

Sustainability statement relating to residential development providing 9 No new dwellings, and 1 No self-build plot

In support of Application No: tbc

Location: Rear of and beside Wayside and Hillview, Eastergate Lane, PO20 3SJ

Proposal: 9 N° new detached dwellings, with associated access and parking

Purpose: Integrate rural development sensitively into its setting in order to respect the character of the District's countryside areas.

1 Introduction

Sustainability in building design aims to create structures with minimal environmental impact, prioritizing resource efficiency and environmental health throughout their lifespan. This can include site selection, materials, maximizing energy efficiency and reducing wastage.

The current site usage has reached its natural end, and wholesale building replacement is required for continued use to a standard acceptable to such business enterprises. The pattern of development in the local area is not for increased industrial use, therefore redevelopment for more appropriate use class represents a sustainable approach to providing much needed housing.

Brownfield/Greyfield redevelopment offers significant sustainability benefits compared to greenfield development, primarily by preserving untouched areas, reusing existing infrastructure, and reducing the demand for new land. By focusing on repurposing previously developed sites, brownfield projects can mitigate urban sprawl, conserve resources, and improve the quality of life for people within existing settlements.

2 Principles of development

This particular site already demonstrates appropriateness for sustainable redevelopment due to the reasoning above. This document sets out to illustrate an approach to providing sustainable building fabric and potential reduction in CO2 emissions over Part L of the Building Regulations (2021) via:

Energy Efficiency

- U-Values have been set to maximise embedded fabric efficiency and reduced energy demand.
- LED Lighting with a minimum efficacy of 85lm/w L is proposed.
- An Air Permeability target of 3 m3/(hm2) @50Pa is proposed.

Renewable Energy

The on-site provision of renewable energy has been prioritised and following a feasibility review, the following technologies will be provided:

- Air Source Heat Pumps

Through these measures, compliance with the requirements of the Local Authority have been exceeded and a low-carbon and sustainable development is proposed.

3 Policy Framework

The proposed development is classified as a minor development.

National Planning Policy Framework (NPPF) (2023)

The NPPF was updated in December 2023 and contains the following text regarding sustainable development.

Achieving Sustainable Development (Paragraphs 7 to 14):

The purpose of the planning system is to contribute to the achievement of sustainable development.

This includes three overarching objectives:

An economic objective: To help build a strong, responsive, and competitive economy.

A social objective: To support strong, vibrant, and healthy communities.

An environmental objective: To protect and enhance our natural, built, and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently,

minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

Presumption in Favour of Sustainable Development (Paragraph 11):

Plans and decisions should apply a presumption in favour of sustainable development.

This includes promoting a sustainable pattern of development that seeks to meet the development needs of their area; align growth and infrastructure; improve the environment; mitigate climate change (including by making effective use of land in urban areas) and adapt to its effects.

Local Policy

Arun District Council - The Arun Local Plan 2011-2031 (2018)

Policy ECC SP2

Energy and climate change mitigation

All new residential and commercial development (including conversions, extensions and changes of use) will be expected to be energy efficient and to demonstrate how they will:

- a. Achieve energy efficiency measures that reflect the current standards applicable at the time of submission;
- b. Use design and layout to promote energy efficiency; and
- c. Incorporate decentralised, renewable and low carbon energy supply systems, for example small scale renewable energy systems such as solar panels.

All major developments⁽⁴⁷⁾ must produce 10% of the total predicted energy requirements from renewable or low carbon energy generation on site, unless it can be demonstrated that this is unviable. Energy efficiency measures will be taken into consideration when the total predicted energy requirements are calculated. The Council will consider 'allowable solutions' where it is clearly demonstrated that the provision of on site renewable or low carbon energy generation is unviable or not feasible.

Where planning permission is required to retrofit energy efficiency measures into existing development, schemes will be permitted, subject to the Design and Built Heritage policies.

In assessing the achievement of these standards the Council will consider:

- Site constraints;
- Technical viability;
- Financial viability; and
- Delivery of additional benefits.

Policy ECC DM1

Renewable energy

The Council will support renewable energy development subject to the criteria in this Policy. Schemes will be expected to contribute to the social, economic and environmental development and overall regeneration of the District.

Within areas of protected landscapes, areas or buildings, development should generally be small scale or community based.

Supplementary Planning Documents (SPDs)

The Arun District Design Guide SPD (2024)

The following sections of this SPD have been considered of value to the production of this report:

- K.01 Energy & Carbon
- K.02 Water & Material Management
- K.03 Adapting to Climate Change

K.01 Energy & Carbon



Maximise energy efficiency and minimise whole life carbon.

All new development including conversions, extensions and changes of use must be designed to **reduce energy demand and carbon emissions** in line with national and local standards including the **Arun Local Plan**.

Approaches to design must demonstrate that each step of the **energy hierarchy** set out in Figure 233 has been followed whilst also ensuring the incorporation of **low and zero carbon (LZC) technologies** and clear commitments to comprehensive **energy monitoring and transparency** of performance.

Passive design should be the first step, considering form and **orientation, effective insulation, air-tightness and utilising natural ventilation** where this can **avoid the risk of overheating**, both today and in the future. Existing buildings should incorporate retrofitting measures such as **cavity wall insulation and additional glazing**, but these interventions must be supported by detailed **analysis of moisture risk**.

Large development should consider others in proximity with which a **heat network** could be established to meet energy demand.

Figure 230: The Energy Hierarchy



	Energy & Carbon - Make sure the scheme:	Tick when Reviewed
	Sets targets for energy and carbon reductions beyond the relevant Part L Building Regulations.	☐
	Demonstrates consideration of embodied carbon (emissions from the manufacture, transport and construction of building materials, together with end of life emissions).	☐
	Incorporates passive solar design measures such as avoiding single aspects, including south facing windows on habitable rooms, minimising north-facing glazing, using roof lights and sunpipes and providing shading to south facing windows through tree cover.	☐
	Uses heat recovery systems wherever mechanical ventilation is installed (MVHR).	☐
	Considers the ventilation strategy alongside proposed air tightness levels, to ensure buildings are not left susceptible to mould growth. This may include hydrothermal modelling.	☐



Feasibility studies should be carried out to explore a range of passive design measures and low and zero carbon technologies appropriate to the site, to reduce energy consumption to a minimum. Following the energy hierarchy, once maximum savings have been achieved through passive design, a further minimum 10% of the energy requirement should be generated through on-site renewable or low carbon technologies.

Part L of the Building Regulations (2021)

In July 2018 the then Department for Business Energy & Industrial Strategy (BEIS) published their proposed update to SAP 9.92 (Part L 2013), called SAP 10. In June 2022, Part L 2021 of the Building Regulations came into force. As per the requirements, all new homes must produce 31% less CO2 emissions than that of Part L 2013 in-order to achieve Building Regulation compliance.

One of the major changes in the regulations was the change in carbon factor of electricity to represent the decarbonisation of the National Grid and the push towards net-zero carbon developments.

Part L 2021 also introduced three targets for Part L compliance:

- TER Target Emission Rate
- TPER Target Primary Energy Rate
- TFEE Target Fabric Energy Efficiency

The Future Homes and Buildings Standard

In October 2019, the then Ministry of Housing, Communities and Local Government(MHCLG) issued a consultation on changes to Part L. Dubbed *The Future Homes Standard*, it was an aspiration to ensure all new homes will have low carbon heating and “world-leading levels of energy efficiency” by 2025 and was intended to be the primary driver in achieving the net-zero carbon commitment made by the Government.

On 13th December 2023, consultation documents were issued by the Department for Levelling Up, Housing and Communities for *The Future Homes and Buildings Standard*. While still at a consultation age, this document details potential scenarios in how new build dwellings and buildings in the UK will become *net-zero ready*. The published proposals however contain two options and the final choice will not be made until the end of 2024. A separate consultation was published to discuss the withdrawal of the Standard Assessment Procedure (SAP) and replace it with a Home Energy Model (HEM).

Key points within the consultation document are:

- Removal of Gas Boilers from the Notional Dwelling Specification and;
- Fossil fuel-powered boilers in new buildings will be prohibited from 2025
- Further reduction in the carbon factor of electricity as the grid-decarbonises.
- Hybrid & hydrogen-ready boilers “will not meet the proposed standards”
- No major changes to M&E or Fabric requirements from Part L 2021.

4 Energy Calculations

To estimate the CO₂ emissions for the site, SAP calculations will be required to be produced by an accredited OCDEA Domestic Energy Assessor using Design SAP 10's online platform. The baseline CO₂ emissions covered by Part L 2021 of the Building Regulations are expressed as the Target Emission Rate (TER) and the proposed actual emissions are the Dwelling Emission Rate (DER). These use the unit of measurement of kilograms of CO₂ per square-metre per annum (kg/CO₂/m²).

This covers regulated carbon emissions from:

- Heating (and Cooling)
- Hot Water
- Lighting
- Auxiliary (Pumps and Fans)

Passive Design Measures

Passive measures utilised in the concept and development of the design include:

- High levels of insulation more than the Part L 2021 notional values.
- Through good design, air infiltration will be minimised.
- Where possible, orientation and site layout to reduce energy demand.
- Provision of cross-ventilation.
- A high-performance glazing system to reduce heat demand and increase solar gains.

Active Design

The development will incorporate efficient building services to limit carbon emissions, including a zero-NOx heating system, smart metering and the following measures:

- Lighting

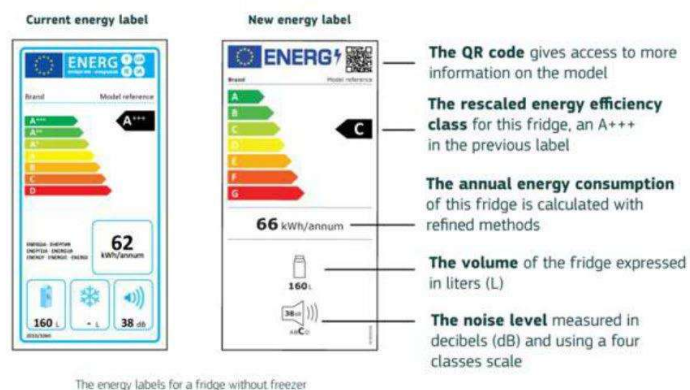
In-line with exceeding Part L minimum requirements, all residential light fittings should be Light Emitting Diodes (LEDs) with a luminous efficiency per circuit watt of at least 85 lumens/Watt.

- Unregulated Emissions

Unregulated energy use and their carbon emissions are from systems or processes that are harder to quantify than regulated emissions which are from fixed systems. Unregulated energy is not counted within SAP for the purpose of Part L compliance. This is because the emissions from these items are variable and dependant on occupant behaviour and specification i.e. different levels of White Good provision and use and

amount of small power equipment used. For the proposed residential units, unregulated emissions consist of; Equipment (Small Power devices), Cooking, External Lighting, Appliances

In March 2021 the energy labelling ratings for appliances were updated, and are now rated simply A-G. What may have been an A+++ before might now be a B or even a C rating. Very few appliances achieve an A rating currently, as the new system leaves room for the industry to improve. Therefore, appliances should be sourced with the highest rating available (typically B or C currently).



Overheating

This development will be compliant with Part O of the Building Regulations and a full overheating assessment will be undertaken at RIBA Stage 4.

The scheme has been designed to avoid overheating with the early stages of the cooling hierarchy prioritised and with the following being major factors in mitigating potential risk:

- Individual heating is proposed thus no communal heat distribution to factor in.
- Windows are openable for the purpose of overheating management.

In this section the cooling hierarchy is examined to highlight the measures introduced to mitigate the potential for overheating.

Energy Monitoring

It is a requirement of the Councils SPD that there should be *comprehensive energy monitoring and transparency of performance*.

For this scheme, a Smart Meter will be installed and further to that, Air Source Heat Pumps expect the make/model specified to be app controlled so they have the ability to:

- Control the temperature remotely, even when the resident is not at home.
- View real-time consumption details in terms of kWh and cost.
- View historic consumption data allowance for seasonal performance to be reviewed.
- Allow for further connection to IoT ecosystems

5 Renewable Energy

Renewable Energy is typically defined as:

“Energy derived from a source that is continually replenished, such as wind, wave, solar, hydroelectric and energy from plant material, but not fossil fuels or nuclear energy. Although not strictly renewable, geothermal energy is generally included.”

As per Renewable Energy Directive (2018/2001/EU) aerothermal and hydrothermal technologies are also officially included within the definition.

Based on recent legislation including the *Clean Air Act* and *The Future Homes and Buildings Standards: 2023 consultation* as well as the location of the scheme, the following technologies have been discounted and are not discussed further:

- Wind Turbines
- Hydropower / Wave Technology
- Biogas / Biofuel / Biomass
- Hydrogen
- Hybrid Heat Pumps

The feasibility of remaining renewable and low carbon technologies has been undertaken based on the following parameters:

- a) Practicality of installation of the technology
- b) Energy demand profile for the project
- c) Environmental impact & land use
- d) Economic feasibility and overall payback (including available financial incentives)
- e) Planning and regulatory issues i.e. conservation and heritage areas and aspects
- f) Noise & aesthetic considerations

It should be noted that due to decarbonisation and the decrease in carbon factor for electricity, factors such as energy security and lowering running costs are deemed equal to or more important to that of the offset of CO₂.

Air Source Heat Pumps (ASHP) for domestic use are an advancing technology and heat pumps are embedded as the primary policy driver for the commitment to meet net-zero by 2050. It is a renewable technology that produces circa 3 units of electricity for each unit consumed from the National Grid (300% efficiency / a coefficient of performance of 3). With the continued decarbonisation of the grid, associated carbon emissions with the system are projected to continually decrease in the near to medium term.

Domestic ASHP models have advanced in recent years, being integrated with smart technology features like app control, IoT integration and voice assistant compatibility. Noise levels have dropped to where they can be below the level where planning permission is required (permitted development) and their aesthetic has softened. They can also work at higher efficiency at lower temperatures than a decade ago, especially when paired with underfloor heating. While efficiency at freezing temperatures is still an issue, this has been improving slowly over the past decade. Capital cost is still much higher than Gas or Electric Boilers but it is hoped that economies of scale will improve the competitive in the short term.

Overall, an ASHP is the most feasible renewable technology for a standard house currently.

Renewable Energy Tariffs

For new-build developments within England, there are no grants available for the installation of renewable technologies. Previous schemes such as the Feed-In-Tariff (FiT) and Renewable Heat Incentive (RHI) are now closed to new applications. The only scheme available is the Smart Export Guarantee for PV systems, administered through utility companies where a small payment for exported energy is paid.

Feasibility conclusion; following a review of the available technologies, individual heat pumps have been integrated into the scheme.

Individual Air Source Heat Pumps

Air Source Heat Pumps (ASHPs) are designed to extract heat from the external air, a process that is effective even during colder conditions. Despite low temperatures, the air contains heat energy that can be utilised. Through a refrigerant system, ASHPs absorb this ambient heat at a lower temperature, use a compressor to increase its temperature, and subsequently transfer the elevated heat via a heat exchanger into the building's heating system. The functionality of ASHPs is based on refrigerant, which easily transitions between liquid and gaseous states. During the evaporation process, the refrigerant absorbs heat; when it is compressed and condensed back into a liquid, it releases heat.

Scheme Proposals

At this early stage, an indicative Air Source Heat Pump has been modelled for the purpose of Part L compliance based on the estimated kW output and by using a common manufacturer that performs averagely in SAP. This is due to using a SAP default ASHP causes a disproportionately poor result within the software that would not be reflective of the final scheme.

A final make & model will be supplied during M&E design at RIBA Stage 3 / 4.

6 Water Efficiency

The Local Plan requires that all developments must incorporate water conservation to ensure a maximum internal water consumption rate of 110 litres/per person/per day (with an additional external water allowance of 5 litres). This target is the same as the optional target included within Part G of the Building Regulations which encourages the efficient use of potable water. The specification proposed has been produced using the calculation methodology used to assess compliance against the water performance targets in Building Regulations 17.K and is based on the Government's *"The Water Efficiency Calculator for new dwellings – September 2009"* (withdrawn in June 2016).

7 Conclusion

An energy assessment will be undertaken on the proposed scheme in-line with the requirements of the Local Authority. These calculations will demonstrate a reduction in CO₂ emissions over the baseline of Part L via the following energy efficiency measures;

- Thermal insulation specified to achieve U-Values lower than the Part L 2021 notional.
- An Air Permeability target of 3m³/(hm²) @50Pa
- LED Lighting with high luminous efficacy (85lm/W) will be provided to all fittings.

Renewable Technologies

A feasibility on renewable technologies has been undertaken and individual air source heat pumps are proposed to each dwelling.

As a result of the above proposals, findings and recommendations the proposed scheme is a highly sustainable and low-carbon development that complies with and exceeds the 10% CO₂ reduction by renewable energy requirement of the Local Authority.