LITTLE COURT

SUSTAINABILITY AND ENERGY STATEMENT

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1. INTRODUCTION

Element Sustainability Limited have been commissioned by CARE (Little Court) Limited to review the sustainability performance of the proposed care home development at Little Court, Little Wratting, West Suffolk.

The purpose of this statement is to summarise the relevant policy background and requirements of West Suffolk Council (hereafter referred to as the council) and demonstrate the ways in which these policies have been addressed through their proposals, ensuring all practicable measures have been taken in order to deliver a sustainable development at this site.

Details of the design attributes, specifications and characteristics of the scheme are appraised in order to demonstrate how the proposals contribute to sustainable development within West Suffolk and seek to mitigate the environmental impacts of the scheme.

2. DEVELOPMENT PROPOSALS

2.1 Development Site Description

The proposed development site is situated in the village of Little Wratting, approximately 1.1km from the town of Haverhill, West Suffolk. A stable block, outbuilding, horse riding arena and paddocks currently occupy the 12,000m^2 parcel of land as well as associated hardstanding areas. A small copse of mature trees and a pond lies to the north of the site.

The wider area is characterised by open farmland with a number of residential buildings and farmhouses. The application site is bound by Haverhill Road to the north and an access road to the east with Broadlands Hall School just beyond that. Adjoining the site to the west and south west is Hills Farm and Little Court Equestrian Centre with open farmland to the south. The proposed development site is not located within a landscape or nature conservation designated area.

Figure 2.1 – Pre-development Site Location

2.2 Development Proposals

The development proposals include for the demolition of the existing buildings and paddocks to allow for the construction of a specialist dementia care village for up to 120 residents.

The scheme will be divided into fourteen blocks comprising three single-storey and eleven two-storey buildings. The dementia care village will include a central amenity building (shop, restaurant, pub, communal hall, treatment/counselling rooms, offices and staff accommodation), club/hobby rooms, vehicle parking, landscaping proposals and associated works.

Low-carbon and renewable energy supply in addition to the significant soft landscaping and preserved vegetation will form a key element of the design, enhancing the sustainability credentials of the site. The application also includes for a sixty-space carpark provisioned with electric vehicle charging ports.
The area schedule including the intended use floorplans and elevations are presented below in Table 2.1 and Figures 2.2 to 2.8.

Table 2.1 – Area Schedule by Activity Type

Activity Type	Area (GIA)
Activity Rooms	193 m^2
Communal, Management, Back of House	706 m^2
Management, Staff Quarters	512 m^2
Residential	5,640 m^2
Total	**7,051** m^2

Figure 2.2 – Proposed Site Plan

Figure 2.3 – Proposed Ground Floor Plan

Figure 2.4 – Proposed Roof Plan

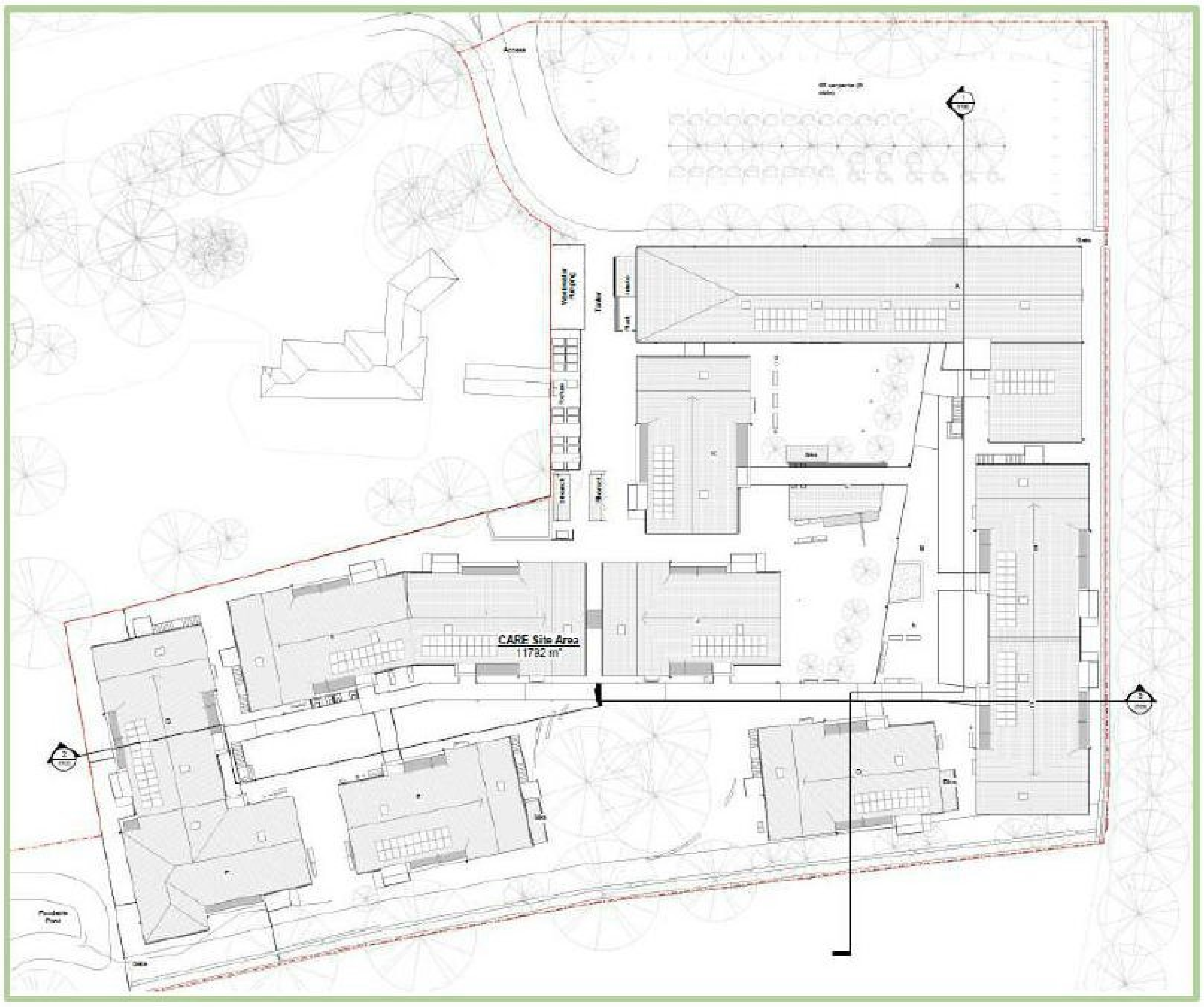


Figure 2.5 – Proposed South Elevation

Figure 2.6 – Proposed West Elevation

Figure 2.7 – Proposed North Elevation

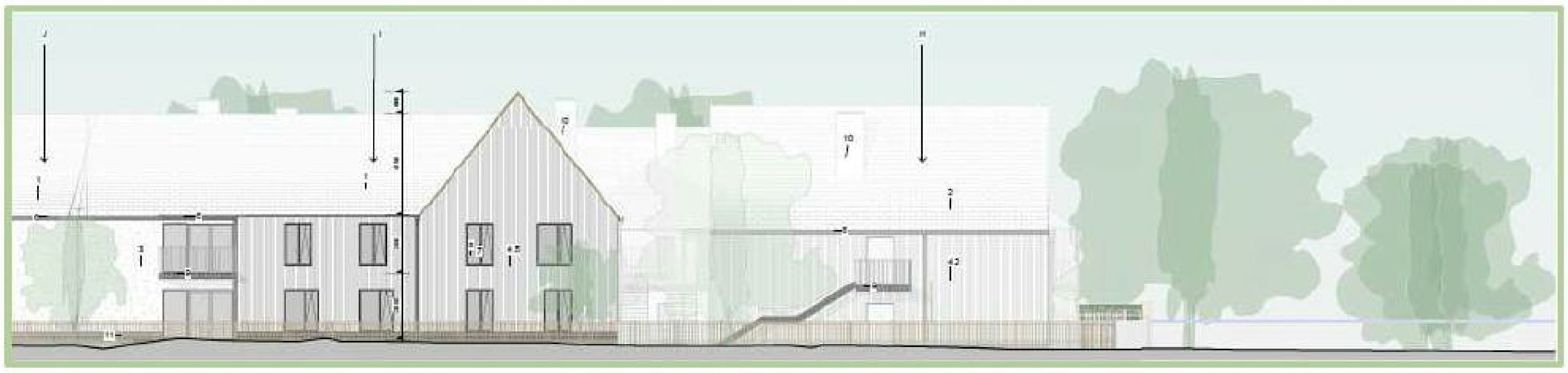


Figure 2.8 – Proposed East Elevation

3. POLICY REVIEW

3.1 Local Planning Policy

The West Suffolk Local Plan consists of the former Forest Heath area (FHDC) and former St. Edmundsbury area (SEBC) Local Plan documents and sets out the long-term planning and land use policies within West Suffolk. **The St. Edmundsbury Core Strategy Development Plan Document** (adopted December 2010) is part of the St. Edmundsbury Local Development Framework (LDF) and is the principle planning document that provides the overall strategic vision of the borough. **The St. Edmundsbury Core Strategy** contains the following relevant policies:

Policy CS2 – Sustainable Development promotes:

- The protection and enhancement of natural resources:
  - Making the most resource efficient use of land and infrastructure;
  - Protecting and enhancing biodiversity, wildlife and geodiversity;
  - Conserving and, wherever possible, enhancing the character and quality of local landscapes, the wider countryside and public access to them;
  - Protecting the quality and availability of water resources;
  - Maximising the efficient use of water including recycling of used water and rainwater harvesting; and,
  - Maximising the potential of existing and new sources of energy from biomass including timber and other energy crops.

- Sustainable design of the built environment:
  - Incorporating the principles of sustainable design and construction in accordance with recognised appropriate national standards and codes of practice to cover the following themes:
    - Energy and CO_2 Emissions – seeking, where feasible and viable, carbon neutral development, low carbon sources and decentralised energy generation;
    - Water – ensuring water efficiency by managing water demand and using wastewater reuse methods such as rainwater harvesting and grey water recycling;
    - Materials - minimising the use of resources and making use of local materials;
    - Surface Water Run-off – incorporating flood prevention and risk management measures, such as sustainable urban drainage;
    - Waste – adhering to the waste hierarchy during construction and following development to prevent waste generation and ensure reuse, recovery and recycling;
    - Pollution – remedying existing pollution or contamination and preventing further pollution arising from development proposals;
    - Transport – minimising the need for travel and ensuring a balance between transport infrastructure and pedestrians;
    - Health and Wellbeing – ensuring that the development enhances the quality of life of future occupants and users; and,
    - Ecology – valuing and enhancing the ecological features of the development site, where appropriate.
  - Ensuring that developments and their occupants are capable of managing the impact of heat stress and other extreme weather events;
  - Creating a safe environment which enhances the quality of the public realm; and,

  - Making a positive contribution to local distinctiveness, character, townscape and the setting of settlements.

Policy CS7 – Sustainable Transport promotes a high quality and sustainable transport system across the borough and reducing the need for travel through spatial planning and design:

- All proposals for development will be required to provide for travel by a range of means of transport other than the private car in accordance with the following hierarchy:

  - Walking;
  - Cycling;
  - Public Transport (including taxis);
  - Commercial vehicles; and,
  - Cars.

The LDF also contains development plans at a local level including the Forest Heath and St Edmundsbury Joint Development Management Policies Document (adopted February 2015) which is used in day-to-day planning decisions across both areas, in line with each council's adopted Core Strategy. The Joint Development Management Policies Document contains the following planning policies relevant to the development at Little Court:

Policy DM2: Creating Places – Development Principles and Local Distinctiveness requires proposals for all development to:

- Take mitigation measures into account, not affect adversely:

  - The distinctive historic character and architectural or archaeological value of the area and/or building;
  - Important landscape characteristics and prominent topographical features;
  - Sites, habitats, species and features of ecological interest; and,
  - The amenities of adjacent areas by reason of noise, smell, vibration, overlooking, overshadowing, loss of light, other pollution (including light pollution), or volume or type of vehicular activity generated.

- Produce designs and layouts which are safe and take account of crime prevention, community safety and public health.

- Produce designs that provide access for all, and that encourage the use of sustainable forms of transport through the provision of pedestrian and cycle links, including access to shops and community facilities.

Policy DM6 – Flooding and Sustainable Drainage requires proposals for all new development to detail how on-site drainage will be managed so as not to cause or exacerbate flooding elsewhere. Examples include rainwater harvesting and greywater recycling, and run-off and water management such as Sustainable Urban Drainage Systems (SUDS) or other natural drainage systems.

Policy DM7 – Sustainable Design and Construction expects all development to adhere to broad principles of sustainable design and construction and optimise energy efficiency through the use of design, layout, orientation, materials, insulation and construction techniques.

All new non-residential developments over 1000 square metres will be required to achieve the BREEAM 'Excellent' standard or equivalent unless it can be demonstrated that one or more of the conditions contained within the Joint Development Management Policies Document apply.

This policy promotes the energy hierarchy as an approach to reduce greenhouse gas emissions. The authorities will expect and encourage developers to explore innovative ways of cutting CO_2 emissions.

Policy DM12 - Mitigation, Enhancement, Management and Monitoring of Biodiversity requires in the design for all development, where appropriate, the protection of biodiversity and the mitigation of any adverse impacts. Additionally, enhancement for biodiversity should be included in all proposals, commensurate with the scale of the development.

3.2 Climate Emergency

On the 19th September 2019, the council declared a Climate Emergency in response to the findings of the Intergovernmental Panel on Climate Change (IPCC) report. A taskforce was assembled and an ambition of reaching net zero greenhouse gas (carbon) emissions by 2030 was established.

3.3 National Planning Policy

In addition to the local planning policies, the National Planning Policy Framework 2018 is a material consideration. The National Planning Policy Framework (amended June 2019) replaces all previous PPSs and PPGs.

The NPPF states that the planning system should play an active role in guiding development to sustainable solutions. There are three dimensions to sustainable development, as stated within the NPPF: economic, social and environmental. These dimensions give rise to the need for the planning system to perform a number of roles:

An economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

A social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being; and

An environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

These roles should not be undertaken in isolation, because they are mutually dependent. Economic growth can secure higher social and environmental standards, and well-designed buildings and places can improve the lives of people and communities. Therefore, to achieve sustainable development, economic, social and environmental gains should be sought jointly and simultaneously through the planning system.

Pursuing sustainable development requires careful attention to viability and costs in plan-making and decision-taking. To ensure viability, the costs of any requirements likely to be applied to development, such as requirements for affordable housing, standards, infrastructure contributions or other requirements should, when taking account of the normal cost of development and mitigation, enable the development to be deliverable. At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development - for decision-taking this means approving development proposals that accord with the development plan without delay.

3.4 Regulatory Framework

3.4.1 Building Regulations

Building Regulations, Part L - Conservation of Fuel and Power sets the compliance standards for energy demand and carbon dioxide emissions from buildings. Guidance on how to meet the requirements of this regulation is provided within a number of approved documents. The relevant documents are referenced below:

Approved Document L2A addresses the conservation of fuel and power in new non-domestic buildings. The proposed development will be registered against Building Regulations, Part L (2013) which requires all newly constructed buildings to comply with the 5 criteria set out in Approved Document L2A:

I. Achievement of an acceptable Building CO2 Emission Rate. i.e. the BER is less than the TER (target emission rate for a notional building);

II. Limits on design flexibility – including U-values, air permeability, air handling plant efficiency, duct leakage, insulation, lighting system efficiency;

III. Limiting solar gains in summer;

IV. Construction quality and commissioning - The BER must be recalculated as constructed; and,

V. Provision of information - Information must be provided to the building operator.

3.5 Key Drivers and Targets for this Development

Based upon a review of relevant planning policy requirements, legislative drivers and client priorities, the following list provides a brief precis or the key criteria that should be targeted for this development:

- Policy CS2 – Sustainable Development;
- Policy CS7 – Sustainable Transport;
- Policy DM2: Creating Places – Development Principles and Local Distinctiveness;
- Policy DM6 – Flooding and Sustainable Drainage;
- Policy DM7 – Sustainable Design and Construction;
- Policy DM12 - Mitigation, Enhancement, Management and Monitoring of Biodiversity; and,
- Building Regulations, Part L2A.

4. SUSTAINABILITY PERFORMANCE

This section provides an appraisal of the development proposals and details the specific approach, design features and specifications which will contribute to reducing the environmental impact of the proposed development. Ensuring that the proposed scheme contributes to sustainable development and meets the council's current policies, this section outlines the commitments that have been made by the applicant. The following categories identified in the council's Local Plans are considered:

- Energy;
- Water and Surface Water Run-off;
- Materials;
- Waste Management;
- Pollution;
- Health and Wellbeing;
- Landscape and Biodiversity; and,
- Location and Transport.

4.1 Energy

In order to limit energy demand and carbon dioxide (CO_2) emissions from the operation of the care home facility, the following design features will be integrated within the scheme to enable the occupants to reduce their environmental impact:

4.1.1 Energy Strategy

- The proposed approach to emissions reduction at this site will be through a fabric led energy strategy supplemented by efficient servicing in accordance with the principles of the Energy Hierarchy;
- A number of Low and Zero Carbon (LZC) technologies will form part of the combined energy strategy for the site including:
    - High efficiency heat pumps;
    - Photovoltaic panels; and,
    - Solar thermal panels.
- The proposed energy strategy will provide improvements in the energy performance of the buildings above national building regulations in relation to heating energy demand, energy consumption and carbon dioxide emissions; and,
- The scheme will seek to improve upon current building regulation Part L1A (2013) criteria by at least 7.5% with regards to regulated carbon emissions.

Further details of the proposed approach to reducing the energy demand and associated carbon dioxide emissions are presented in the Section 5.

4.1.2 General Principles

- White goods are graded on a scale from G (the least efficient) up to A++ (the most efficient) under the EU energy efficiency labelling scheme. There will be the provision of A and A+ rated white goods (where applicable);

- Provision of EU energy efficiency labelling scheme details to assist in the purchasing of energy efficient white goods;

- 100% low energy and/or LED internal lighting;

- All external space lighting to be provided by dedicated energy efficient fittings and controls; and,

- Secure cycle storage will be provided to promote more sustainable modes of transport for staff, residents and visitors.

4.2 Water

The buildings will be designed to reduce mains/potable water consumption and will include water efficient devices and equipment as per the following:

- A water efficiency strategy will be determined for the site. This will include ‘A’ rated appliances (where provided);

- Specification of water-efficient fixtures throughout the scheme (low flow taps and showers, dual flush WCs and low volume baths) will ensure that a calculated daily consumption of no more than <110litres/person/day for each residential unit;

- Water meter(s) on the main water supply will encourage water consumption management and monitoring to reduce the impacts of inefficiencies and leakage; and,

- The landscaped areas of the development will be irrigated solely by precipitation throughout all seasons of the year to reduce unregulated water consumption. Water butts will collect and recycle the rainwater from roofs to aid in irrigation and further reduce potable water consumption.

4.3 Materials

This development will seek to contribute towards more efficient use of non-renewable resources and to reducing the lifecycle impact of materials used in construction. This will be demonstrated by the selection of:

- Materials with low environmental impact throughout their lifecycle;

- Materials used throughout the development will be responsibly sourced from suppliers operating an Environmental Management System or procuring timber verified by either the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification standard (PEFC);

- Local sourcing of construction materials, where feasible, which will contribute to the retention of the local architectural characteristics of the area and minimise the impact of carbon dioxide emissions associated with the transportation of materials; and,

- Roof and wall materials will be chosen and selected to reflect the local vernacular. The proposals include for the use of timber panels for the external envelope and vertical structures that would be of low-key colours and that also incorporate elements of local rural distinctiveness.

4.4 Surface Water Run-off

Flood Risk -

- The development site benefits from a Low Flood Risk Zone location. Data provided on the Environment Agency website confirms the development has a low probability of flooding and lies within Zone 1 (see Figure 4.1).

Figure 4.1 – Flood Risk Map

On Site Surface Water Management -

The proposed development will result in an increase of impermeable surfacing across the site therefore, the surface water drainage strategy will be designed to ensure that the peak rate and volume of surface water run-off will be no greater post-development than pre-development run-off rates. An outline Surface Water Management Strategy has been prepared by Cannon Consulting Engineers as displayed in Figure 4.2.

Figure 4.2 – Surface Water Management Strategy (Source: Cannon Consulting Engineers)

To minimise the risk and impact of localised flooding on and off-site, watercourse pollution and other environmental damage, the following measures will be implemented:

- Sustainable urban drainage systems (SuDS) will be incorporated including permeable surfaces wherever possible;
- Below ground attenuation tanks and water butts for rainwater recycling. As well as being used for irrigation, the attenuated water will be slowly released into the water cycle to reduce surface water run-off loads. Furthermore, attenuation ponds to the west of the site, that fall within land owned by the applicant, will also capture surface water run-off from the site; and,
- The retained and new tree planting coupled with the significant soft landscaping scheme will serve to increase the short-term water storage within the site and attenuate the rate and volume of surface water movements off-site, thereby relieving potential for flash flood risk and pollution within the water catchment.

4.5 Waste Management

Construction Waste -

Best practice techniques to prevent and minimise waste during the design and construction phases of the development will be adopted as per the regulatory requirement, as follows:

- Prior to commencement of the above ground construction phase, a site waste management plan (SWMP) will be produced by the developer, containing procedures for waste minimisation, as well as optimisation of waste recovery and recycling in accordance with the Waste Hierarchy. This SWMP will limit the on and off-site environmental impacts of construction and will detail:
    - Recycled and secondary materials;
    - Waste reduction;
    - Waste segregation;
    - Waste recovery; and,
    - Waste disposal.
- A site waste management plan will identify opportunities to minimise waste generation and could help to divert at least 90% of construction waste from landfill; and,
- This scheme will promote the minimisation of waste from the site development and seek to maximise the use of recycled materials in construction.

Domestic Waste -

The development will be specified with infrastructure and facilities that meet the need of the building occupants and users for segregated waste storage, thereby optimising the ability to recycle waste:

- Recycling bin storage provision will enable the facility to make full use of local authority recycling services and support local recycling targets; and,
- An on-site composting facility will further reduce waste while providing a natural mulch fertiliser for the landscaped and gardening areas.

4.6 Pollution

To reduce emissions of gases with high global warming potential (GWP) into the atmosphere, all buildings will be specified with:

- Insulating materials that have a GWP of less than 5 throughout the development to reduce the construction phase impact of this scheme.

Additionally, the following measures will be implemented:

- Pollution Prevention Guidance will be adhered to with respects to air (dust) and water (ground and surface) pollution during the demolition and construction phases;
- External light fittings will be controlled through a time switch and daylight sensor to prevent operation during daylight hours. This will limit the impact of artificial lighting for the development's residents and surrounding environment;
- The landscaping proposals include for the retention of trees, as well as hedgerows and shrubbery around the site borders which will help buffer any noise generated by the surrounding area; and,

- Sound insulation will be specified to achieve Building Regulation Part E compliance (this will be verified by pre-completion testing).

4.7 Health and Wellbeing

To enable the occupants and building users of the care facility to lead lower environmental impact lifestyles and to enhance their quality of life, the following measures will be delivered at the proposed development:

- Excellent levels of natural daylighting throughout the blocks will be facilitated by the generous window dimensions in the proposed design. This will help improve the quality of life for the occupants and reduce the need for energy to artificially light the buildings;

- The landscaping proposals have been specifically designed to enhance social interaction between residents. Features including lawns, raised terraces, a courtyard with water a feature, a main piazza with active shop frontages, restaurant and café fronts in addition to an abundance of outdoor seating throughout the development;

- Active allotments and gardening areas will provide residents with the opportunity to learn about and grow their own produce. As well as the environmental benefits, this will strengthen the scheme as an social development where people maintain long occupancies, thereby ensuring a strong local community;

- Further enriching the health and wellbeing of the occupants, an area of quiet woodland will offer a more private, natural setting. Access to green space improves mental wellbeing, reducing the need to treat anxiety and mental health conditions. This space will help to create an inclusive environment where people will want to spend the free time; and,

- The landscaped areas and paths will also facilitate natural surveillance and create busy, overlooked routes at the site to reduce the opportunity for crime, creating a safer and more secure environment.

4.8 Construction Management

In order to minimise the impact of the development during construction and operation, whilst providing a safe place to live, the proposals include for the following provisions:

- The security needs of the development will be taken into account and crime prevention measures will be adopted to assist in reducing the opportunity for, and fear of, crime; and,

- Construction site impacts will be minimised, and best practice policies will be adopted in respect of air and water pollution. This will be facilitated through registration with the Considerate Constructors Scheme.

4.9 Ecology and Land Use

Land Use -

- The emphasis on residential and community development is driven by the need to establish a sense of place. The landscaped areas, woodland and amenity space within the proposed care facility is intended to create a sense of place that houses and supports a significant local population.

Ecology -

The proposed development site will incorporate ecology enhancing features and measures within the development footprint and provides an opportunity to secure an overall net gain in biodiversity.

The Chartered Institute of Ecology and Environmental Management (CIEEM), Institute of Environmental Management (IEMA) and the Construction Industry Research and Information Association (CIRIA) have established a framework of good practice principles for Biodiversity Net Gain. In line with the recommendations of the Preliminary Ecological Appraisal Report prepared by Greenwillows Associates Ltd and the Biodiversity Mitigation Hierarchy, the scheme will:

- Avoid the removal of habitats wherever possible. The existing tree clusters and hedgerows have been integrated into the design (See Figure 4.3 below) as assets. A water system of ditches and ponds at the northern border of the site will remain undisturbed to avoid interference with the fauna and established surface water runoff sites.

- Mitigate and manage measures to avoid and reduce impacts to biodiversity features during construction which include:

    - Vegetation clearance to be undertaken outside of bird breeding season (March to September);
    - Permeable site boundaries at lower levels to allow the passage of small fauna in and out of the site (also known as 'hedgehog holes'); and,
    - The lighting used at the site during construction or thereafter will be designed in accordance with guidance issued by the Bat Conservation Trust as lighting overspill may deter use by wildlife such as foraging bats. Furthermore, non-bitumen coated roofing membranes should be avoided due to the risk posed to bats.

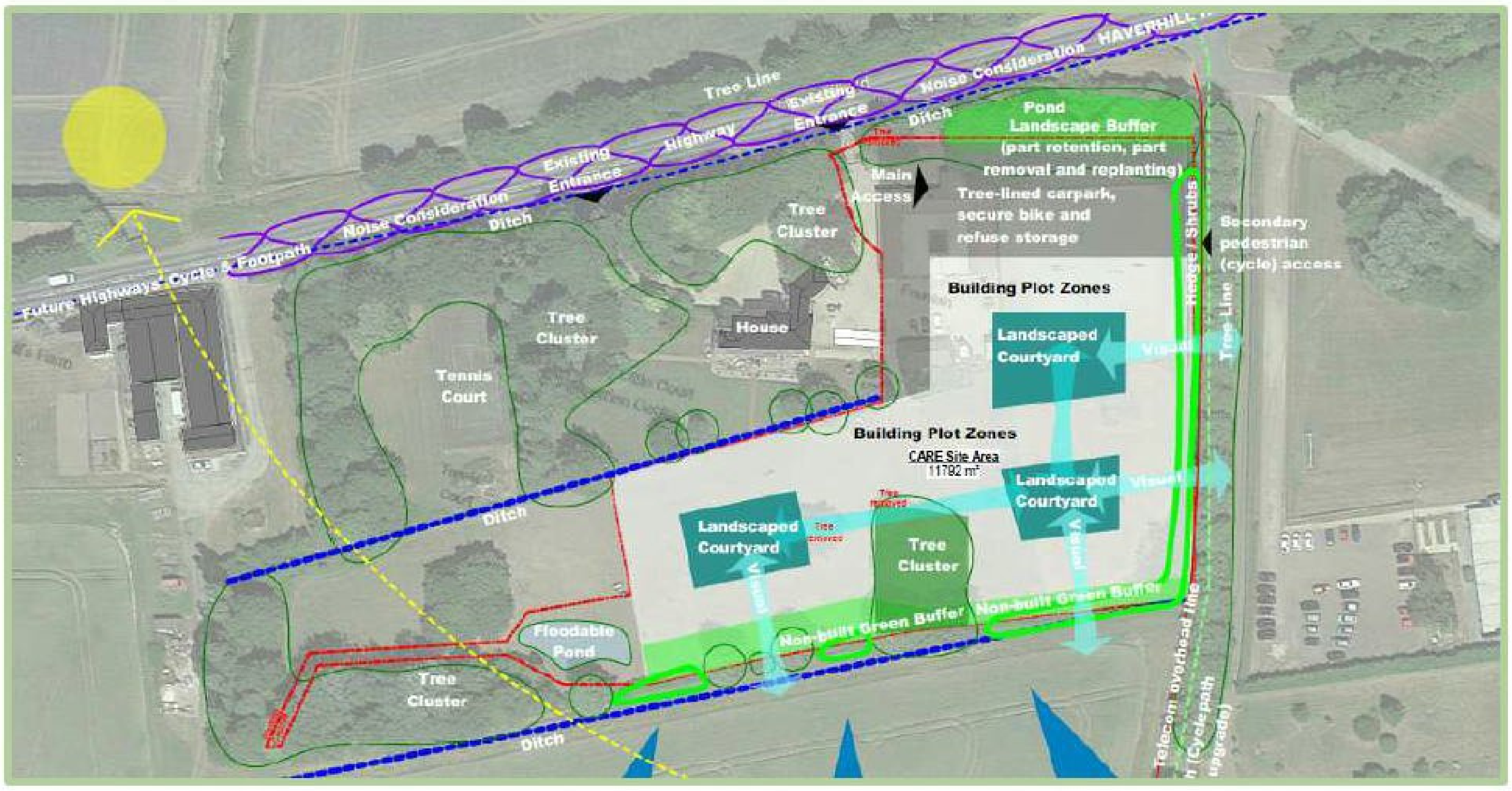
- Compensate for biodiversity losses resulting from the development. The proposals include for:

    - The installation of swallow nesting boxes to replace the fourteen nests present in the stable block; and,
    - The installation of two integrated bat boxes within the buildings and two bat boxes placed on retained trees to compensate for any potential bat roosting habitats that are lost.

- Enhance the surrounding biodiversity, enabling it to thrive into the site. The development proposals provide the opportunity to create valuable habitats for wildlife through:

    - The integration of swift boxes and sparrow terraces into the final building designs;
    - Placement of non-integrated nest boxes within the woodland area;
    - Bee hotels incorporated into the development to help sustain the local bee population; and,
    - Soft landscape planting of shrubs and trees of local progeny that support blossoms and fruit to support invertebrates. This will also encourage foraging birds and bats.

Figure 4.3 – Proposed Landscape Design



4.10 Transport

The residential scheme is located within a rural village setting and in close proximity to the larger settlement of Haverhill. It is surrounded largely by agricultural land and as such, the location presents some constraints as to the level of sustainable transport that can be accommodated.

Transport Links –

- Bus – The nearest bus stops are located approximately 700m away from the site along Haverhill Road. These stops provide daily services to into Haverhill, Cambridge, Bury St. Edmunds and Kedlington.
- Cycle – Adequate cycle storage will be provided onsite in accordance with local authority guidelines.
- Rail – There are no train stations local to the proposed development site.
- Pedestrian – The proposed development site will benefit from improved local access for cyclists and pedestrians to existing and future public highways.
- Car – The proposals include for the provision of sixty car parking spaces to support the care facility development. A portion of these spaces will feature active electric vehicle (EV) charging points to facilitate the increasing, widespread transition to electric car usage and ultimately help to support a growing sustainable community.

Disability Access -

- Disabled access provision within the scheme itself will be in accordance with Building Regulation, Part M criteria.

5. ENERGY STRATEGY

Details of the proposed energy strategy for the Little Court care facility is reviewed below. The enhanced building fabric specification throughout the development allied to low and zero-carbon technologies as well as efficient mechanical and electrical systems and advanced controls will achieve compliance with the rigorous emission reduction and fabric energy efficiency targets stipulated by Building Regulation, Part L2A (2013) and West Suffolk Council's planning policy requirements.

5.1 Local Planning Policies

West Suffolk's current Local Plan includes the following relevant policies to guide sustainable development:

- **Policy CS2 – Sustainable Development** promotes sustainable design of the built environment and seeks, where feasible and viable, carbon neutral development, low carbon sources and decentralised energy generation.

- **Policy DM7 – Sustainable Design and Construction** expects all development to adhere to broad principles of sustainable design and construction and optimise energy efficiency through the use of design, layout, orientation, materials, insulation and construction techniques. This policy promotes the energy hierarchy as an approach to reduce greenhouse gas emissions. The authorities will expect and encourage developers to explore innovative ways of cutting CO_2 emissions.

5.2 Build Fabric and Thermal Performance

In buildings, heat loss generally occurs through the following main areas and elements of the construction:

- Ground Floor;
- External Walls;
- Roofs;
- Doors and windows;
- Thermal bridging (heat loss through construction joints); and
- Uncontrolled ventilation.

The standard measurement of heat transfer through a given building material or construction type is the U-value (W/m^2K). The lower the U-value, the more slowly heat transfers and is lost out of a building.

5.2.1 Build Fabric and Thermal Performance

The scheme will be built to the following proposed material specification to limit heat loss and ensure efficient operation of the buildings, as presented in Table 5.1.

Table 5.1 – Proposed Fabric Specification

Construction Element	Specification
Ground Floor	U=0.13 W/m²K
External Wall	U=0.14 W/m²K
Roof	U=0.13 W/m²K
Windows	U=0.1.4 W/m²K *(Double Glazed, Low-E, g= 0.72)*
Doors	U=0.1.0W/m²K *(Solid, unglazed)*
Glazed Doors	U=0.1.2W/m²K *(Double Glazed, Low-E, g= 0.72)*
Design Air Permeability	5.0m³/hm² (@50Pa.)

This material specification and design will deliver a building that significantly reduces the carbon dioxide emission rate beyond the minimum standards of a Part L2A compliant solution and will provide the following benefits:

- **High performance thermal insulation** will ensure low U-values for all heat loss elements. Energy demand for space heating will be significantly reduced through the provision of an effective thermal envelope;

- **Thermally efficient, 'A' rated, double glazed windows** will be specified with argon gas fill and low emissivity coatings to limit heat loss through the pane. Thermal breaks will be incorporated within the frame to further limit heat loss. The glazing g value will be specified to optimise beneficial solar gains but limit the propensity for the buildings to overheat;

- **Low air tightness** will minimise uncontrolled ventilation. This will reduce heat losses and provide high levels of occupant comfort. Focus on the quality of the build is vital to deliver airtight buildings; and,

- **Attention to cold bridging junctions** including the provision of insulation and thermal breaks to limit heat transfer that occurs at the junctions between building elements and around openings. This will significantly improve the emission rate of the scheme.

5.3 Building Services

The proposed mechanical and electrical specification that will be incorporated to ensure efficient servicing of the scheme is presented in Table 5.2.

Table 5.2 – Proposed Mechanical and Electrical Specification

Item	Specification
Ventilation	Mechanical ventilation with heat recovery to all habitable rooms *(80% efficient, SFP= 1.1)* Natural ventilation to activity rooms: L, M and N and extract fans to bathrooms
Lighting	100% Low Energy and LED
Space Heating	Electric underfloor heating serving circulation, store and bathrooms (100% efficient) High efficiency split system heat pump serving bar, restaurant, foyer and theatre *(SEER = 4.0 – cooling only)* High efficiency split system heat pump to all other zones *(SCOP= 4.0 – heating only)*
Heating Control	Time and temperature zone control to underfloor heating
Water Heating	Instantaneous electric point of use water heater serving circulation, store and bathrooms *(100% efficient)* High efficiency hot water storage tank from ASHP serving all other zones, supplemented by solar thermal *(1000L, supplementary auxiliary electric heater for peak demand)*
Renewables	Solar thermal panels *(59m^2 total, ideally south facing, 30^o tilt serving combined cylinder)* Photovoltaic panels *(59kWp total, ideally south facing, 30^o tilt)*

This mechanical and electrical specification will deliver a Building Regulation Part L2A (2013) compliant scheme and will provide the following benefits:

- **Mechanical ventilation with heat recovery (MVHR)** systems will be specified in each habitable area to maintain a healthy living environment and further reduce the heat losses and the energy demand of the buildings. The proposed MVHR system can recover up to 80% of heat from the extracted stale air from the units by using a counter flow heat exchanger which 'pre-heats' cool incoming, fresh air. The outgoing and incoming air pass next to each other, but do not mix. The design air permeability of 5.0m^3/hm^2 (@50Pa.) will virtually eliminate uncontrolled ventilation and ensure that the majority of the expelled stale air will pass across the heat exchanger, thereby boosting the energy reduction potential of these systems. This ventilation system will also feature a summer bypass mode to limit the propensity of the buildings to overheat in summer;

- **No mechanical cooling** is required for the development with exceptions for the theatre, bar, restaurant and foyer. All remaining units are not considered to be at risk from overheating due to the orientation of the buildings, openable windows allowing cross-ventilation and the mechanical ventilation systems which incorporate a summer by-pass function to provide cool air during warm days;

- **Low energy and LED lighting** will be specified throughout all areas of the development in order to maximise operational efficiencies and lifespan of the fittings. LEDs operate with an estimated energy efficiency of up to 90% when compared to traditional lighting and conventional light bulbs. This means that about c.90% of the electrical energy is converted to light, rather than wasted heat as in conventional bulbs;

- **Split system heat pumps** benefit from high seasonal efficiencies for both heating and cooling modes. Additionally, these systems allow precise control of the necessary refrigerant circulation amount according to the system load facilitating a comfortable environment by use of smooth capacity control while serving a wet underfloor heating system;

- **High efficiency hot water storage** will be specified providing very low standing losses to reduce energy demand from the systems. To further limit energy demand for hot water, the buildings will be provided with water-efficient fixtures and fittings to limit overall water consumption;

- **Electric instantaneous hot water** systems will meet the hot water loads of the circulation, store and bathrooms zones. The water flows immediately to the desired temperature therefore conserving water with little energy or circulation losses; and,

- **Sophisticated heating controls** including time and temperature zone controls will ensure the efficient delivery of heat from the underfloor heating to further reduce the scheme's energy demand.

5.4 Renewable Energy Feasibility

A number of renewable energy technologies have been considered for this site, including:

- Combined Heat and Power (CHP);
- District Heating;
- Solar Hot Water;
- Photovoltaics (PV);
- Wind;
- Heat Pumps; and,
- Biomass heating

A review of the Little Court proposals and site location concludes that three of these options are feasible for the development, as detailed in Table 5.3 below:

Table 5.3 – Renewable Energy Feasibility Study

Technology	Description	Advantages	Limitations	Feasibility
Combined Heat and Power (CHP)	CHP is effectively an on-site, mini power plant providing both electrical power and thermal heat energy. It is an energy efficient, low carbon measure rather than a renewable energy technology	✓ Buildings with high heat / hot water demands and constant power demands lend themselves to CHP. ✓ Can be linked to a district heating scheme. ✓ Efficient use of fuel and excess electricity can be exported to the grid.	✖ Only viable for buildings with high heat / hot water demands and constant power. ✖ Plant space required. ✖ Maintenance intensive.	**Potentially** - The space heating and hot water demand at the development would lend itself to CHP, however, it is the developer's preference to focus on alternative energy efficiency measures such as heat pumps.
Solar Hot Water	The solar collector absorbs the radiant energy of the sun and converts it to heat energy for use as hot water in buildings.	✓ Feasible for small scale developments. ✓ Low maintenance.	✖ Panels ideally facing south at 30° tilt for optimum efficiency.	**Yes** – This technology is considered to be a feasible option for this site.
Photovoltaics (PV)	PV panels harness solar thermal energy and convert it into electricity which can then be used within a building. The panels may be roof or floor mounted.	✓ Low maintenance. ✓ Easy to integrate into building design. ✓ Cost of PV is constantly dropping.	✖ Panels ideally facing south at 30° tilt for optimum efficiency. ✖ Overshadowing will reduce performance. ✖ Can require significant roof space	**Yes** – This technology is considered to be a feasible option for this site.
Biomass heating	Biomass boilers typically burn wood chips or pellets as fuel to provide space heating and hot water.	✓ Almost a carbon neutral technology.	✖ Frequent and large fuel deliveries. ✖ Large fuel store required. ✖ Regular maintenance. ✖ Air quality issues in urban areas.	**Potentially** – The location and size of the development site makes this technology a potentially feasible option. It is, however, the preference of the developer to focus on alternative energy efficiency measures such as heat pumps and solar thermal to provide space and water heating.

Wind	Wind generation equipment harness the wind to turn a propeller and in doing so, drive an alternator to generate electricity. The turbines may be pole or roof mounted.	✓ Low maintenance. ✓ Excess electricity can be exported to the grid. ✓ Vertical Axis Turbines able to operate at wind speeds as low as 2m/s.	✖ A wind speed of at least 6m/s is typically required for traditional turbines to operate efficiently. ✖ Visual and noise impact risk.	**No** – The NOABL wind speed database records a wind speed of approximately 4.6m/s at 10m above ground level for this site. In order to operate efficiently a wind speed of at least 6m/s is typically required.
Ground Source Heat Pumps (GSHP)	GSHPs collect low-grade heat from the ground to supply useful heat for space and water heating requirements by applying additional energy input (in the form of electricity).	✓ Flexible installation methods - vertical ground collector boreholes can used when space is more limited. ✓ Can provide both heating and cooling as well as hot water.	✖ Full ground survey required to determine suitability/ geology. ✖ Large area required for horizontal ground collector loops. ✖ Prohibitive costs.	**No** – Prohibitively expensive installation costs for a large residential care home development coupled with technical complexity of installing ground collector loops renders this technology unfeasible.
Air Source Heat Pumps (ASHP)	ASHPs collect low-grade heat from the air to supply useful heat for space and water heating requirements by applying additional energy input (in the form of electricity).	✓ Highly efficient method of producing heat. ✓ Can provide both heating and cooling as well as hot water.	✖ Prohibitive costs. ✖ Internal and external unit space required. ✖ Potential noise issues from external plant.	**Yes** – This technology is considered to be a feasible option for this site.

5.4.1 Proposed Renewable Energy Solutions

The combined energy strategy will provide a number of benefits in terms of:

- Improved energy efficiency;
- Reduced carbon dioxide emissions;
- Deliverability; and,
- Viability of the scheme as a whole.

<u>Photovoltaic Panels (PV)</u>

PV arrays are therefore selected as an appropriate renewable energy technology to contribute to CO_2 emission reductions. PV arrays are relatively straightforward to install, benefit from low maintenance costs and will reduce the operational cost of the building. The use of PV in general would provide the following benefits:

- Reducing the building's electrical energy grid load;
- Simple installation and commissioning;
- Low maintenance; and,
- Reliable, proven technology.

Proposed System Details -

It is proposed that PV panels be mounted upon the pitched roofs and orientated due south (or east/ west if south facing is not possible) in order to optimise the operating efficiency of the system.

- A total installed capacity of 59kWp[1,2] PV will be specified at this site.

An array of this capacity will require approximately 354m^2 plus an allowance for access and avoidance of over shading. This size PV array may be accommodated within the available roof areas on the new build blocks. See Figure 5.1 which details the proposed roof orientations and locations of the panels.

Land use -

- There are no land use issues associated with PV technology at this site.

Local Planning Issues -

- There are no planning policy issues associated with this technology. PV is encouraged at all tiers of planning policy.

Noise Issues -

- PV is silent in operation.

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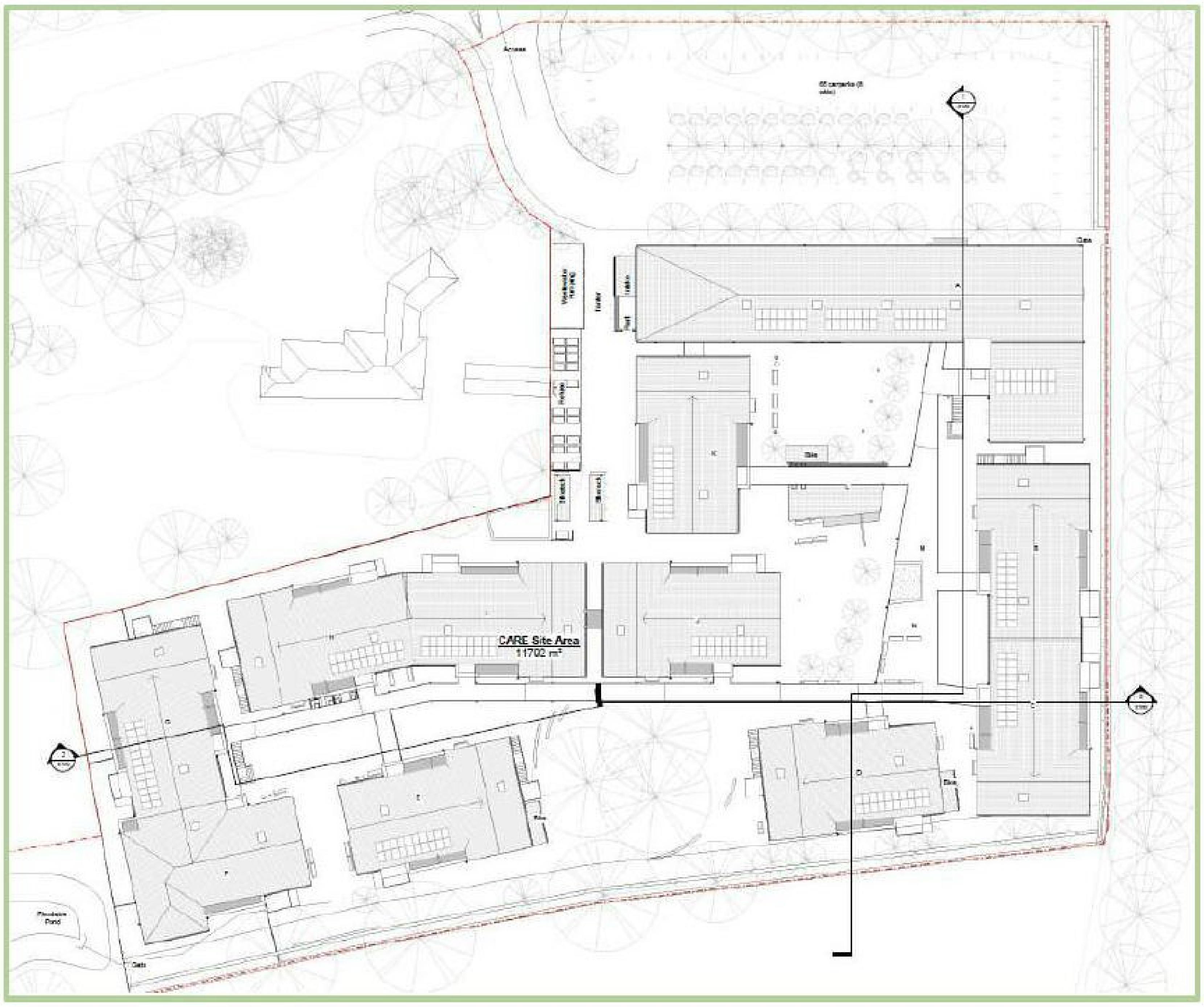
[1] Block A (the building selected and modelled as being representative of the whole site) has been apportioned with 10kWp of PV for the purpose of the SBEM model.
[2] Please note that this capacity is based on extrapolated data using block A as a representation of the whole site.

Whole life cost and lifecycle impact –

- Current installed costs for PV are approximately £1,500 / kWp installed.
- Additional costs throughout the system's 30-year lifecycle are limited to:
    - Cleaning of the arrays;
    - Potential vandal damage to the arrays; and,
    - Replacement of the DC / AC inverter unit which typically have a lifespan of around 10 years.

Figure 5.1 – Proposed Roof Layout



Solar Hot Water

The high hot water demand of the proposed development lends itself to the use of solar hot water panels and has therefore been selected as an appropriate renewable energy technology to contribute to CO_2 emission reductions. Similarly to PV technology, the use of solar hot water in general would offer the following benefits:

- Reducing the building's electrical energy grid load;
- Simple installation and commissioning;
- Low maintenance; and,

- Reliable, proven technology.

Proposed System Details –

It is proposed that solar thermal panels be mounted upon the pitched roofs in tilted arrays of 30° and orientated due south (or east/ west if south facing is not possible) in order to optimise the operating efficiency of the system.

- It has been calculated that an area of approximately $59m^2$[3][4] of solar collectors will be required for the entire development.

This size solar array may easily be accommodated within the available roof areas on the new build blocks (see Figure 5.1).

Land Use and Local Planning Issues -

- There are no land use issues/ planning policy issues associated with solar technology at this site.

Noise Issues -

- PV is silent in operation.

Whole Life Cost and Lifecycle Impact -

- Current installed costs range from approximately £700 per m^2 installed (flat plate collector).

- Additional costs throughout the system's 20-25-year lifecycle are limited to:

    - Cleaning of the arrays;
    - Potential vandal damage to the arrays; and,
    - Replacement of the pump unit which typically have a lifespan of around 10 years.

<u>Air Source Heat Pumps (ASHP)</u>

ASHP collect low-grade heat from the air to supply useful heat for space and water heating requirements. It is proposed that a split system, heat pump solution could be integrated within the design to meet the majority of heating and hot water demands. Spilt systems consist of an outdoor unit and an indoor unit. The outdoor unit is typically installed on the roof or exterior wall of building and houses the compressor, condenser coil and the expansion coil or capillary tubing. The indoor unit contains the cooling coil, a long blower and an air filter. This strategy would provide the following benefits:

- This approach will ensure a highly energy efficient heating system is provided in the form of heat pumps that are able to deliver both heating and cooling, dependent upon ambient temperatures and comfort requirements. This technology benefits from a low 'carbon footprint' due to the inherent efficiency of the heat pump process. It is a well-established technology with an anticipated long lifespan - with proper care they can be operational for up to 20 years;

[3] Block A (the building selected and modelled as being representative of the whole site) has been apportioned with $10m^2$ of solar thermal for the purpose of the SBEM model.
[4] Please note that this capacity is based on extrapolated data using block A as a representation of the whole site.

- Spilt systems consist of an outdoor unit and an indoor unit. The outdoor unit is typically installed on the roof or exterior wall of building and houses the compressor, condenser coil and the expansion coil or capillary tubing. The indoor unit contains the cooling coil, a long blower and an air filter;

- The 'multi-split' variable refrigerant flow (VRF) system consists of one or several outdoor units and many indoor units. The modulation of the refrigerant flow in each indoor unit allows higher thermal comfort in separate zones and lower energy consumption via the matching of the cooling or heating load;

- VRF systems continually adjust the flow of refrigerant from the outdoor condenser to each indoor evaporator. The control is achieved by continually varying the flow of refrigerant which responds to the demand from the indoor units by varying its compressor speed to match the total cooling and/or heating requirements. VRF systems offer a highly energy-efficient, modular energy strategy;

- Flexible installation possibilities that can be combined with underfloor heating in a configuration that requires less energy to heat the buildings (due to the scalding risk that radiators could pose to residents, space heating will be emitted via underfloor heating only);

- Heat pumps can be combined with solar support such as PV or solar thermal to increase hot water energy savings; and,

- There are no fuel storage issues associated with heat pumps.

6. EMISSIONS PERFORMANCE CALCULATIONS

The enhanced building fabric specification throughout the scheme, plus efficient mechanical and electrical servicing allied to renewable technologies will achieve compliance with the emission reduction and fabric energy efficiency targets stipulated by Building Regulation, Part L2A (2013).

6.1.1 Methodology

Approved SBEM software (Design Builder v6.1) has been used to calculate an energy demand model for building A to represent all new buildings within the scheme under one BRUKL document (see Appendix A for details). A subsequent BRUKL has been produced to demonstrate the environmental benefits associated with the 'fabric led' approach to energy demand and emissions reduction. The 3D energy model image is presented in Figure 6.1.

Figure 6.1 – 3D Representative Building Energy Model

6.1.2 Emission Calculations - Regulated Energy Demand

The calculated building emission rate reduction over Part L2A (2013) associated with the proposed specification for building A is presented in Table 6.1.

Table 6.1 – Calculated Building Emission Rate for Building A

Building Emission Rate (kgCO_2/m^2/yr.)	36.8
Target Emission Rate (kgCO_2/m^2/yr.)	39.8
% BER Reduction over Part L 2013	7.5

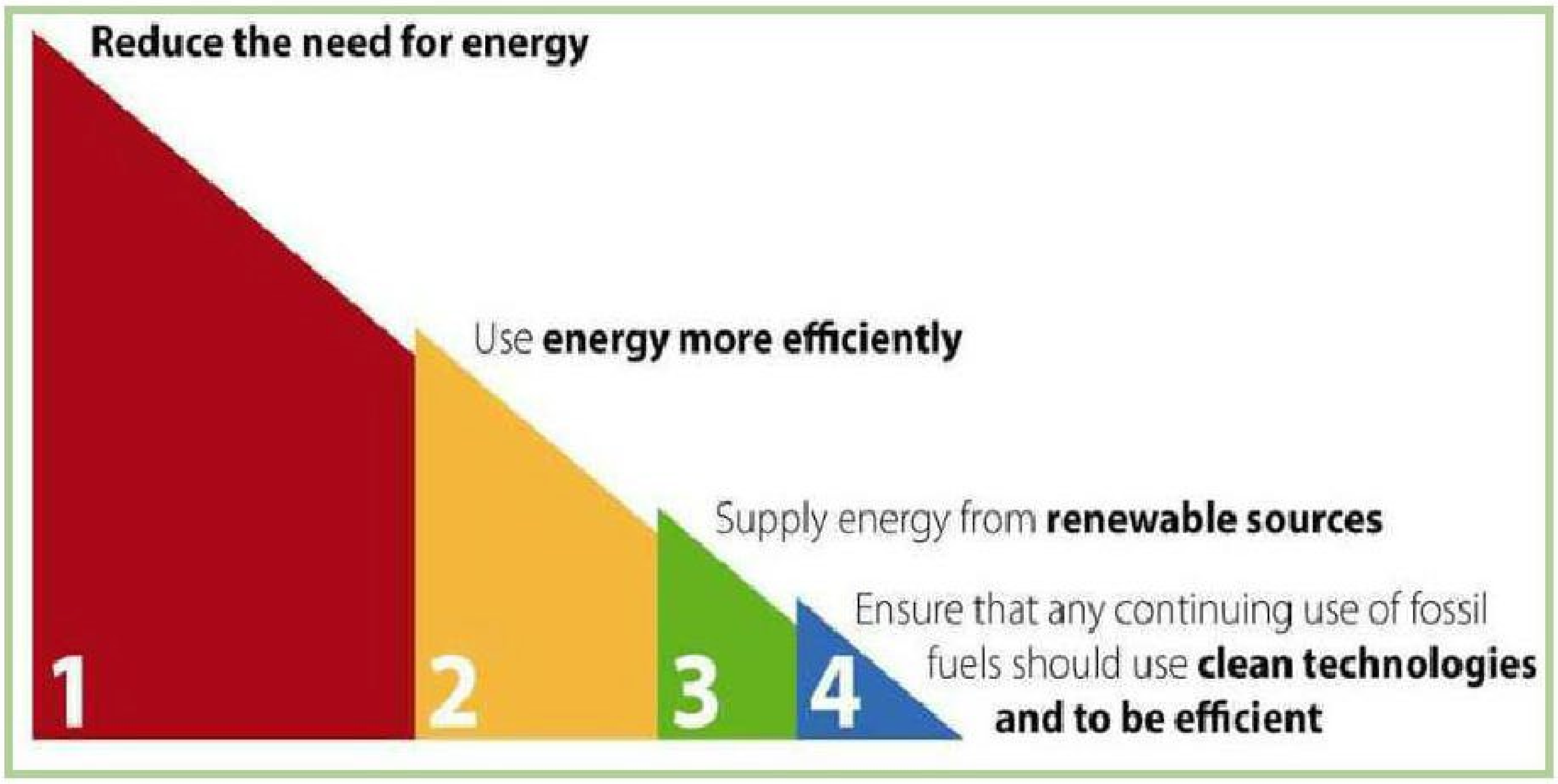
The SBEM calculation demonstrates that the building emission rate (BER) reduction is anticipate to be at least 7.5% better than Part L2A (2013) compliance requirements and is representative of the entire scheme. Therefore, this development will provide a significant improvement above current Building Regulation, Part L2A standards. This is a result of considered design with enhanced fabric specifications, efficient mechanical and electrical systems and low carbon/ renewable technologies.

7. ENERGY HIERARCHY

As discussed in the previous sections of this report, the scheme will incorporate an enhanced material specification along with high quality design and construction standards to improve the energy efficiency of the whole building through a 'fabric led' energy strategy.

The proposed construction, design and specification will deliver a scheme that is inherently efficient and cost-effective during occupation. The Energy Hierarchy provides a framework to guide energy policy and decision making to achieve practical and cost-effective carbon emission reductions. The hierarchy prioritises such demand-side activities to reduce wastage and improve efficiency (see Figure 7.1).

Figure 7.1 – The Energy Hierarchy



First Principle

The following efficiency measures are designed to reduce heat losses and minimise energy demand in line with the first principle of the energy hierarchy:

- This 'fabric led' approach to minimising energy demand and associated carbon dioxide emissions is aligned with the first principle of the energy hierarchy which states that reduction in energy demand should be achieved initially by energy efficiency;
- The buildings will be constructed with a material and design specification which exceeds minimum Building Regulation standards and includes numerous efficiency measures designed to reduce heat losses and minimise energy demand;
- The design air permeability target for the units is $5m^3/hm^2$ (@50Pa.). This low air permeability target will assist to limit the heat loss through the structure of the buildings; and,
- The g value within the buildings will be optimised to control solar gain in the summer months and allow beneficial gains in the winter season so as to minimise the overheating risk and limit the heating energy demands.

Second Principle

The following efficiency measures will ensure that energy is consumed efficiently within the site:

- 100% LED lighting provision and automatic presence control of the lighting will be specified in order to further improve the efficiency of the lighting system within the communal zones;

- Sophisticated control systems for the space and water heating will ensure that energy consumed by the development is used efficiently. Furthermore, the buildings are designed to not require active cooling;

- Hot water will be separately programmable and high efficiency cylinders with low standing losses will be specified. Instantaneous hot water systems that avoid long water lines and reduce heat losses will service the circulation, store and bathroom zones; and,

- Mechanical ventilation with heat recovery systems are also specified within all habitable rooms to further reduce energy demand.

This strategy therefore accords with the second principle of the energy hierarchy.

Third Principle

As per the third principle of the Energy Hierarchy:

- Photovoltaic arrays and solar hot water collectors will be integrated on the roofs of the new buildings to reduce the carbon dioxide emissions associated with the proposed development; and,

- Furthermore, high efficiency heat pumps are specified to meet space and water heating loads generated by the scheme.

Fourth Principle

An auxiliary electric immersion heater will be utilised during peak time of hot water demand to supplement the heat pump if required.

This strategy will ensure that fossil fuels converted and distributed through the National Grid as electrical energy for heating purposes will also be burnt cleanly and efficiently. Furthermore, as the UK electricity grids' CO_2 footprint continues to decarbonise, so too would the carbon dioxide emissions associated with this 'fully electric' building services energy strategy.

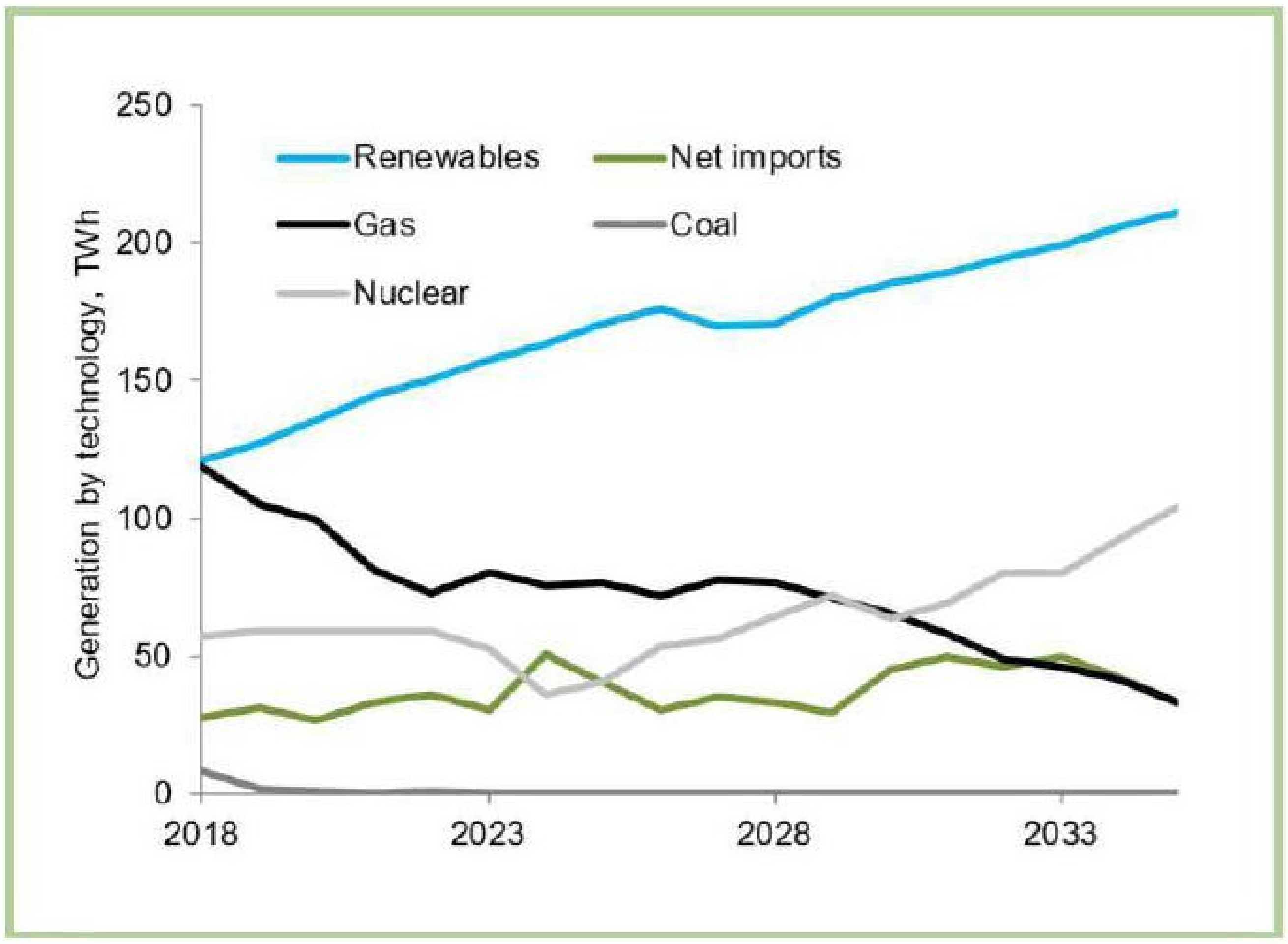
The development proposals are therefore, aligned with the energy hierarchy promoted within the West Suffolk's Local Plans and Supplementary Planning Documents.

8. CLIMATE CHANGE EMERGENCY

A Climate Emergency was declared by West Suffolk Council in September 2019, with a target of reaching net zero greenhouse gas (carbon) emissions by 2030 in recognition of the importance of tackling the emergency more urgently. In support of this, the developer wishes to highlight the following measures that will form part of the specification of this development:

- An energy strategy that will provide at least a 7.5% betterment over the current, stringent building regulation Part L (2013) targets:
    - In securing compliance with the current building regulation Part L targets, a commitment is made to construct a high quality, energy efficient thermal envelope thereby minimising demand side energy loads – in accordance with the principles of the energy hierarchy; and,
    - The low carbon share of electricity generation is projected to rise from 22% in 2010 to 65% in 2020. As the UK electricity grid CO2 footprint continues to reduce (see Figure 8.1 sourced from BEIS Energy and Emissions Projections 2018), so too will the carbon dioxide emissions associated with this 'fully electric' heating and hot water strategy.
        - This would not be the case if the building were heated from fossil fuels (for example, gas boilers and/or CHP).

Figure 8.1 - Energy and Emissions Projections 2018 (BEIS)



- On-site renewable/ low carbon energy generation forms part of the proposals in support of West Suffolk's aspirations for the borough to be carbon neutral by 2030 and includes:
    - Photovoltaic panels;
    - Solar thermal panels; and,
    - Air Source Heat Pumps.

- Unregulated energy demand (that is, the energy demand associated with 'plug in' appliances and cooking) typically accounts for over half of the total carbon dioxide emissions from modern developments such as this. To limit this:

    - The integrated white goods will have as a minimum an A+ energy rating; and,
    - Electricity will be supplied by 'low carbon' electricity tariffs, containing high percentage of renewables, above that supplied within the standard grid mix (the facilities manager will be required to ensure this is maintained going forward).

- The development will demonstrate resilience to potential climate change effects through the management of surface water:

    - The drainage strategy will incorporate the use of Sustainable Drainage Systems (SuDS); and,
    - The landscaped areas, newly planted trees and retained woodland area will serve to increase the short-term water storage within the site and attenuate the rate and volume of surface water movements off-site, thereby relieving potential for flash flood risk and pollution within the water catchment. Furthermore, the proposed development site will incorporate ecology enhancing features and measures within the development footprint in pursuit of an overall net gain in biodiversity.

- Waste is a misuse of natural resources and also contributes a large proportion of the UK's carbon footprint;

    - Waste minimisation during construction will reduce raw materials demand, thereby reducing the scheme's embodied carbon footprint; and,
    - During occupation, the buildings will benefit from recycling facilities to enable the local authority waste reduction targets, diverting more materials away from landfill and reducing the carbon footprint of the development further.

- The buildings are designed to incorporate features that will serve to reduce energy demand and carbon emissions arising from access to the care home facility:

    - Basic infrastructure provided such as secure cycle storage on site;
    - EV charging ports will service a number of the parking bays;
    - The lighting provision within the common areas will include active sensors; and,
    - The fit-out specification of the residential units will seek to minimise water demand. Water efficiency measures (such as dual flush toilets, flow restrictors and reduced volume baths) will limit potable water demand. This will reduce water heating energy loads and also cut the process energy required to supply clean drinking water.

These commitments, in combination, seek to work towards the carbon reduction target of no more than 1.5°C global temperature increase and assist West Suffolk Council in meeting their Climate Emergency aims.

9. CONCLUSION

This statement has reviewed the sustainability performance of the proposed development at Little Court, Little Wratting against national and local planning policies. The material specification and servicing strategy for the scheme has also been reviewed and a solution has been provided which accords with West Suffolk Council's planning policy requirements.

Energy Strategy –

Full compliance with the key criteria of the current Local Plan and accompanying development plan documents have been achieved by the proposed energy strategy while also taking the council's declaration of a Climate Emergency into consideration and responding positively to its aims, as follows:

- Minimising the impacts of climate change is a key element of the proposed design. The proposed energy strategy will incorporate an enhanced 'fabric led' material specification, along with high quality design and construction standards to improve the energy efficiency of the buildings.
- The energy strategy for this development provides a significant carbon dioxide emissions reduction, the building emission rate (BER) reduction will be approximately 7.5% lower than Part L2A (2013) compliance requirements based upon the representative SBEM model completed for this scheme.
- In accordance with Policy CS2, the following measures will help to deliver a scheme that is inherently efficient and cost-effective during occupation:
    - A total approximate capacity of 59kWp photovoltaic array is proposed as a part of the design to provide on-site renewable energy generation;
    - Approximately 59m^2 of solar hot water panels will supplement the developments high hot water demand, thus reducing energy demand;
    - Ventilation systems with heat recovery systems will capture lost heat from expelled air, further lowering energy demands;
    - High efficiency heat pumps will supply some cooling as well as space and water heating for most zones within the scheme; and,
    - The development has been designed and specified in accordance with the principles of the Energy Hierarchy in line with Policy DM7.
- Furthermore, as a consequence of the decarbonised status of the UK's electricity grid, the actual emissions are 45% lower than the current out-of-date carbon factors used for Building Regulation compliance purposes. Therefore, this meets the council's objectives in addressing the recently declared Climate Emergency.

Sustainability Performance -

The key issues of West Suffolk's Local Plan have been achieved by the proposals. These are as follows:

- Responding positively to Policy DM 7 internal water management will be achieved through the provision of water efficient fittings and appliances to reduce the developments internal water demand.

The internal water strategy will be specified to achieve a calculated daily consumption of <110litres/person/day (within the residential units only).

- The development site is located within Flood Zone 1, a Low Flood Risk Zone. The site drainage strategy will be designed to manage the surface water runoff to ensure that the peak rate and volume of surface water run-off will be no greater post-development than pre-development run-off rates. Responding positively to Policy DM 6, SuDS techniques and rainwater harvesting will form part of the proposals to reduce the risk of flooding and use natural processes to reduce pollutants in the surface water runoff.

- Waste arising during construction and occupation/operation will be minimised. A site waste management plan will be adopted during construction. The scheme will be provided with waste facilities and a comprehensive waste management plan for the site will accord with the local authority recycling scheme. The provision of suitable space and facilities will allow the development to segregate and store operational recyclable waste. Construction site management procedures will minimise adverse impacts on the environment and control pollution generated during the construction phase. These include a waste management strategy to reduce the quantity of waste generated, and to increase re-use and recycling of materials. A commitment will be made to minimise waste and pollution. This is in accordance with adopted Policy CS2.

- In line with the adopted Policy CS2, materials are proposed to be responsibly sourced, materials with low environmental impact will be selected and local suppliers will be prioritised. In combination, this procurement strategy will minimise and conserve energy associated with transportation and waste generation.

- In line with Polices CS 2 and DM2, measures that will enhance the quality of life of future occupants and users of the development have been prioritised. The landscaped areas and paths will facilitate social interaction as well as natural surveillance, creating busy, overlooked routes at the site to reduce the opportunity for crime, creating a safer and more secure environment.

- The development will provide an opportunity to enhance the site's biodiversity. The landscaping scheme has been designed to provide an enhancement to the aesthetic value of the post-developed site and will help mitigate/ compensate for any lost biodiversity. This is in accordance with Policies CS2 and DM12.

- Sustainable transport measures include secure cycle storage on site and a number of EV charging ports to encourage the use of more sustainable modes of transport. The site's proximity to local bus nodes will also enable more sustainable and low carbon lifestyles in line with Policies CS2 and CS7.

Furthermore, the proposals accord with the aims of the National Planning Policy Framework, as follows:

- The betterment over Building Regulations Part L2A (2013) emissions performance will assist in mitigating the impact of climate change;

- Construction practices that minimise adverse impacts on the environment will be adhered to including a waste management strategy to reduce the quantity of waste generated, and to increase re-use and recycling, a commitment will be made to minimise waste and pollution; and,

- The proposals include the redevelopment of a previously developed site and represents an efficient use of land and resources.

In conclusion, the proposed care home facility at Little Court, Little Wratting will deliver an energy efficient scheme, providing a quality development that accords with the guidance provided within West Suffolk's adopted planning policies as well as national planning and regulatory standards.

Appendix A – BRUKL Report

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Block A

As designed

Date: Tue Jan 19 19:03:20 2021

Administrative information

Building Details

Address: Block A, Little Court, Haverhill, CB9

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v6.1.7

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Colin Sowerbutts

Telephone number: 01829 733444

Address: 75 High Street, Tarvin, CH3 8JA

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2$.annum	39.8
Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	39.8
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	36.8
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	$U_{a-Limit}$	U_{a-Calc}	U_{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.35	"Ground Floor A - Theatre_P_14"
Floor	0.25	0.1	0.13	"Ground Floor A - Toilet 2_S_3"
Roof	0.25	0.13	0.13	"Ground Floor A - Foyer_R_5"
Windows***, roof windows, and rooflights	2.2	1.4	1.4	"Ground Floor A - Foyer_G_8"
Personnel doors	2.2	1	1	"Ground Floor A - Foyer_D_11"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a-Limit}$ = Limiting area-weighted average U-values [W/(m²K)]

U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]

U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	5

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- AC From ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	4	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

2- Electric underfloor

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

3- ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Electric POU

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

2- Little Ct HW from ASHP

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.01
Standard value	N/A	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Ground Floor A - Bar	-	-	-	1.1	-	-	-	-	-	0.8	0.5
Ground Floor A - Restaurant	-	-	-	1.1	-	-	-	-	-	0.8	0.5
Ground Floor A - Theatre	-	-	-	1.1	-	-	-	-	-	0.8	0.5
Ground Floor A - Shower	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Toilet 2	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Toilets 1	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Toilets 2	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Toilet 3	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Toilets	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Toilet 1	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Shower	-	-	0.4	-	-	-	-	-	-	-	N/A
First floor A - Toilet	-	-	0.4	-	-	-	-	-	-	-	N/A
First floor A - Toilet	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Meeting	-	-	-	1.1	-	-	-	-	-	0.8	0.5
Ground Floor A - Office	-	-	-	1.1	-	-	-	-	-	0.8	0.5
Ground Floor A - Shop	-	-	-	1.1	-	-	-	-	-	0.8	0.5
Ground Floor A - Kitchen	-	-	0.4	-	-	-	-	-	-	-	N/A
Ground Floor A - Staff room	-	-	-	1.1	-	-	-	-	-	0.8	0.5
Ground Floor A - Staff room	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Office 1	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Office	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Medical	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Living	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Living	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Living	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5
First floor A - Bedsit	-	-	-	1.1	-	-	-	-	-	0.8	0.5

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Ground Floor A - Foyer	-	100	-	114
Ground Floor A - Bar	-	100	-	90

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
Ground Floor A - Restaurant	-	100	-	140
Ground Floor A - Theatre	-	100	-	643
Ground Floor A - Store 1	100	-	-	26
Ground Floor A - Circulation 2	-	100	-	85
Ground Floor A - Shower	-	100	-	8
Ground Floor A - Toilet 2	-	100	-	25
Ground Floor A - Toilets 1	-	100	-	41
Ground Floor A - Toilets 2	-	100	-	37
Ground Floor A - Toilet 3	-	100	-	24
Ground Floor A - Toilets	-	100	-	41
Ground Floor A - Store 5	100	-	-	25
Ground Floor A - Store 4	100	-	-	24
Ground Floor A - Toilet 1	-	100	-	25
Ground Floor A - Store 2	100	-	-	20
Ground Floor A - Store 3	100	-	-	18
Ground Floor A - Shower	-	100	-	17
Ground Floor A - Store 6	100	-	-	21
Ground Floor A - Store	100	-	-	19
Ground Floor A - Circulation	-	100	-	22
First floor A - Store	100	-	-	13
First floor A - Circulation	-	100	-	34
First floor A - Circulation	-	100	-	81
First floor A - Circulation	-	100	-	59
First floor A - Circulation	-	100	-	49
First floor A - Toilet	-	100	-	21
First floor A - Toilet	-	100	-	21
First floor A - Store	100	-	-	15
First floor A - Circulation	-	100	-	20
Ground Floor A - Meeting	100	-	-	665
Ground Floor A - Office	100	-	-	115
Ground Floor A - Shop	-	100	50	441
Ground Floor A - Kitchen	-	100	-	302
Ground Floor A - Staff room	100	-	-	26
Ground Floor A - Staff room	100	-	-	13
First floor A - Office 1	100	-	-	331
First floor A - Office	100	-	-	237
First floor A - Medical	100	-	-	172
First floor A - Bedsit	-	100	-	28
First floor A - Bedsit	-	100	-	29
First floor A - Living	-	100	-	50
First floor A - Living	-	100	-	62
First floor A - Bedsit	-	100	-	29
First floor A - Bedsit	-	100	-	29

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
First floor A - Bedsit	-	100	-	29
First floor A - Living	-	100	-	54
First floor A - Bedsit	-	100	-	28
First floor A - Bedsit	-	100	-	28
First floor A - Bedsit	-	100	-	28
First floor A - Bedsit	-	100	-	28
First floor A - Bedsit	-	100	-	28
First floor A - Bedsit	-	100	-	28
First floor A - Bedsit	-	100	-	28

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Ground Floor A - Foyer	NO (-49.8%)	NO
Ground Floor A - Bar	NO (-75.2%)	NO
Ground Floor A - Restaurant	NO (-66.1%)	NO
Ground Floor A - Theatre	N/A	N/A
Ground Floor A - Meeting	NO (-85.4%)	NO
Ground Floor A - Office	NO (-65.4%)	NO
Ground Floor A - Shop	NO (-77.7%)	NO
First floor A - Office 1	NO (-60.7%)	NO
First floor A - Office	NO (-52.2%)	NO
First floor A - Medical	NO (-65.4%)	NO
First floor A - Bedsit	NO (-71.6%)	NO
First floor A - Bedsit	NO (-69.4%)	NO
First floor A - Bedsit	NO (-69.6%)	NO
First floor A - Bedsit	N/A	N/A
First floor A - Bedsit	N/A	N/A
First floor A - Bedsit	NO (-62.1%)	NO
First floor A - Bedsit	NO (-61.8%)	NO
First floor A - Bedsit	NO (-62.5%)	NO
First floor A - Bedsit	NO (-62.3%)	NO
First floor A - Bedsit	NO (-62.2%)	NO
First floor A - Bedsit	NO (-62.4%)	NO
First floor A - Bedsit	NO (-61.7%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	1257.3	1257.3
External area [m²]	2321.7	2321.7
Weather	NOR	NOR
Infiltration [m³/hm²@ 50Pa]	5	3
Average conductance [W/K]	450.21	965.38
Average U-value [W/m²K]	0.19	0.42
Alpha value* [%]	27.88	16.1

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
4	**A1/A2 Retail/Financial and Professional services**
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
91	**C2 Residential Institutions: Hospitals and Care Homes**
5	**C2 Residential Institutions: Residential schools**
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	17.6	26.01
Cooling	14.23	8.87
Auxiliary	14.85	12.13
Lighting	18.6	20.87
Hot water	11.75	17.99
Equipment*	92.37	92.37
TOTAL**	**77.03**	**85.87**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	6.18	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	3.44	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	468.14	491.95
Primary energy* [kWh/m²]	236.47	220.11
Total emissions [kg/m²]	36.8	39.8

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	87.1	577.5	6.5	56.5	26	3.73	2.84	4	4
	Notional	139.2	456.6	15.9	35.2	19.3	2.43	3.6	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Natural Gas										
	Actual	195.5	68.7	67.9	0	5.2	0.8	0	1	0
	Notional	255.3	137.1	86.6	0	7.8	0.82	0	----	----
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Natural Gas										
	Actual	21	439.5	1.6	0	13.6	3.76	0	4	0
	Notional	44.7	439.7	5.1	0	10.5	2.43	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.14	"Ground Floor A - Foyer_W_7"
Floor	0.2	0.07	"Ground Floor A - Circulation 2_S_3"
Roof	0.15	0.13	"Ground Floor A - Foyer_R_5"
Windows, roof windows, and rooflights	1.5	1.4	"Ground Floor A - Foyer_G_8"
Personnel doors	1.5	1	"Ground Floor A - Foyer_D_11"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

Air Permeability	Typical value	This building
$m^3/(h.m^2)$ at 50 Pa	5	5