes to be ‘net zero ready’, without the need retrofitting.

2.2. Local Regulation

The following key policies and documents for East Hampshire District have been reviewed in detail in the context of the scheme, to identify and target compliance with relevant requirements to inform the viable sustainability design features and opportunity across all measures of the development.

2.2.1. East Hampshire District Local Plan: Joint Core Strategy



CP2 SPATIAL STRATEGY

“New development growth in the period up to 2028 will be directed to the most sustainable and accessible locations in the District in accordance with the Spatial Strategy shown on the Key Diagram.”

CP5 EMPLOYMENT AND WORKFORCE SKILLS

“Planning permission will be granted for development that:

C) secures local skills and training provision and employment on significant development, particularly with regard to construction skills and employment”

CP10 SPATIAL STRATEGY FOR HOUSING

“Provision is made for a minimum increase of 10,060 dwellings in the period 2011 to 2028 by means of: 1. completion of existing permissions and allocations, 2. development within the defined settlement policy boundaries of towns and villages where it is consistent with maintaining and enhancing their character and quality of life”

CP11 HOUSING TENURE, TYPE AND MIX

“To address housing requirements and to help to create sustainable communities new residential development will be required to:

- a) maximise the delivery of affordable housing;
- b) provide a range of dwelling tenures, types and sizes to meet housing needs;
- c) provide housing that meets a range of community requirements, including retirement, extra care housing and other housing for the elderly. Those with

special or supported needs and people wishing to build their own homes; and

d) meet Lifetime Homes Standard as appropriate.”

CP13 AFFORDABLE HOUSING ON RESIDENTIAL DEVELOPMENT SITES

“In order to meet affordable housing needs, all residential development, which results in 1 or more additional dwellings (net), should contribute towards the provision of affordable housing. New residential development will be required to: a) provide affordable housing to meet a range of requirements of the local community, including the elderly and those with special or supported needs; and b) provide a range of affordable housing types and sizes.”

CP20 LANDSCAPE

“The special characteristics of the district’s natural environment will be conserved and enhanced”

CP21 BIODIVERSITY

“Development proposals must maintain, enhance and protect the District’s biodiversity and its surrounding environment.”

CP24 SUSTAINABLE CONSTRUCTION

“Planning permission will be granted for development1 which on completion:

a) meets the following minimum Code for Sustainable Home threshold level, and equivalents for non-residential development (unless proven to be financially or technically unviable), as set out below:

All residential development achieves at least the following level of the Code for Sustainable Homes and meets the minimum carbon compliance standards set out under the Zero Carbon Hub report recommendations		All multi-residential and non-residential developments with a floor space of over 500 m ² must achieve at least the following BREEAM3 standards`
Until the end of 2012	3	BREEAM ‘very good’
from 2013	4	BREEAM ‘excellent’
from 2016	5*	BREEAM ‘excellent’

(* Level 5 can include for ‘allowable solutions’4 .)

b) provides at least 10% of energy demand from decentralised and renewable or low carbon energy sources (if possible, including connections to a district heating system), unless it is proven that this is not feasible or viable; c) for major areas of development, provides adequate land or funding for waste management infrastructure.”

CP25 FLOOD RISK

Development in areas at risk of flooding, now and in the future, as identified on the latest Environment Agency flood risk maps and the Council’s Strategic Flood Risk Assessment will be permitted provided that:

- a) it meets the sequential and exception test (where required) as outlined in Government guidance;
- b) a site-specific flood risk assessment demonstrates that the development, including the access, will be safe without increasing flooding elsewhere, and where possible, will reduce flood risk overall;
- c) the scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site;
- d) appropriate flood warning and evacuation plans are in place; and
- e) new site drainage systems are designed taking account of events which exceed the normal design standard."

CP26 WATER RESOURCES/WATER QUALITY

"Development will be required to protect the quality and quantity of water, and make efficient use of water. Development will be permitted provided that:

- a) it protects and enhances the quality and quantity of groundwater, surface water features and controls aquatic pollution to help to achieve the requirements of the European Water Framework Directive;
- b) it has an adequate means of water supply (even in a drought), sufficient foul and surface water drainage and adequate sewage treatment capacity. Development must be phased to take into account the timing of any water and/or wastewater infrastructure required which must be in place prior to the occupation of development. The developer must show that additional provision or improvement of local infrastructure is required and demonstrate that adequate funding is available for that infrastructure in advance of development taking place;
- c) demand management technologies are incorporated to meet the appropriate levels of the Code for Sustainable Homes as set out in Policy CP24."

CP27 POLLUTION

"Development must not result in pollution which prejudices the health and safety of communities and their environments. Developments that may cause pollution, and developments sensitive to pollution, will only be permitted if they are appropriately separated and designed to remove the risk of unacceptable impacts. Engineering or administrative controls may be required to provide sufficient protection to focus on reducing pollution at source."

CP28 GREEN INFRASTRUCTURE

"Development will be permitted provided that it maintains, manages and enhances the network of new and existing green infrastructure. Development will need to take forward the objectives and priorities presented in the District's Green Infrastructure Study and Strategy, the South Hampshire Green Infrastructure Strategy and its Implementation Framework and the avoidance and mitigation measures set out in the Joint Core Strategy's Habitats Regulations Assessment. Account will also need to be taken of other relevant joint core strategy policies such as landscape, historic environment, biodiversity, flood risk and design. New green infrastructure must be provided either through on-site provision or financial contributions. The size of contribution will be linked to the scale of the development and the resulting new green infrastructure must be located as close as possible to the development it is intended to serve."

CP29 DESIGN

"The District's built environment must be of an exemplary standard and highly appealing in terms of visual appearance. All new development will be required to respect the character, identity and context of the district's towns, villages and countryside and must help to create places where people want to live, work and visit."

CP31 TRANSPORT

"Through implementation of the Hampshire Local Transport Plan (2011 – 2031), the fullest possible use of sustainable modes of transport (including cycling, walking and public and community transport) and reduced dependence on the private car will be encouraged."

POLICY CSWB4 HOUSING

"The target in Whitehill & Bordon is for 35 % of all new dwellings to be provided as affordable housing subject to individual site circumstances (eg. Development viability, site surroundings). Residential proposals must include a mix of housing types, with a proportion of family homes (3, 4 and 5 bedrooms) and executive homes that will help to correct the town's current housing imbalance."

POLICY CSWB5 DESIGN

"In addition to the criteria set out in Policies CP29 and CP30 new development should: a) demonstrate an integrated approach to sustainable design to achieve the policy requirements on energy, water, transport, green infrastructure and biodiversity; b) be in accordance with the character area design codes, design guidance, the neighbourhood quality charter and Town Design Statement; c) where opportunities arise, for example in the new town centre, incorporate taller landmark or locally distinctive ex-military buildings into the overall design to create an identity to the town and the overall development area."

POLICY CSWB6 SUSTAINABLE CONSTRUCTION

"Proposals should, where technically or financially viable, demonstrate best practice, innovation and higher levels than those outlined in policy CP24 whilst at the same time being in accordance with wider national government policy on sustainable construction. The carbon footprint of the whole town will not exceed the carbon footprint of the existing settlement. This will include the provision of localised energy centres and help the Eco-town to de-carbonise the energy infrastructure by employing such solutions as biomass and energy from waste systems, decentralised heat and power networks and smart grids All new development must comply with the District's Sustainable Construction policy (CP24)"

POLICY CSWB7 WASTE

"Planning applications should include a sustainable waste and resource plan covering both domestic and non-domestic waste. The plan should consider: a) The use of arboricultural arisings and farm waste as biomass fuel; b) The use of locally generated waste as part of the energy solution for the town; c) Composting schemes; d) Using organic waste for anaerobic digestion.

This policy should be read in conjunction with Policy CP27 (Pollution) which set out the approach to managing waste across East Hampshire."

POLICY CSWB8 SUSTAINABLE WATER MANAGEMENT

“All development will be required to contribute to the overall Eco-town target of achieving water neutrality (no net increase in water abstraction or carbon emissions as a result of the Eco-town). Development must be designed and delivered to limit the impact of new development on water resources, water quality and quantity. Innovative and sustainable water management systems must be used to help to achieve a ‘water neutral’ status.”

POLICY CSWB9 BIODIVERSITY

“Development proposals must protect and enhance the biodiversity of Whitehill & Bordon and the surrounding environment (see Policies CP19 and CP20). Development at Whitehill & Bordon will be guided by its Habitats Regulations Assessment, Green Infrastructure Strategy and Local Biodiversity Action Plan. All development must show a net gain in biodiversity, secure existing and create new wildlife habitats supported by long term management plans and show that there are no adverse significant effects on the integrity of any European designated site.”

POLICY CSWB10 GREEN INFRASTRUCTURE

“New and existing greenspaces will be part of a well managed, high quality, green infrastructure network, which is linked to the wider countryside for the benefit of communities and wildlife”

POLICY CSWB12 PEDESTRIAN AND CYCLE ROUTES

“Development proposals will provide:

- a) A comprehensive network (Green Grid) of well signed walking and cycling routes separated from the road where possible, in and around the town and linking to other destinations. Proposals must include safe, convenient and attractive travel options for non-car modes of travel from the home to the town’s facilities, schools, service and employment areas;*
- b) High quality cycle parking facilities within its neighbourhood centres, the town centre, at employment locations and within each residential area.”*

POLICY CSWB13 PUBLIC TRANSPORT

“Development proposals will deliver: a) a high-quality, frequent, modern and attractive public transport system, comprising a ‘three-tiered’ bus system offering town-wide services, local services and strategic services to key destinations; b) high-quality bus infrastructure throughout the development; c) a Transport Hub within the new town centre to provide a focal point for all town travel information and services. Neighbourhoods will include ‘Sub-Hubs’ to act as local information points.”

POLICY CSWB14 TRAVEL PLANS

“Development proposals will ensure the implementation of a Town-wide Travel Plan which provides an innovative and comprehensive balanced package of measures to encourage smarter travel choices to be made and to maximise opportunities for sustainable travel. The Town-wide Travel Plan will be supported by individual Travel Plans for significant travel generators within the town, including major employers, retailers and schools.”

POLICY CSWB15 LOCAL TRANSPORT NETWORK IMPROVEMENTS

“Development proposals must include targeted improvements to the local transport network. The targeted improvements will be phased with development and shall include engineering measures within local villages and on key routes to discourage inappropriate traffic usage.”

POLICY CSWB17 CAR PARKING

“Development proposals will provide car parking in accordance with the Car Parking Strategy for Whitehill & Bordon. The strategy balances the need for car parking with the need to promote sustainable transport.”

POLICY CSWB18 LOW CARBON VEHICLES

“Development proposals will promote the use of low-carbon vehicles, including electric vehicles and other alternative low-carbon fuel technology, to reduce the carbon emissions resulting from the development. The development will promote and deliver the necessary infrastructure to support electric vehicles and alternative fuel travel.”

CP32 INFRASTRUCTURE

“Where the provision or improvement of infrastructure is necessary, to meet community or environmental needs associated with new development or to mitigate the impact of development on the environment, such works or facilities should be provided either on or off-site, or the payment of financial contributions will be required through planning obligations and/or the Community Infrastructure Levy (CIL) to ensure that all such development makes an appropriate and reasonable contribution to the costs of provision”

2.2.2. Emerging Local Development Scheme

The council of East Hampshire is in the process of preparing a revised Local plan, with the expected timeline shared on their website, indicating the targeted deadlines for the submission, consultation and examination, leading to the adoption in September 2025.

3. Energy and Carbon

3.1. Energy

The EHDC requires “To plan for new development to be built to a high quality that promotes the use of sustainable resources in developments, in particular to minimise waste, increase energy efficiency in new and existing developments and to maximise the proportion of energy generated from renewable sources within environmental constraints;” As well as achieve a BREEAM Excellent from 2016, unless proven to be financially or technically unviable.

This chapter provides a summary of the expected process to be undertaken for the energy assessment, following the nationally recognised energy hierarchy, shown in Figure 3. Following the hierarchy should maximise the energy savings on site and maximise energy reduction and the associated carbon emissions. The Energy Hierarchy comprises of three parts and should be followed in order of priority:

- **Be Lean:** Minimise the energy demand of new buildings through fabric performance and energy efficiency measures.
- **Be Clean:** Utilise energy more efficiently in buildings.
- **Be Green:** Supply energy from new, renewable energy sources.

Firstly, a development should be designed to reduce energy demand (‘Be Lean’ stage), this includes consideration of passive and active reduction measures. Secondly, it should consider approaches and technologies to efficiently supply energy (‘Be Clean’ stage). It should then consider the implementation of low carbon and renewable technologies on-site (‘Be Green’ stage). Smart energy technologies for monitoring and control should also be promoted to influence sustainable behaviours of occupants. Finally, offsetting can be considered as last resort if client aspires to achieve a net zero carbon development.

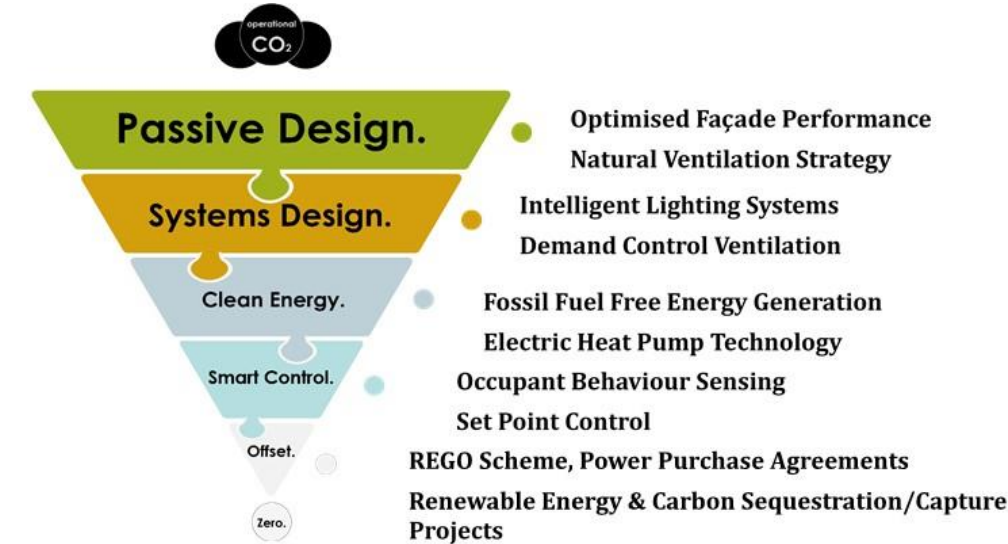


Figure 3 Energy Hierarchy.

3.2. Passive Design measures (Be Lean)

The first stage of the energy hierarchy assessment methodology is to incorporate high levels of passive and energy efficient design measures to reduce the development’s energy consumption and associated CO₂ emissions.

As the development is in outline form, consideration has been given to incorporating passive design.

Early-stage passive design considerations are as following:

- Pushing building beyond Part L 2021 fabric performance
- Consideration for mixed mode systems and understanding air flow across the development.

3.2.1. Building Fabric

A fabric first approach aims to drive thermal envelope performance values to go beyond the Part L:2021 Minimum standards. The passive design element of the development is key to meeting the aspirations for BREEAM ‘Excellent’ rating. The following building fabric targets in Table 1, below Part L limiting values, are recommended to align with the client and council vision and promote best practices:

Table 1 Proposed Building Fabric Performance

Building Fabric	Part L21 2021 Limiting Value (W/m ² ·K)	Recommended target values (W/m ² ·K)
Wall	0.26	0.15
Roof	0.16	0.12
Floor	0.18	0.12
Glazing U-Value	1.6	1.2
Solid door	1.6	1.2
Air Tightness	8 m ³ /h·m ² @50Pa	3 m ³ /h. m ² @50Pa

Further assessment will be required as the design progresses, mostly focusing on construction make-ups to achieve the desired U-values.

3.3. Energy Efficient (Be Clean)

The development is expected to aim to maximise building services performance, through energy efficient systems. According to the new Part L 2021, heating/cooling systems should not be fuelled by fossil fuels and therefore heating systems selected for the proposed development must be fully electrically powered. That includes using low specific fan powers, as well as highly efficient lighting with good lighting control.

When outdoor conditions are acceptable, openable windows are recommended to allow for natural ventilation during the day, as well as the night-time to make use of the night-time cooling.

The Proposed Development will be served by electric systems, with no fossil fuel use on site. This choice of system aligns with the UK decarbonisation strategy and benefits from a decarbonising grid. Over time the grid is set to decarbonise and therefore the Proposed Development will also reduce in operational carbon emissions associated with electricity use.

Phase 3 of the development will continue the effort to exceed the regulatory requirements and best practice industry guides, as achieved in previous phases, in regard to system efficiencies and lighting.

3.3.1. Fuel types and Carbon factors

In December 2021, the Government adopted Approved Document Part L: 2021. This Approved Document became legislation on the 15th of June 2022 and therefore has been followed for the purpose of this assessment. The Proposed Development emissions calculations will be based on carbon factors contained within Approved Document Part L: 2021, shown in Table 2. Gas will not be consumed on site but has been displayed for the purpose of comparison, demonstrating that electric-led systems are a more attractive option from a carbon perspective. Moreover, it is anticipated that the grid is decarbonising over time as more renewables are introduced in the UK energy sector and generation.

Table 2 Carbon Factors

Fuel type	Part L:2021 Adopted carbon factors (kgCO ₂ /kWh)
Natural Gas	0.210
Grid electricity	0.145 (annual average)

3.4. Clean Energy (Be Green)

Low carbon and renewable energy technology options for generation of on-site clean energy are to be considered and evaluated as the project progresses. A number of the variables affecting suitability were considered within this review, such as:

- Environmental Constraints (e.g. suitability of geology for Ground Source Heat Pumps);
- Infrastructure Constraints (e.g. impacts on aviation from wind turbines, transport infrastructure).

3.4.1. Renewable Technology Feasibility

A preliminary feasibility assessment has been carried out assessing the potential and suitability of a number of renewable technologies. Table 3 sets out the complete list of potential low and zero and renewable technologies along with their concluding viability for this development.

Table 3 Summary of Renewables Sources Appraisal

Technology	Feasible	Notes
Photovoltaics	Yes	Photovoltaic (PV) panels convert the sun's energy into electricity. As the Proposed Development is solely electricity serviced, offsetting imported energy from the grid will benefit the scheme and therefore this technology will be used.
Combined Heat and Power	No	A Combined Heat and Power (CHP) plant integrates the production of heat and power into a single, highly efficient process. CHP is considered feasible where the heating requirement of a scheme brings together many small intermittent loads to form a substantial base load demand for heat. As the development consists of mainly residential units, CHP is considered a technically feasible and cost-effective option. However, due to use of fossil fuels (i.e. gas) this is not deemed compliant with the new Building Regulations.
Solar Thermal	No	Solar thermal panels convert the sun's energy into hot water and are typically used to pre-heat domestic hot water systems. Solar thermal systems are renowned to be major contributors in the summer however, it is questionable whether they can sustain the demands through the months where the solar resource is at its weakest, and when the DHW demand is at its highest. For this reason, the building makes it more favourable to utilise roof space to install photovoltaic panels (PV) in lieu of solar thermal.
Bio-fuel Heating	No	There are currently a number of environmental concerns regarding the use of biofuel in buildings. These include, fuel transportation / storage issues, potential air quality impact and resulting flue structure, plant space / storage requirements & maintenance requirements. It is not considered that the biofuel market has developed sufficiently to resolve the above concerns and is not considered viable for this development due to environmental issues surrounding this fuel type.
Ground/Water Source Heat Pump	Further investigation required	Ground source heat pumps make use of the relatively stable ground temperatures to improve the efficiencies of the heat pumps compared to an air source option. Especially GSHP as part of a 5 th generation heating network, as a shared resource between dwellings. Further investigation is required to determine suitability of geological properties. This technology may be costly to implement.
Air Source Heat Pump	Yes	Air source heat pumps (ASHP) are like ground source heat pumps but extract heat from the ambient air rather than the ground. The efficiency of air source heat pumps are generally slightly lower than ground source heat pumps. Alternative technology such as CO ₂ air source heat pumps may also be considered for domestic hot water systems to maximise energy efficiency.

Wind power	No	There is considerable evidence of urban wind turbines failing to perform to manufacturer’s output estimates. Significant planning and integration issues also exist and consequently wind turbines are not viable
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Following the preliminary feasibility , the strategy is proposed to include:

- Photovoltaic panels on any available roof space. A balance between ecology, plant and photovoltaic panels needs to be developed during RIBA stage 2 of the project.
- Battery storage – the use of innovative technology and the use of battery storage will be considered in more detail during RIBA stage 2 of the project.
- Heat Pumps – the use of heat pumps to support the heating of cooling is recommended, including heat network configurations that incorporate ground source heat pumps.
- All commercially available Low and Zero Carbon options have been reviewed with respect to the development. These technologies have been considered within the constraints of the prevailing environmental conditions, building operation, loads, integration within the concept building services, viability, architectural design, capital and maintenance costs with associated payback and overall effective carbon dioxide reduction.
- The development will include feasible renewable energy technology to reduce the development’s CO₂ emissions once passive design and active energy efficiency measures have been considered.

3.5. Embodied Carbon

The industry is moving towards the use of Life Cycle Assessment (LCA), in order to understand the environmental impacts from construction products and materials is used to appraise a range of different design options with the aim of improving the construction product related environmental performance of the building. The results of the LCA, with its stages detailed in Figure 4, are presented in an environmental product declaration (EPD) in order to provide the causes for assessing buildings and identify those which cause less stress to the environment.

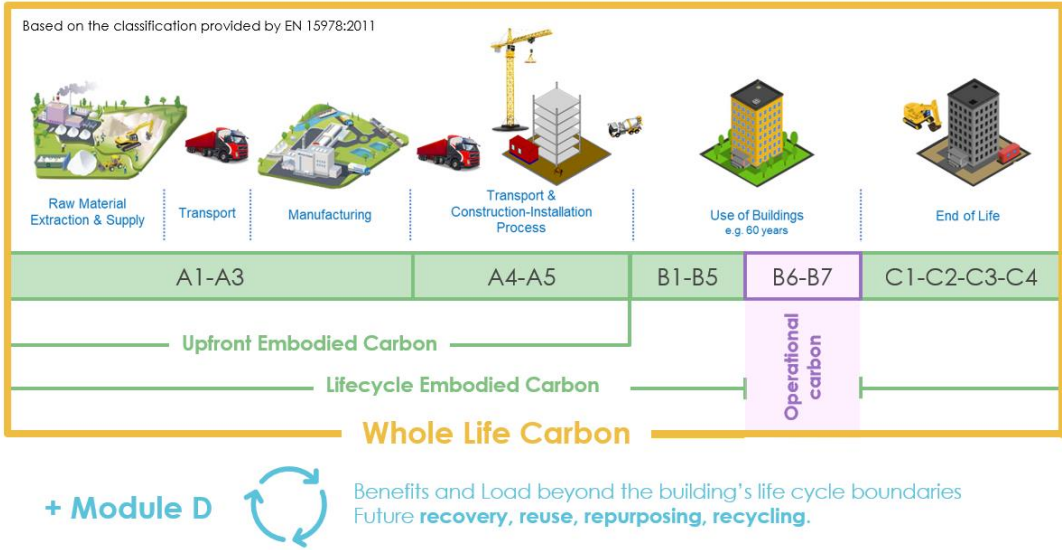


Figure 4 Whole Life Carbon

Materials used should be responsibly sourced in accordance with any national and local policy such as the UK Government’s Timber Procurement Policy. Where appropriate local suppliers should be used in order to reduce emissions relating to the transportation of materials and equipment to and from site.

The Proposed Development could use, at an early design stage, the LCA tool to identify what are the most sustainable materials suitable for the proposed development. It is recommended that an embodied carbon study should be commissioned to determine actual savings.

The proposals have been designed to be in-keeping with the local area whilst also delivering contemporary sustainable design solutions which effectively integrate into the existing fabric of the area. External materials and streetscape palettes will incorporate materials considered to be sympathetic to the local character and the appearance of the surrounding area.

The development will aim to incorporate the following measures in regards to embodied carbon and the carbon footprint of the development:

- Assess whole life carbon and disclosed for all construction projects to drive carbon reductions.
- Measure and offset embodied carbon impact at practical completion.

3.6. Next Steps

The proposed development requires undertaking a number of more detailed assessments during the upcoming stages, starting early in RIBA stage 2 and update them as the project progresses. These include:

- Energy Assessment including dynamic thermal modelling.
- Overheating risk assessment to ensure adequate indoor air quality and thermal comfort is achieved, ensuring satisfactory operative temperatures now and in the future.

- Feasibility studies to determine the optimum design of renewable and low-carbon technologies to be incorporated.
- Designing streets for south-facing homes optimizes energy from the sun, reducing reliance on artificial heating, enhancing natural lighting, and sustainability.
- Designing homes for comfort and energy efficiency involves maximizing natural light, heat, and ventilation for optimal living conditions.
- Whole Life Cycle assessment to quantify and reduce embodied carbon incorporated in the development.

4. **BREEAM**

BREEAM is the world’s first and leading sustainability assessment and certification scheme for the built environment. It assesses, encourages and rewards environmental, social and economic sustainability throughout the built environment.

BREEAM Multi-residential is intended for use on multi-occupancy residential buildings which are not suitable for assessment under the Code for Sustainable Homes (CSH), as it covers buildings which contains a mix of residential accommodation with communal areas which make up more than 10% of the total Net Internal Floor area. Figure 5 outlines the credits needed per category to achieve ‘Excellent’ rating as an indication of what the proposed development should pursue. It is worth noting that about 40% of the credits need to be achieved by the end of Stage 2.

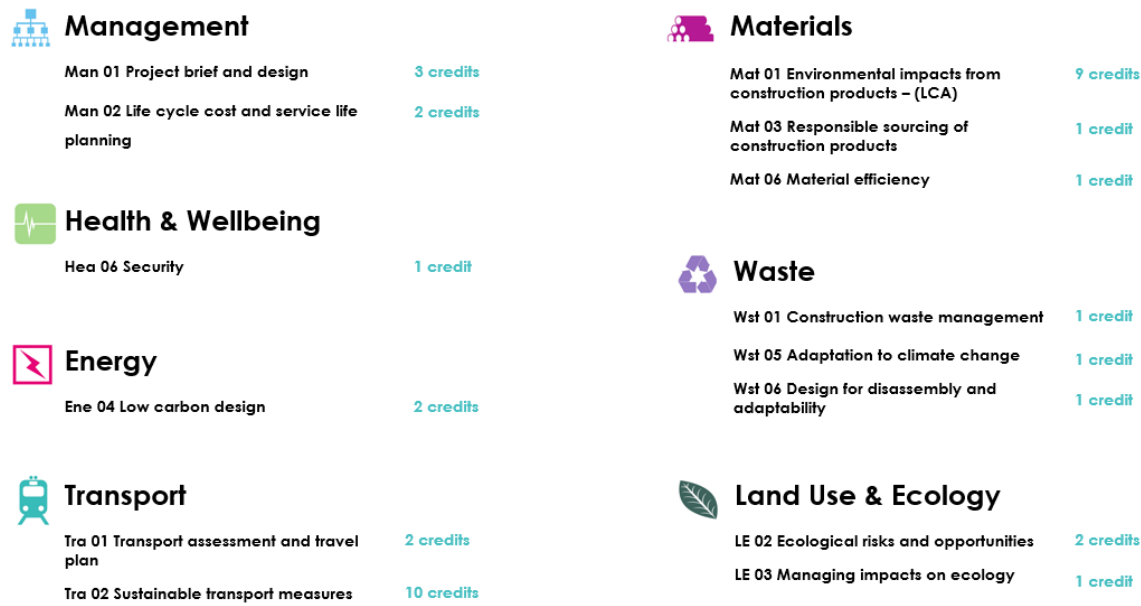


Figure 5 Early-Stage BREEAM credits.

If these credits are not addressed at the correct stage, there is possibility that some points may be lost for particular credits, potentially jeopardising the targeted BREEAM rating. The overlap of BREEAM and RIBA stages is shown in Figure 6, indicating the expected delivery time.

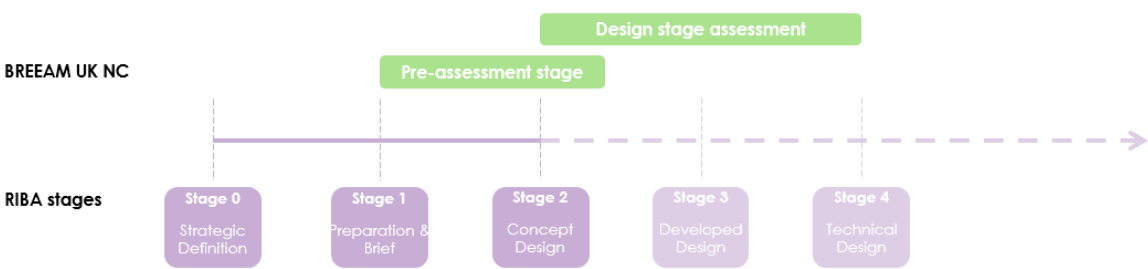


Figure 6 Timeline for BREEAM UK NC.

5. Green spaces and Ecology

The proposed development is located in Southern boundary of East Hampshire District Council (EHDC) and is adjacent to Catherington Park housing development. the development is in close proximity of an agricultural filed and an Ancient Replanted Woodland, as shown in Figure 7. Surrounded by a rich green landscape, the development aims to protect the enrich the ecological environment is operates within, benefiting and benefiting from nature, offering future residents a pleasant and enjoyable environment to live and work.

The plan is expected to include up to 190 homes, as well as associated open spaces, foot paths, access roads and play spaces, as shown in Figure 7.



Figure 7 Illustrative diagram of green spaces on site.

To establish an ecological base line and highlight the potential Important Ecological Features (IEF), an ecological appraisal has been conducted for the area. The ecological appraisal highlighted the impact of the development that will replace the predominantly poor semi-improved grassland with a development that champions habitat creation and protects hedgerows and trees, within and surrounding the site.

The protection and inclusion of sites for the species identified on the site is a part of the masterplan. The main species identified and will be protected includes bat species, breeding birds and foraging badgers.

The following measures are recommended to ensure ecology and biodiversity within the site is preserved, protected and enhanced:

- Provide extensive landscaping within and around the site will offer shade, cooling, and a pleasant, healthy environment for residential and public areas.
- Preserving existing hedgerows, planting new ones, and adding trees for biodiversity are integral aspects of our environmental efforts.
- Preserving local wildlife habitats within and around the development, while concurrently creating new opportunities for ecological enhancement.
- Selecting smaller plant species to have less watering;
- More species variety of plants (climate change friendly species), which will have greater resilience (more resilient to the future);
- Green infrastructure across site;
- Blue infrastructure through provision of SuDS using site topography;
- Use UK or European sourced for street furniture and utilise timber that does not come from tropic hardwood i.e., Nordic pine;
- Landscape with low maintenance regime in many areas using native, drought tolerant species capable of withstanding long periods without additional water;
- Conservation and enhancements;
- Biodiversity net gain (Defra metric calculation tool);
- Health and wellbeing benefits; and
- The contractors will be required to put measures in place to protect the existing fauna and flora.

6. Water and Flood risk

6.1. Water Resources

There is need for developments to be more water efficient and limit their water demand. Water consumption can be reduced through installing water efficient features in dwellings and incorporating green infrastructure which can survive on precipitation alone.

6.1.1. Reducing Water Consumption During Construction

During the construction phase of the development measures should be incorporated to reduce the demand for water on site in line with the recommended Waste & Resource Action Program (WRAP) water efficiency construction measures. These may include:

- Collecting and storing rainwater on site for use instead of mains water;
- Using water efficient equipment on site; and
- Preventing problems arising that may need water use to control e.g. minimise dust emissions to reduce the need for dampening down surfaces.

6.1.2. Reducing Internal Potable Water Consumption

The specification of low water consuming fittings will be fitted within the dwellings with information explaining the benefits of reducing the water use available.

The development will be designed to reduce mains water usage following to Building Regulations Part G requirements. This involves the potential water consumption by residents living in new dwellings should not exceed 110 litres per person per day.

A range of water saving measures will be employed to reduce water demand, this may include the following:

- Flow restrictors to reduce the flow rate of kitchen sink and bathroom basin taps;
- Low-flow showers;
- Small capacity baths;
- Dual-flush toilets with appropriate controls;
- Water efficient appliances such as dishwashers and washing machines (where provided);
- Leak detection systems to notify facilities teams of any leaks;
- Pulsed water meters to allow users to actively monitor consumption;
- Installation of solenoid valves to automatically turn off the water when the area is not occupied; and

6.1.3. Reducing External Water Consumption

Measures will be incorporated to reduce external water consumption. The water strategy would focus on demand reduction in the first instance, followed by consideration of any water collection and reuse.

The following measures will be considered and incorporated if appropriate:

- Garden landscape planting focusing on species requiring reduced irrigation; and
- Rainwater harvesting using water butts for private garden irrigation.
- Water harvesting for irrigation purposes, such as rainwater butts on individual properties.

Any soft landscaping should include either drought-resistant species or those which can survive on precipitation alone so as to reduce irrigation needs.

6.1.4. Water and Ground Pollution

The principal contractor could implement best practice site practices to reduce the risk of water and ground pollution during the construction phase, including:

- The use of drip trays with all stationary machinery;
- The secure and diligent storage of hazardous materials to prevent incidence of pollution; and
- The implementation of procedures to clean up spills immediately after occurring to reduce further pollution.

6.1.4.1. Construction Mitigation Measures

In order to reduce the potential air pollutants arising from construction, the principle contractor will implement construction management practices during the construction phase, including:

- Watering of roads (dust suppression) within the construction site;
- Locating machinery and dust causing activities furthest from sensitive receptors where possible;
- Erect barriers and screens to prevent dust leaving the site;
- Ensure all on road vehicles comply with the London Low Emission Zone;
- Turn off vehicle engines when stationary;
- Only use cutting, grinding and sawing equipment with dust suppression equipment;
- Cover stockpiles of loose building materials such as sand and ballast; and
- Minimise drop heights for deliveries.

The approach to managing these impacts will be formed within a CEMP by the principal contractor.

6.2. Flood risk

A Draft Flood Risk Assessment and Drainage Strategy has been prepared by Hilson Moran, in accordance with the standing advice and requirements of the Environment Agency for Flood Risk Assessments as outlined in the Communities and Local Governments Technical Guidance to the National Planning Policy Framework (NPPF). Considerations were made for the assessment to be appropriate to the nature and scale of the residential development at Land at Woodcroft Farm in East Hampshire.

The assessment investigated all potential risks of current or future flooding to the site, considered the impact the development may have elsewhere with regards to flooding, and considered design proposals to mitigate any potential risk of flooding determined to be present.

The FRA has identified that the site is within a Flood Zone 1 and demonstrates that the site is at low risk of flooding from all fluvial sources (Tidal and River), artificial water bodies, and also groundwater. The flood maps have identified that some potential surface water flooding has been highlighted from the Environment Agency (EA) flood maps; this is mainly routed within the middle section of the site (i.e., the potential karstic area). As a precautionary measure, the evolving masterplan has not placed any buildings within this region. Due to the site being greenfield, there is no recorded historical flooding within the vicinity, and being a flood Zone 1 will automatically pass the EA's Sequential Test. This is documented in the Drainage Strategy document prepared by Hilson Moran with flows attenuated for the 1 in 100-year event plus climate change.

The development site is classified as a Greenfield development. In Greenfield development (where reasonably practical), the runoff volume discharged from the development should not exceed the greenfield runoff volume up to 1 in 100-year, 6-hour rainfall event.

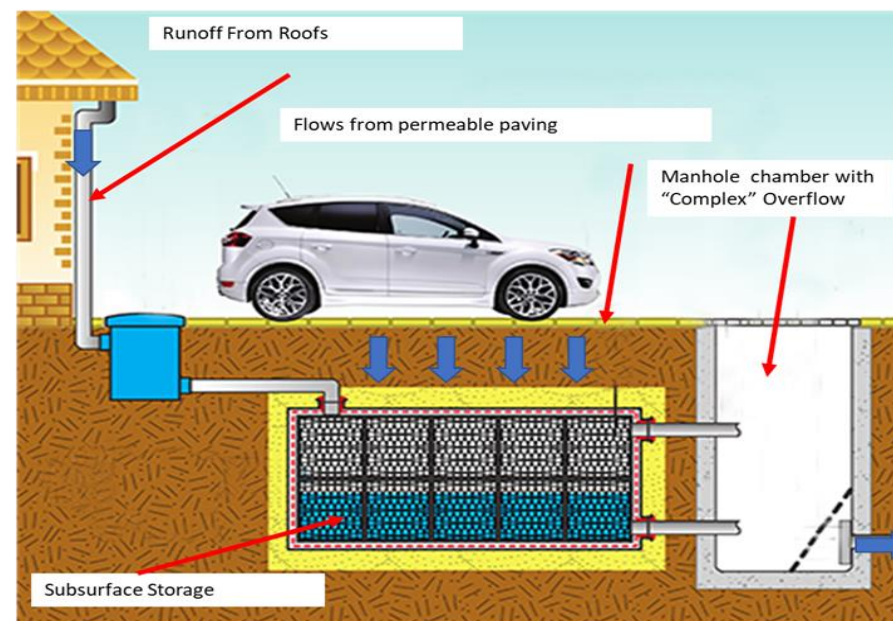


Figure 8 Illustration of proposed Sustainable Urban Drainage measures.

It is proposed that the site will aim to meet the DEFRA 2015 Non-statutory Technical Standards for Sustainable Drainage Systems and the requirements from the local SFRA. The requirement mandates to reduction of runoff rates from the proposed development during the 1 in-1 year and the 1 in-100-year events to respective green field rates, accounting for the effects of climate change on rainfall-runoff over the lifetime of the proposed redevelopment. This will be achieved by using a series of Sustainable Urban Drainage (SuDS) measures, demonstrated in Figure 8, within the site including:

- Permeable Paving,
- Subsurface storage geocellular systems - Polystorm systems 1m x 0.5m x 0.4m (l/w/d), with 95% void ratio.
- Detention Basins.

The flood risk characteristics for Land at Woodcroft Farm, demonstrated in Figure 9, is described in the sub-sections below:

Fluvial - The entire site is within a Flood Zone 1 and therefore is characterised by *very low risk* of flooding from fluvial sources (tidal/ rivers). The nearest known watercourse is roughly 700m southwest of the site (a tributary to Billy's Lake).

Surface Water/ Pluvial – Some potential surface water flooding has been highlighted from the EA flood maps; this is mainly routed within the middle section of the site (i.e. the potential karstic area). Following the site visit carried out by Hilson Moran, no indication of surface water ponding was identified within this area, despite recent rainfall. The evolving masterplan has not placed any buildings within this region.

Groundwater - The Strategic Flood Risk Assessment (SFRA) shows that the historical groundwater flooding does not include the areas surrounding the site. In addition, the British Geological Survey (BGS) 'Susceptibility to groundwater flooding' indicates that there is a low risk of flooding from groundwater sources at Woodcroft farm.

In conclusion aside from a few minor areas that may provide surface water flood flow routes during extreme storms. Overall, the flood risk of the site is low and within a Flood Zone 1.

The site is not within a Source Protection Zone, which is a designated area used for groundwater extractions that the EA will protect. However, due to the Karstic nature of the site, infiltration within the site should be kept to a minimum within this section of the site. Provisional infiltration testing has been conducted and demonstrated that infiltration SUDs are unlikely to be feasible for this site.



Figure 9 Illustrative diagram detailing the drainage and flood risk strategy of the proposed development.

7. Wellbeing

The development will aim to encourage wellbeing by designing for pedestrian and cyclist movement and effective transport, as well as focusing on adding social value to the community. The design is to include elements to facilitate access to local facilities, jobs, bus routes, cycle links and other facilities.

An added social value to the development is delivered through affordable housing, to meet the housing needs of the community. Affordable dwellings are to be built to the same high-quality as privately owned housing.

7.1. Social value

The Proposed Development has been designed with community in mind, with the aim to foster social value. Access to open spaces will be ensured for all dwellings, as well as footpaths, community orchards, and courtyard. In addition to that, access to the adjoining footpaths and Public Right of Ways, to allow for a better connection to nature and green spaces.

The illustrative masterplan illustrated in Figure 10 shows the land uses across the site, green spaces and play areas proposed.



Figure 10 Illustrative diagram of proposed green spaces and wellbeing areas.

The Proposed Development has been designed with community in mind, with the aim to foster social value in Land at Woodcroft Farm and within the East Hampshire area. A focus on social value has been considered by proposing the following design ideas:

- Promoting health & wellbeing in design
- Improved air quality
- Meeting local housing needs with 40% affordable housing
- Large public space provisions, including children play areas and fitness trails
- Community focused landscapes
- 47% green open spaces and retention of trees
- Walking and cycling is promoted to influence healthy lifestyles
- Cycle parking is proposed to be incorporated into the site in line with the local standards for residential units
- Lighting elements and configuration design for safety and security.
- House and flat size diversity, including 1,2 3 and 4 bed dwellings
- Incorporation of edible landscape as a social hub.
- A 10% contribution to Biodiversity Net Gain.

7.2. Transport

The development will be designed to support and promote walking, cycling and use of public transport, as these are integral to creating a sustainable development. The Proposed Development aims to contribute towards sustainable transport objectives set in Elmbridge Local Plan.

Sustainable modes of transport will be promoted through the proposed development by incorporating infrastructure that will aim to reduce vehicle use and encourage walking and cycling. EV charging points will be provided as a way to support the electrification of transport and reduce the associated emissions associated with these.

In addition, cycle stands will be provided on-site, as detailed below, to encourage and enable cycling. The provision exceeds the expected requirements and aims to influence habitants and visitors to adopt sustainable and healthy modes of transport.

A Framework Travel Plan (FTP) is recommended to enable continued monitoring of the development, by securing measures to promote sustainable modes of travel, supported by incentives which will be made available to residents to increase their awareness of different travel choices.

Various measures are recommended to be employed in regards to sustainable transportation in the development, this includes the following:

- Designing the masterplan in walkable residential clusters, with limits of 10-minute walks from local facilities and 5-minute walk from the existing bus network.

- Dedicated pedestrian walkways, foot paths and cycle links, interconnected throughout the development to create a connected network
- Connectivity to surrounding footpath networks, natural sites and Right of Way trails.
- Electric vehicle charging points
- Traffic calming features



Figure 11 Illustrative Movement Strategy

7.2.1. Electric Vehicle Charging Infrastructure

The Proposed Development aims to support the reduction of Greenhouse Gases (GHG) associated with transport. It aims to shift away from fossil-fuelled vehicles and electrification of transport by introducing EV charging points on-site. This provision is in line with local requirements and Part S of the Building Regulation. The provision of EV charging points includes 1 charging point for each dwelling.

Providing all residential plots with access to dedicated EVC point (including affordable units).

EV charging points will be provided at the site in line with the latest SCC standards, which are for one charging socket to be provided per residential unit. This will encourage the uptake of sustainable vehicles by providing comfort and convenience, as there will always be a charging point available to keep their vehicle charged.

The uptake of EV by future users of the Proposed Development will help to reduce the GHG emissions associated with transport.

The electrical load associated with this infrastructure is to be considered and reflecting within a Utilities Statement, which should be read in conjunction with this section.

8.

Conclusion

On behalf of Grainger Plc, Hilson Moran has prepared an Energy and Sustainability statement. The development has focused on key energy and sustainability issues, in line with national and local policies, including the East Hampshire District Council plan. These areas include Energy and Carbon, Water and Flood risk, Ecology and Wellbeing, along with the associated green spaces.

The Proposed Development aims to reduce its contribution to global warming and climate change by promoting sustainable modes of transport (e.g., cycling, public transport) and encourage its users to move away from fossil-fuel vehicles, designing buildings that are energy efficient and introducing renewable energy technologies on-site (e.g., solar PVs on roofs).

Energy and carbon

The Proposed Development has significant opportunity to become an energy efficient and low-carbon development. The final design will aim to incorporate highly performing building fabric, energy efficient and electric-led heating system and introduce renewable technologies on-site, such as solar PV.

The development aspires to go beyond Part L notional building emissions for the new build. The existing buildings will be designed to exceed regulation requirements, when possible, as well as allow energy savings through fabric upgrade and efficient building services.

Moreover, the development will aim to reduce Embodied carbon and the associated carbon footprint by assessing and monitoring the embodied carbon throughout the stages of the development and after completion.

Wellbeing

Sustainable modes of transport will be promoted through the proposed development by incorporating infrastructure that will work towards reducing vehicle use and encourage walking and cycling. EV charging points are planned to provide a way to support the electrification of transport and reduce the associated emissions associated with these. Access to greenspaces and social hubs will be highlighted to maximise its contribution to the social value of the development.

Ecology and green spaces

Safeguarding biodiversity and providing high quality green spaces is achieved by protecting and enhancing features with ecological value. Progress against this aspiration is measured by tracking the percentage of biodiversity net gain achieved by the development. The Proposed Development aims to achieve this through the preservation and retention of trees, introducing enhanced ecological measures and preserving connections t Right of Way paths.

Water and Flood risk

A Flood Risk Assessment (FRA) has been undertaken and a SuDS strategy has been designed to adapt to climate change in line with revised UK Government climate change allowances.

The assessment investigated all potential risks of current or future flooding to the site, considered the impact the development may have elsewhere with regards to flooding, and considered design proposals to mitigate any potential risk of flooding determined to be present.



People. Places. Planet.