JS LEWIS LTD

Barrington Close and Fairford Close, Kingswood

Energy and Sustainability Strategy

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Bromford

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EXECUTIVE SUMMARY

This statement has been prepared in support of the planning application for Barrington Close and Fairford Close, Kingswood. JS Lewis Ltd was engaged by EG Carter to help develop an energy and sustainability strategy to address local policy. This document sets out that strategy.

The proposals are for the development of 85 new homes through the demolition and redevelopment of the Barrington Close and Fairford Close site. There are 17 apartments, 7 maisonettes and 61 houses.

The scheme is mindful of passive design, layout, orientation, and massing whilst working within the constraints of the site itself. Energy efficiency and renewable energy measures have been included. District heating and CHP technologies are considered not to be viable or necessary. The proposed strategy is summarized as follows:

- Efficiency measures including:
  - Highly efficient building form with apartments and terracing of houses;
  - High percentage of shared party floors and walls, minimizing heat loss;
  - Good levels of fabric efficiency;
  - Use of careful detailing for reduced thermal bridging;
  - Low energy fittings including LED lighting;
  - Energy labeled white goods where provided;
  - Controls on external lighting;
  - Controlled fan power with decentralized mechanical ventilation.
- Renewable energy:
  - Air source heat pumps for heating and hot water for all dwellings with the exception of Block 1 which will have hot water heat pumps.

The adopted policy framework expects developments to address climate change, but does not set any specific targets for this type of development. The strategy above demonstrates that policy and regulatory requirements are met, demonstrating good design. As a result, the scheme meets the local policy requirements and national regulatory requirements on energy within new developments.

1 INTRODUCTION

1.1 Scope and Purpose of Report

This statement has been prepared in support of the planning application for Barrington Close and Fairford Close, Kingswood. JS Lewis Ltd was engaged by EG Carter to help develop an energy and sustainability strategy to address local policy. This document sets out that strategy.

1.2 Description of Development

The proposals are for the development of 85 new homes through the demolition and redevelopment of the Barrington Close and Fairford Close, Kingswood. There are 17 apartments, 7 maisonettes and 61 houses.

Figure 1 - Proposed Site Layout

In terms of solar access, most dwellings have primary facades facing South East and North West. All units including the apartments benefit from cross-ventilation, thus maximising the opportunities for natural ventilation, and thus reducing risks of overheating.

The accommodation schedule is as follows:

- 17 apartments;
- 7 maisonettes;
- 61 houses.

2 PLANNING POLICY

2.1 National Planning Policy

National Planning Policy Framework (2023)

The National Planning Policy Framework sets out a framework for positive growth, making progress in environmental, social and economic areas, and enhancing existing areas. It is a material consideration in planning decisions and reinforces the need for decisions to be determined in accordance with the local plan, unless material considerations indicate otherwise.

The policies throughout the NPPF constitute the government's view of what sustainable development is, and requires the planning process to perform a number of roles:

1. An economic role – building a strong economy, supporting growth and innovation;
2. A social role – supporting communities through providing housing supply, a high-quality built environment, and accessible local services;
3. An environmental role – contributing to natural and built environments, improving biodiversity, using resources prudently, minimizing waste and addressing climate change, including moving to a low carbon economy.

The 2023 National Planning Policy Framework retains a presumption in favour of sustainable development. Section 14 concerns itself with climate change:

153. *Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.*

154. *New development should be planned for in ways that:*

a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and

b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

The NPPF sets out the importance of dealing with climate change, and the use renewable energy. Development should be in sustainable locations to reduce CO2 emissions. It notes the need to align local policies with the national timeline for low carbon buildings.

2.2 Local Policy

The key local policies are set out below:

South Gloucestershire Core Strategy (December 2013)

Policy CS1 (section 8)

8. ensure the design, orientation and location of buildings, roof pitches, windows, habitable rooms, lighting and soft landscaping help to achieve energy conservation, the protection of environmental resources and assist the appropriate siting of renewable and/or low carbon energy installations and infrastructure. Schemes that can demonstrate that they will outperform statutory minima, such as the building regulations, in terms of sustainable construction, at the time of construction commencement, will be considered a primary indicator of good design. All new developments will be required to meet the building regulations current at the time of full planning or reserved matters approval. Until the 'Zero Carbon' building regulations are implemented major residential (10 or more dwellings) and mixed-use schemes will be encouraged to achieve full compliance with each Code level (currently level 3) or above, and/or Building Research Establishment Environmental Assessment Method (BREEAM) 'very good' or other equivalent standard; and

POLICY CS3 - RENEWABLE AND LOW CARBON ENERGY GENERATION

Proposals for the generation of energy from renewable or low carbon sources, provided that the installation would not cause significant demonstrable harm to residential amenity, individually or cumulatively, will be supported.

In assessing proposals significant weight will be given to:

1. the wider environmental benefits associated with increased production of energy from renewable sources

2. proposals that enjoy significant community support and generate an income for community infrastructure purposes by selling heat or electricity to the National Grid

3. the time limited, non-permanent nature of some types of installations; and

4. the need for secure and reliable energy generation capacity, job creation opportunities and local economic benefits.

POLICY CS4 - RENEWABLE OR LOW CARBON DISTRICT HEAT NETWORKS

Any applications to develop a thermal generating station or proposals that have a capacity to generate significant waste heat as part of an industrial or commercial process must either:

1. include heat recovery and re-use technology; and

2. heat distribution infrastructure; or

3. provide evidence that heat distribution has been fully explored and is unfeasible.

Major development proposals (more than 100 dwellings that are wholly or in part greater than 50dph, or non-residential of more than 10,000sqm) should, where practical and viable:

4. include renewable or low carbon heating or CHP generation and distribution infrastructure on-site and demonstrate how opportunities to accommodate an energy and or district heating solution have been maximised, taking into account density, mix of uses, layout and phasing; or

5. connect to an existing renewable or low carbon heat distribution network; or

6. provide a heat distribution network as part of the development where there are firm proposals for renewable or low carbon heat generation or CHP and distribution in the locality within a reasonable time frame; or

7. provide evidence that renewable and low carbon sources of heating or CHP have been fully explored and are unfeasible.

Developments of less than 100 dwellings or 10,000sqm of non-residential floorspace should connect to any existing available district heat network(s) in the vicinity, providing this is practical and would not adversely affect the viability of the development.

Renewable or low carbon energy installations will not be supported in areas covered by national designations and areas of local landscape value unless they do not individually or cumulatively compromise the objectives of the designations especially with regard to landscape character, visual impact and residential amenity.

Developments will also be required to meet objectives of Policy CS1 (High Quality Design), as far as engineering requirements permit.

POLICY CS4A - PRESUMPTION IN FAVOUR OF SUSTAINABLE DEVELOPMENT

There is a presumption in favour of sustainable development. When considering proposals for sustainable development the Council will take a positive approach. It will work pro-actively with applicants to find solutions so that sustainable development can be approved wherever possible.

Planning applications that accord with the policies in this Plan will be approved without delay unless material considerations indicate otherwise.

Where there are no policies relevant to the application, or relevant policies are out of date at the time of making the decision, then the Council will grant permission unless material considerations indicate otherwise. Account will be taken of whether:

1. Any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits when assessed against the policies in the National Planning Policy Framework and other policies in the Council's Local Plan, neighbourhood development plans, supporting supplementary planning documents and any emerging policy as it may be relevant.

2. Specific policies in the National Planning Policy Framework, other policies in the Council's Local Plan, neighbourhood development plans, supporting supplementary planning documents and any emerging policy as it may be relevant, indicate that development should be restricted.

South Gloucestershire Local Plan Policies, Sites and Places Plan (November 2017)

POLICY PSP6 - ONSITE RENEWABLE AND LOW CARBON ENERGY

All development proposals will:

1. **be encouraged to minimise end-user energy requirements over and above those required by the current building regulations through energy reduction and efficiency measures, and in respect of residential for sale and speculative commercial development offer micro renewables as an optional extra, and**
2. **be expected to ensure the design and orientation of roofs will assist the potential siting and efficient operation of solar technology.**

In addition, all major[2] greenfield residential development will be required to reduce CO_2 emissions further by at least 20% via the use of renewable and/or low carbon energy generation sources on or near the site providing this is practical and viable.

The Council will also take positive account of and support development that provides further energy reduction, efficiency, renewable and low carbon energy measures on or near site, where measures comply with other policies of the plan.

South Gloucestershire Guidance - Sustainable Energy Requirements

All major (residential and non-residential) development proposals are required (via the Local Planning Application Requirements list) to include the submission of energy information in the form of a Sustainable Energy Statement or as part of a Design and Access Statement. Major development is defined as residential development comprising 10 or more dwellings, or development comprising over 1000 sqm. of commercial floor space.

The guidance below sets out the minimum information that needs to be included in the Sustainable Energy Statement or Design and Access Statement to enable us to evaluate compliance with relevant planning policies.

The relevant planning policies are:

- *Policies, Sites and Places (PSP) Plan Policy 6 "On site renewable and low carbon energy" (Adopted November 2017). Refer to the PSP plan webpage for further detail.*
- *Core Strategy Policies (Adopted December 2013):*
  - *CS1(8) "High Quality Design";*
  - *CS3 "Renewable and Low Carbon Energy Generation"; and*
  - *CS4 "Renewable or Low Carbon District Heat Networks"*
- *New development – High quality design*

Policy CS1(8) seeks to ensure that all new development minimises the amount of energy and natural resources used during construction and the operation of the development over its lifetime. The design of a development should enhance energy efficiency and enable the addition of renewable and/or low carbon energy technologies (such as solar panels). If schemes outperform statutory minima (i.e. current building regulations in terms of energy conservation) then this will be considered a primary indicator of good design. The policy encourages higher energy efficiency standards to be achieved, for example BREEAM 'Very Good'.

All developments are expected to ensure the design and orientation of roofs will assist with the potential siting and efficient operation of solar technology.

Parts 1 and 2 of PSP Policy 6 encourages all development proposals to minimise end-user energy requirements over and above those required by current building regulations. This is expected to be achieved through energy efficiency measures. Also, in the same way as Policy CS1, the policy expects the design and orientation of the development to assist the siting of solar technology. In respect of residential for sale and speculative commercial development, micro-renewables should also be offered as an optional extra.

To ensure policy compliance, planning applications should therefore set out the design principles and detailed measures that will be applied to the proposed development to demonstrate: how the current building regulations requirements, in terms of energy reduction and efficiency, will be outperformed; and how the appropriate siting and efficient operation of solar technology, micro-renewables, and/or other renewable / low carbon energy installations and infrastructure will be achieved.

- *New development – Sustainable energy information*

The specific energy information that we would expect to be included with planning applications for different types of development proposals is detailed below.

- *Major residential, commercial and mixed-use developments*

1. *State which building regulations the development is to be built to, taking into account any planned changes in the energy requirements of building regulations over the build-out period*

2. *Provide an estimate of the regulated energy demand and CO2 emissions of the proposed development, assuming construction to the minimum energy performance required by the applicable building regulation standards*

3. *Demonstrate how landform, layout, building orientation, massing and landscaping will be designed to minimise energy consumption*

4. *Describe what measures are being included which will reduce the energy demand of the development beyond the building regulations requirement, with quantification of the additional energy expected to be saved and a simple explanation of how this has been calculated*

5. *Describe what renewable / low carbon energy generation measures are being included, their installed capacity (kW), predicted energy generation (kWh/yr) and associated CO2 savings (tonnes/yr) and a simple explanation of how this has been calculated*

6. *Provide a concluding section summarising why certain measures were chosen and any additional reduction in energy demand and offset CO2 emissions achieved through the measures being deployed compared with the baseline energy demand and emissions as allowed by the relevant building regulations*

- *Additional information to be provided for proposals for major greenfield residential development (10 or more dwellings)*

For major greenfield residential development proposals, PSP Policy 6 has an additional requirement for proposals to reduce CO2 emissions by at least 20% via the use of renewable and/or low carbon energy generation sources on or near the site.

The following guidance focuses on how applicants are expected to calculate the 20% reduction in CO2 emissions, thereby ensuring compliance with Policy 6.

- *Calculation*

The baseline against which development will be required to reduce CO2 emissions by at least 20% is total residual energy consumption, which includes regulated energy use (space heating, hot water, lighting and ventilation); and unregulated energy use (appliances and cooking).

Therefore, the lower the residual energy consumption of the development, the lower the requirement for renewable and / or low carbon energy generation will be. This provides an incentive to minimise energy requirements through energy efficiency measures beyond that required by Building Regulations (as encouraged by the first part of Policy 6).

In order to calculate total residual energy consumption, applicants should:

1. *Set out projected annual energy demands for heat and power from the proposed development. The projected annual energy demands must include both regulated and unregulated energy use*

2. *Subtract the additional impact of any further energy reduction and energy efficiency measures incorporated into the design. This will give a figure for total residual energy consumption*

3. *Applicants should then demonstrate how they have calculated the onsite renewable/low carbon measures they propose will generate sufficient carbon savings to offset 20% of the total residual energy consumption*

As noted above, projected annual energy demands for heat and power should be calculated to include both regulated and unregulated energy use.

Part L of the Building Regulations sets out the Target Emissions Rate (TER) that must be achieved in order to comply with Part L, and the Dwelling Emission Rate (DER) must not exceed the TER. To avoid double counting energy efficiency measures, the TER is used as the starting point for calculating the projected annual energy demands for heat and power from regulated energy use.

To calculate the unregulated element of projected energy use, the latest Building Regulations Standard Assessment Procedure for Energy Rating of Dwellings (SAP) methodology (currently SAP 2012, which includes guidance in Section 16 on estimating energy use for cooking and appliances) should normally be used. However, alternatively, the emerging guidance (BREEAM GN32 Guidance Note 2018 'Energy Prediction and Verification') issued by BRE may be used to calculate predicted unregulated energy consumption once adopted (expected Spring 2018).

- *Evidence requirements*

In order to demonstrate compliance with the 20% CO2 reduction element of Policy 6, compliance tables (templates set out below) and supporting evidence, should be submitted with a planning application. The information would normally form part of a sustainable energy statement, or can alternatively be included in a Design and Access Statement.

2.3 Pre-Application Advice

Pre-application advice was provided regarding energy and sustainability matters from the Council in their document dated 16-02-2023. It noted the requirement to provide a sustainable energy statement and set out policy.

2.4 Policy Analysis

The local policy requires the submission of information regarding energy and CO2 emissions in the proposed development. It also requires 20% renewable energy from major developments (i.e. over 10 dwellings) that are greenfield developments. The proposal does not fall into this category as the site is an urban regeneration site. The policy generally supports improvements upon the regulatory minima as 'good design'.

Therefore this document must set out a strategy albeit without specific targets above the regulatory minima in force. Orientation, design and location are design considerations that must be addressed. Any strategy arising needs to be practical and feasible in management terms for the long-term with this in mind.

3 APPROACH AND METHODOLOGY

3.1 Approach

It has been established that the policy aims are to address good design in energy efficiency terms, and to aim to exceed the statutory minima. There are no specific CO2 savings targets that policy requires the development to achieve. The design team approach has been to consider the adopted policy framework and to integrate measures across the disciplines that contribute to good energy performance and climate change mitigation whilst achieving the wider goals of providing new modern affordable housing. Deliverability remains crucial for such a project.

3.2 Assessment Methodology

The methodology for assessing energy and CO2 performance is for an accredited SAP assessor to calculate the likely energy performance and emissions based on planning-stage information. SAP 10.2 was used for the assessment with various house types and all apartments and maisonettes modelled.

3.3 Viability

It is essential that the proposals remain viable and deliverable, whilst achieving a sustainable development. Viability has two aspects to it – technical viability, and economic viability. Where something is not technically robust, it can be considered not viable. Economic viability itself has two aspects – whether the cost of the proposed measures can be supported by the development, and secondly, whether the measures proposed has an economic operating model that will ensure their ongoing success. The latter is less important with passive measures, but where technologies have significant operating requirements and costs, it is a crucial consideration. If operating the system makes a loss, then it cannot be considered viable.

4 ENERGY, GREENHOUSE GASES AND CO2

4.1 Low CO2 Design and Energy Efficiency

Key planks in the local policy are for new schemes to address design, orientation and location to reduce CO2 emissions. There are design measures than can achieve strategic efficiency objectives such as reduced heat loss areas, reduced thermal bridging and useful solar gain during the heating season; fabric measures that can reduce heating demand; and specification measures selecting the lowest energy technologies for the provision of services.

The site is in a sustainable location with good access to the local retail offering in Pound Road, various parks, schools, and other amenities. This will allow future residents to use sustainable modes of transport (walking and cycling) for accessing these facilities, driving down transport-related CO2 emissions.

With regard to the site design and layout, the density of the proposed scheme will ensure that there is a high proportion of party floors and walls, significantly reducing heat loss and resulting emissions. With regards to the energy efficient specification the key aspects are:

- Good fabric insulation standards;
- Thermal bridging minimisation;
- Construction detailing to reduce unwanted ventilation losses;
- Efficient heating and hot water plant;
- Controls for managing behavioural aspects of demand;
- Efficient plant.

At the planning stage, detailed specifications are not always fully understood and are subject to change. The measures modelled are:

- Fabric efficiency;
    - Demanding wall, floor and roof U-values (in line with Part L);
        - Wall 0.18 W/m2K
        - Floor 0.12 W/m2K
        - Roof 0.12 W/m2K
    - High performance doors/glazing;
        - Windows 1.2 W/m2K
        - Opaque doors 1.5 W/m2K
    - Sealing of party walls;
    - Adoption of construction detailing to minimise linear thermal bridging normally caused by penetrations to the insulating layer;
    - Demanding air tightness levels:
        - 4m3/m2/hr
- Heating efficiency;
    - Use of appropriate heating controls.
- Hot water efficiency;
    - Tap flow rates with appropriate controls;
    - Managed shower flow rates.
- Electrical efficiency;
    - Use of LED lighting throughout;
    - Energy labelled white goods;
    - Controls on external lighting to switch automatically when not required;
    - Controlled ventilation fan power with decentralised mechanical extract ventilation.

The specification is likely to be refined and finalised at the building control stage. Windows will be openable.

4.2 CO2 Performance with Efficiency

Part L is a very demanding standard. The efficiency measures set out above achieve Part L1a. (Refer to Figure 2 - South Gloucestershire Table 1)

4.3 District Heating Solutions and CHP

District heating has been assessed for the proposals. It has been dismissed on the basis of economic viability. There is no local system to plug into, and the proposed development is small in scale, which creates a high capital cost for the infrastructure. However, more importantly, the operating model for district heating with gas CHP or biomass is one that makes an annual loss. This results in a redundant investment, and one that would be mothballed immediately. Any theoretical CO2 saving would not occur in reality.

These findings are reflective of the general market for CHP within the UK. As a result, technologies that rely on district heat such as gas CHP and biomass are not viable for the proposed project.

Communal ground source heating has been assessed but found to be uneconomic due to the high capital cost of the ground array.

4.4 Renewable Energy

Air source heat pumps for the provision of heating and hot water are proposed for each dwelling, providing renewable heating and hot water to all units, with the exception of Block 1 where there is no obvious rear where the external heat pump condenser unit could be located. As a result, Block 1 will have internal hot water heat pumps. These heat pumps would be individual to each apartment, relying on ducted air feeding the pump which is attached to a hot water cylinder. This approach avoids the complexities associated with communal or district heat systems whilst delivering onsite renewable energy.

In addition to this, the roof forms create substantial areas of South East/South West facing pitches that can accept solar PV panels in the future due to the site gradient. As a result, the asymetric roofs benefit the scheme in terms of the larger pitches facing SE to SW, thus maximizing the potential area for solar PV. Bromford is considering installation of solar PV from the outset to ensure running costs are more affordable for future customers.

4.5 Summary

Accordingly, the preferred approach for the proposed development is therefore:

- Apply efficiency measures across the scheme;
- Heat pumps for all units;
- Scheme designed with roof pitches that are suited to solar PV.

4.6 South Gloucestershire CO2 Tables

The emissions set out in the South Gloucestershire tables format are as follows:

	Table 1: PSP 6 Compliance		
A	Regulated CO2 (TER)	70	tCO2
B	Unregulated CO2	55	tCO2
C	Total CO2	125	tCO2
D	CO2 Reduction from Energy Efficiency	8.7	tCO2
E	Total Residual CO2	116	tCO2
F	CO2 Reduction from Renewables	33	tCO2
G	CO2 Reduction from Low Carbon Sources	-	tCO2
H	Total CO2 Reduction from LCR	33	tCO2
I	CO2 Reduction (%)	29%	tCO2
	Renewables Saving vs Regulated Emissions	54%	

Figure 2 - South Gloucestershire Table 1

Table 3: LZC Measures

Technology	Description	Capacity	Output	CO2 Saved
		kWp	MWh	tCO2
Air Source Heat Pumps	Full heat pump	425	170.0	33.1
				33.1

Figure 3 - South Gloucestershire Table 3

5 SUSTAINABLE DESIGN

5.1 Climate Change

5.1.1 Mitigation

Energy in building use is a key contributor to the UK's carbon emissions. The proposed development will mitigate climate change through its application of the energy hierarchy:

- Reducing energy use;
  - *See efficiency measures in Energy section;*
- Addressing renewable energy;
  - *See measures in Energy section;*
- Addressing low carbon energy options.

This will help to reduce energy use and associated carbon emissions. Details of how these measures are to be applied are set out in the Energy section. The development will also strive to utilise low impact materials in its construction. Key measures will include:

- Using low climate change impact building materials;
- Sourcing sustainable timber;
- Using low or zero global warming impact insulation materials.

5.1.2 Adaptation

Climate change will impact on the new development. Weather patterns will become less predictable – for example rainfall will become more extreme, and summer temperatures are likely to increase. Biodiversity will alter as conditions change. Water management is a key issue in adaptation, as is designing out the requirement for cooling in buildings. Key mitigation measures employed in the development will be:

- Providing water efficient fittings;
- Integration of appropriate ventilation;
- Metering water use to increase awareness of consumption.

5.2 Transport and Travel

EV charging will be provided in line with Part S of the Building Regulations. The proposed scheme will also have cycle storage designed in to facilitate low carbon personal transportation options for the occupants. The site design will promote working from home and cycling as the main opportunities for reducing travel-related CO2.

5.3 Waste and Recycling

Waste storage has been designed in line with the local requirements for waste and recycling. Construction waste will be segregated and recycled in accordance with a site waste management.

5.4 Water, Materials and Resources

Each apartment should achieve 110lpppd water consumption through an efficient specification. The design makes efficient use of space when compared with detached houses for example, meaning that the materials used for each dwelling are far less in volume due to the shared party floors and walls involved. Timber frame construction is likely to be used ensuring that the development uses a renewable building material.

5.5 Green Infrastructure and Biodiversity

The proposals incorporate landscaping and planting areas within amenity spaces. Micro-habitats can be incorporated including bird and bat boxes where appropriate.

5.6 Flexibility and Adaptability

The design carefully takes account of the surrounding buildings whilst inside, modern efficient living spaces are created. The floor to ceiling heights allow for flexible uses in the future.

6 CONCLUSION

6.1 Proposals

This statement has been prepared in support of the planning application for Barrington Close and Fairford Close, Kingswood. There are 17 apartments, 7 maisonettes and 61 houses. JS Lewis Ltd was engaged to help develop an energy and sustainability strategy to address local policy. This document sets out that strategy.

6.2 Energy

Design considerations are discussed, showing that the location is sustainable. The density and layout of the scheme creates a high level of shared party walls and floors, reducing heat loss areas and thermal bridging; and that orientation and roof design permits solar access. Although district heating, CHP technologies and communal ground source heating are considered not viable, efficiency and renewable measures have been incorporated. The proposed energy strategy is as follows:

- Efficiency measures including:
  - Highly efficient building form with apartments and terracing of houses;
  - High percentage of shared party floors and walls, minimizing heat loss;
  - Good levels of fabric efficiency;
  - Use of careful detailing for reduced thermal bridging;
  - Low energy fittings including LED lighting;
  - Energy labeled white goods where provided;
  - Controls on external lighting;
  - Controlled fan power with decentralized mechanical ventilation.
- Renewable energy:
  - Air source heat pumps for heating and hot water for all dwellings with the exception of Block 1 which will have hot water heat pumps;
  - Roofs with potential for solar PV which is under consideration for installation from the outset.

The strategy above demonstrates that the statutory minima are met and exceeded, demonstrating good design.

6.3 Sustainability

The scheme addresses climate change, sustainable living, travel, biodiversity and materials, resources and waste.

6.4 Compliance

The scheme has addressed the following:

- The NPPF (2023)
- South Gloucestershire Core Strategy (2013)
- South Gloucestershire Places and Sites Policies (2017)

The proposed development has been designed to integrate a range of energy efficiency and renewable energy technology. The proposals can be considered sustainable and compliant with planning policy.

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