Barnsley West Phase 1

SUSTAINABILITY STATEMENT

October 2023

Introduction

This report has been prepared by Award Energy Consultants on behalf of Strata in connection with a planning application for a residential development of 216 dwellings at Barnsley West Phase 1. This report considers the issues surrounding sustainable construction with regards to the proposed residential development. In particular, it considers and evaluates the measures incorporated into the design of the development to reduce the predicted carbon emissions, energy demand and water usage of the site as per Barnsley Metropolitan Borough Council's development policies.

Policy Context

The following documents were considered:

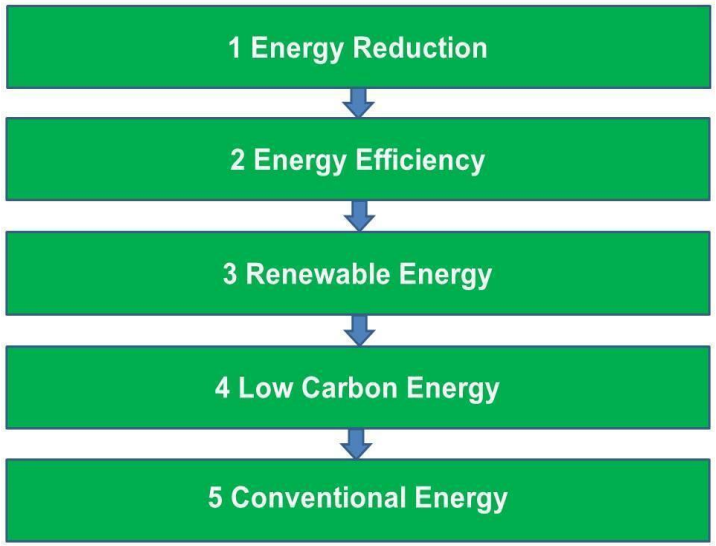
Building Regulations Part L1 2021 – Part L1 sets minimum standards for fabric, energy efficiency and carbon emissions for new build dwellings

National Planning Policy Framework 2023 – strengthens the emphasis on sustainable development, and requires new developments to secure the highest viable resource and energy efficiency and reduction in emissions by considering Governments and other national standards

Barnsley Metropolitan Borough Council's Supplementary Planning Document – Sustainable Construction and Climate Change Adaptation – guidance on requirements for development in respect of sustainable construction and adapting to climate change.

Energy Hierarchy

Award Energy have been instructed to assess the potential energy efficiencies and carbon emission reductions that can be achieved through aligning with the Government's Energy Hierarchy as required by Barnsley MBC's Planning Policies. Design teams are required to apply the following steps to reduce carbon emissions through the steps outlined below:



Step 1 - Energy Reduction

The first step of the hierarchy requires developments to use less energy through passive design measures including the maximisation of solar heating and reducing heat loss and meeting the requirements to reduce energy consumption and introduce energy efficiency

- The development layout has been designed to maximise a north-south orientation to allow for passive design whereby dual aspect dwellings enable views, good daylighting and cross ventilation
- Internally, the accommodation has been laid out to maximise the internal space and light afforded, with primary habitable rooms benefitting from a southern orientation. Each of the principal living rooms will have sufficient glazing to allow natural light to penetrate the rooms, reducing the need for artificial lighting
- The construction specification of every home will include high levels of insulation in the ground floor, external walls and roof spaces and all fabric elements will have u-values lower than those required by Part L 2021
- High levels of air tightness to be achieved within the construction of the dwelling to reduce unnecessary heat loss; all dwellings will be tested for air leakage
- All dwellings will meet the requirements of the new Approved Document Part O: Overheating, utilising an appropriate glazing specification and opening areas to minimise solar gain and allow purge ventilation
- All houses will benefit from a garden or private space for recreation, thus allowing external space for recreation and clothes drying

Step 2 - Energy Efficiency

- Energy efficient lamps will be installed in every light fitting. Each entrance will be illuminated with an energy efficient external light with appropriate controls to avoid unnecessary use
- Highly efficient gas boilers or Air Source Heat Pumps are proposed to provide space and water heating, although the precise plots for each solution have not yet been decided. These will be accompanied by thermostatic controls, zoned heating and programmers to ensure that heating is optimally controlled to use the least amount of energy
- The design team propose using natural ventilation via background/trickle ventilation, opening windows and wet room extraction.
- Electric Vehicle Charging Points or Bollards will be provided for each dwelling

Step 3 – Renewable Energy

Where gas boilers are proposed, Strata anticipate the use of renewable technologies in the form of Photovoltaic panels as outlined in Table 1 below. These will be accompanied by appropriate Waste Water Heat Recovery systems where feasible. The remainder of plots will use Air Source Heat Pumps.

Table 1

Dwelling Type	Average PV Amount Per Plot (kWp) (approximate)
Semi-Detached	0.91
Mid-Terrace	1.83
Detached	3.2275

Material Selection

Significant amounts of energy and natural resources are consumed in the production, transportation and disposal of building materials. Two issues are significant in the specification of building materials; the environmental impact of materials and the responsible sourcing of materials. Strata are dedicated to taking pro-active measures to address these issues and commit to obtaining responsible sourcing certification for at least 90% of the building elements of each dwelling.

Pollution

The dwellings will be constructed with insulating materials that have a Global Warming Potential of less than 5. In addition, all dwellings will be heated by highly efficient gas boilers, with those that have NOx emissions of less than 40 mg/kWh being considered. The ASHP units will emit no onsite NOx emissions.

Waste

Strata have company-wide policies to promote the reduction and effective management of construction related waste. Robust procedures are in place to share materials such as soil and aggregate between sites and to sort waste on and off site to divert waste from landfill.

All construction activities will be carried out to minimise dust, fumes, discharges and any other form of pollution on site, in line with best practice policies.

Energy Efficiency & Carbon Emissions

In order to evaluate the proposed energy strategy, it is important to determine firstly the baseline. This is the level of energy efficiency against which any strategy must be judged using a selection of proposed house types and the standard specification that shows compliance with Building Regulations.

Award Energy have compared this specification that will achieve minimum compliance with Part L1 2021 with the intended enhanced specification, as shown in Table 2. Within the enhanced specification, all heat loss elements have been insulated beyond regulation.

Table 2

Element	Value required by AD Part L1 2021 (u-value)	Enhanced specification (u-value)
Walls (w/m²k)	0.26	0.20
Party Walls (w/m²k)	0.20	0.00
Roofs (w/m²k)	0.16	0.09/0.16
Floors (w/m²k)	0.18	0.12
Windows (w/m²k)	1.6	1.3
Doors (w/m²k)	1.6	1.3
Design air pressure test ($m^3/h/m^2$)	8	4.5

As the precise split between the gas boiler plots and those with Air Source Heat Pumps has not yet been decided, the following Carbon Emission calculations have been produced for a sample of typical dwelling types only and not weighted to establish a site-wide figure.

Carbon Reduction Calculations

Award Energy have compared the specification that will achieve minimum compliance with Part L1 2021 with the intended enhanced specification as shown in Table 2 and the appropriate amount of Photovoltaic power. Table 3 below shows the predicted Carbon Emissions for the proposed dwelling types using gas boilers plus photovoltaic panels.

Table 3

Dwelling Type	Carbon Emissions ($KgCO_2/Year/m^2$) Baseline specification TER	Carbon Emissions ($KgCO_2/Year/m^2$) Enhanced specification DER	% reduction in Carbon Emissions Over Part L1 2021	% reduction in Carbon Emissions Over Part L1a 2013
Mid-Terrace	10.75	10.29	4.28%	35.28%
Semi-Detached	10.13	9.84	2.86%	33.86%
Detached	9.60	9.27	3.44%	34.44%

*calculated using SAP10 software

Table 4 below shows the predicted Carbon Emissions for the proposed dwelling types using Air Source Heat Pumps plus the enhanced specification detailed in Table 2.

Table 4

Dwelling Type	Carbon Emissions ($KgCO_2/Year/m^2$) Baseline specification TER	Carbon Emissions ($KgCO_2/Year/m^2$) Enhanced specification DER	% reduction in Carbon Emissions Over Part L1 2021	% reduction in Carbon Emissions Over Part L1a 2013
Mid-Terrace	9.19	3.04	66.92%	97.92%
Semi-Detached	9.89	2.21	77.65%	108.65%
Detached	9.38	1.95	79.21%	110.21%

*calculated using SAP10 software

Fabric Energy Demand Calculations

Using SAP10 software and the specification detailed in Table 2, the predicted Fabric Energy Demand for a sample of dwelling types in kWh/m^2 per year was calculated, as shown in Table 5 below.

Table 5

Dwelling Type	Fabric Energy Demand (kWh/m²/yr) Baseline specification	Fabric Energy Demand (kWh/m²/yr) Enhanced specification	% Reduction in Fabric Energy Demand above Part L1 2021
Mid-Terrace	33.13	31.24	5.70%
Semi-Detached	33.51	32.74	2.30%
Detached	33.61	32.58	3.06%

*calculated using SAP10 software

As outlined in Table 5 below, the baseline weighted average predicted Fabric Energy Demand for the site was then calculated to be **33.54 kWh/m²/yr** (with all properties meeting the minimum requirements of Part L1 2021). The weighted average predicted fabric energy demand with the design team's enhanced specification is **32.33 kWh/m²/yr** – a **3.59%** site-wide improvement over the 2021 Building Regulations (approximately 18.59% above Part L1a 2013).

Table 6

Dwelling Type	Number	Weighted Fabric Energy Demand (kWh/m²/yr) Baseline specification	Weighted Fabric Energy Demand (kWh/m²/yr) Enhanced specification
Mid-Terrace	10	1.56	1.15
Semi-Detached	154	23.89	23.34
Detached	52	8.09	7.84
Total	**216**	**33.54**	**32.33**
Site-wide average Fabric Energy Demand Reduction (kWh/m²/yr) above Part L1 2021 3.59%			
Site-wide average Fabric Energy Demand reduction (kWh/m²/yr) above Part L1a 2013 (approximate) 18.59%			

*calculated using SAP10 software. Award Energy can, upon request, provide reports from SAP10.

Water Efficiency

Approved Document G (2010) restricts new build dwellings to a maximum consumption of 125 litres per person per day, however Leeds City Council Policy EN2 requires a maximum daily consumption of 110 litres per person. It is proposed that eco-sanitary ware and restricted flow rates will be introduced into the design of each dwelling to obtain the appropriate level of water efficiency.

The following table has been extracted from the Water Efficiency Calculator, demonstrating that 108.9 litres per person per day is anticipated, exceeding the requirement of Leeds City Council's Policy EN2. The exact makes and models are subject to change as the design is progressed, though any specification will achieve less than 110 litres per person per day.

Installation Type	Unit of Measurement	Capacity/Flow Rate	Use Factor	Fixed Use	Litres Per Person per day
WC (Dual Flush)	Full Flush (litres)	6	1.46	0.00	8.76
	Part Flush (litres)	3	2.96	0.00	8.88
Taps (excluding kitchen tap)	Flow rate (litres/minute)	8	1.58	1.58	14.22
Baths (where shower present)	Capacity to overflow (litres)	115	0.11	0.00	12.65
Showers (where bath present)	Flow rate (litres/minute)	8	4.37	0.00	34.96
Kitchen sink tap	Flow rate (litres/minute)	6.0	0.44	10.36	13.00
Washing Machine	Litres/kg dry load	8.17	2.1	0.00	17.16
Dishwasher	Litres/place setting	1.25	3.60	0.00	4.50
TOTAL					**114.13**

Total Internal Water Consumption	114.13
Normalisation Factor (x 0.91)	103.86
External Use	5.00
Part G Water Consumption	**108.9**

Conclusion

This report demonstrates that the proposed enhanced fabric specification reduces site-wide average Energy Demand by **3.59%** over Part L1 2021 (approximately **18.59%** over Part L1a 2013). When combined with Air Source Heat Pumps or gas boilers, photovoltaic panels and Waste Water Heat Recovery units (where practical), carbon emissions on the site are significantly reduced over the requirements of Part L1 2021 and serve to reduce the impacts of climate change. Furthermore, a specification providing water consumption of less than **110** litres per person per day is anticipated which, when combined with material selection and waste management policies, strengthens the sustainability of the development.

Caveat

This document has been prepared for the titled project, or named part thereof, and should not be relied upon or used for any other project or part as the case may be, without an independent check being made on it. Award Energy shall not be liable for the consequences of using this document other than for the purpose for which it was commissioned, and any user and any other person using or relying on this document for such other purpose, agrees and will be such use or reliance be taken to confirm this agreement to indemnify Award Energy for all loss of damage resulting therefrom.