PROPOSED RESIDENTIAL DEVELOPMENT

PHASES 5 & 6, PENDLE ROAD, HIGHER STANDEN, CLITHEROE

ENERGY REPORT

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Introduction

This Energy Report has been prepared by Award Energy Consultants on behalf of Taylor Wimpey UK Ltd ("Taylor Wimpey") in relation to a development of 265 dwellings, associated access, drainage, and the provision of public open space and landscaping at Pendle Road, Clitheroe.

This report considers the issues surrounding sustainable construction and, in particular, it considers and evaluates the measures incorporated into the design of the development to reduce the predicted energy usage of the site.

Policy Context

The following documents were considered:

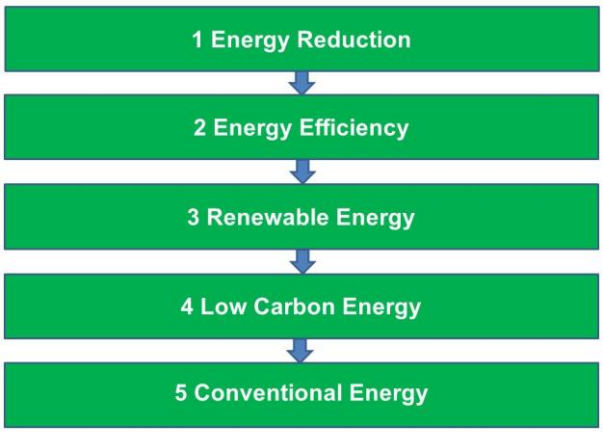
Building Regulations Part L 2021 - as new build dwellings, Part L1 is of particular note. Part L1 sets minimum standards for fabric and energy efficiency for new build dwellings. Whilst a portion of the proposed dwellings will be built to Future Homes Standards, the consultation for its implementation has not yet been concluded and therefore this Report is grounded in Part L1 2021 which are the regulations in force at the time of writing

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

Ribble Valley Borough Council Core Strategy: Policy EN3 Sustainable Development and Climate Change: All development should optimise energy efficiency by using new technologies and minimising the use of energy through appropriate design, layout, material and landscaping

Proposal

Taylor Wimpey have appointed Award Energy to use SAP10 to analyse the potential energy efficiencies that can be achieved through an enhanced fabric specification and design before the application of renewable technology in the form of Photovoltaic Panels and Waste Water Heat Recovery units. These policies align very closely with the Government's Energy Hierarchy, as shown 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, including high performance triple glazing
- Waste Water Heat Recovery Units will be installed, where appropriate
- 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 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 are proposed to provide space and water heating. 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 as per the requirements of Part S.

Step 3 – Renewable Energy

Taylor Wimpey propose the use renewable technology in the form of Photovoltaic panels, as outlined in Table 1 below. In addition, Waste Water Heat Recovery units will be fitted, where appropriate.

Table 1

Dwelling Type	PV Amount Per Plot (kWp) (approximate)
Mid-Terrace	0.81
Semi-Detached	0.81
Detached	2.43
Bungalow	3.645

Energy Efficiency & Carbon Emissions

To evaluate the anticipated sustainability strategy, Award Energy have compared the specification that will achieve minimum compliance with Part L1 2021 with the proposed enhanced specification, as shown in Table 2. All heat loss elements have been insulated beyond Building Regulations, a design air pressure test of 4.5 has been targeted and highly efficient gas boilers have been included with high specification heating controls. In addition, renewable technology (in the form of Photovoltaic panels and Waste Water Heat Recovery units) is proposed across the site.

Table 2

Element	Value required by AD Part L1 2021 (u-value)	Enhanced specification (u-value)
Walls (w/m²k)	0.26	0.25
Roofs (w/m²k)	0.16	0.11
Floors (w/m²k)	0.18	0.15
Windows (w/m²k)	1.6	0.86
Doors (w/m²k)	1.6	1.2
Design air pressure test ($m^3/h/m^2$)	8	4.5

Carbon Reduction Calculations

Award Energy have compared the specification that will achieve minimum compliance with Part L 2021 with the intended enhanced specification as shown in Table 2 plus the installation of approximately 391.23 kWp of Photovoltaic panels across the site. Waste Water Heat Recovery Units have also been included, where appropriate. Table 3 below shows the predicted Carbon Emissions for the proposed house types.

Table 3

Dwelling Type	Carbon Emissions ($KgCO_2/Year/m^2$) Baseline specification	Carbon Emissions ($KgCO_2/Year/m^2$) Enhanced specification	% Reduction in Carbon Emissions over Part L1 2021
Mid-Terrace	11.09	9.24	16.68%
Semi-Detached	10.94	10.03	8.32%
Detached	10.62	10.41	1.98%
Bungalow	9.44	9.03	4.34%

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

Table 4 below shows the predicted Carbon Emissions for each house type, weighted to represent fairly the mix on site. The predicted baseline weighted carbon emissions for the site are **10.76 $KgCO_2/Year/m^2$** (with all properties meeting the minimum requirements of Part L1 2021). The weighted average predicted carbon emissions with Taylor Wimpey's enhanced specification are **9.96 $KgCO_2/Year/$**m^2, representing a **7.38%** reduction in site-wide carbon emissions over Part L1 2021, which is **38.38%** above Part L1a 2013.

Table 4

Dwelling Type	Number	Weighted Carbon Emissions per plot ($KgCO_2/m^2/Year$) Baseline specification	Weighted Carbon Emissions per plot ($KgCO_2/m^2/Year$) Enhanced specification + PV
Mid-Terrace	33	1.38	1.15
Semi-Detached	138	5.70	5.22
Detached	74	2.97	2.91
Bungalow	20	0.71	0.68
Total	**265**	**10.76**	**9.96**
Weighted Average Carbon Emissions Reduction over Part L1 2021 = 7.38 %			
Weighted Average Carbon Emissions Reduction over Part L1a 2013 (as amended in 2016) = 38.38%			

Results of Energy Demand Calculations

As laid out in Table 5 below, the energy demand was calculated from SAP10 for each house type, both with the enhanced specification then with the addition of Photovoltaic panels (in the amounts shown in Table 1) and Waste Water Heat Recovery units.

Table 5

Dwelling Type	Energy Demand Enhanced Specification (kWh/Year)	Energy Demand Enhanced specification + PV + WWHR (kWh/Year)	Reduction in Energy Demand through Renewables
Mid-Terrace	4146.54	3044.60	26.57%
Semi-Detached	5274.42	4186.64	20.62%
Detached	7806.49	5744.43	26.41%
Bungalow	4528.34	1881.04	58.46%

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

Once weighted, to reflect the house type mix on site, the Energy Demand with Taylor Wimpey's enhanced specification is predicted to be **5784.73** kWh per year. After the application of approximately 391.23 kWp of Photovoltaics and Waste Water Heat Recovery units, the energy demand is predicted to reduce to **4305.42** kWh per year, a **25.57%** reduction in energy through renewable technology.

Table 6

Dwelling Type	Number	Weighted Energy Demand Enhanced Specification (kWh/Year)	Weighted Energy Demand Enhanced specification + PV (kWh/Year)
Mid-Terrace	33	516.36	379.14
Semi-Detached	138	2746.68	2180.21
Detached	74	2179.93	1604.10
Bungalow	20	341.76	141.97
Total	**265**	**5784.73**	**4305.42**
Energy Demand Reduction Through Renewables = 25.57%			

Water Efficiency

Approved Document G (2010) restricts new build dwellings to a maximum consumption of 125 litres per person per day. 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, as shown in Table 5 below.

Installation Type	Unit of Measurement	Capacity/Flow Rate	Use Factor	Fixed Use	Litres Per Person per day
WC (Dual Flush)	Full Flush (litres)	46	1.46	0.00	8.76
	Part Flush (litres)	4	2.96	0.00	11.84
Taps (excluding kitchen tap)	Flow rate (litres/minute)	6	1.58	1.58	11.06
Baths (where shower present)	Capacity to overflow (litres)	195	0.11	0.00	21.45
Showers (where bath present)	Flow rate (litres/minute)	10	4.37	0.00	43.7
Kitchen sink tap	Flow rate (litres/minute)	3.8	0.44	10.36	12.03
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				130.50

Total Internal Water Consumption	130.50
Normalisation Factor (x 0.91)	118.75
External Use	5.00
Part G Water Consumption	**123.75**

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. Taylor Wimpey is 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.

Waste

Taylor Wimpey has national 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.

The re-use and recycling of wooden pallets is encouraged to reduce the amount of wood waste sent to landfill and Taylor Wimpey work closely with suppliers to minimise and recycle packaging.

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.

Conclusion

This report demonstrates that the proposed enhanced fabric specification in combination with, subject to viability, approximately 391.23 kWp of Photovoltaic panels plus waste water heat recovery units reduces carbon emissions on the site by an average of **7.38%** over Part L1 2021. This represents a **38.38%** reduction over Part L1a 2013. It is anticipated that the renewable technology (in the form of Photovoltaic panels and Waste Water Heat Recovery units) proposed for the development will provide **25.57%** of the site wide energy demand.

Ribble Valley Borough Council can be assured that the development at Higher Farm, Standen (Phases 5 & 6) will meet the requirements of Core Strategy Policy EN3.