



PROPOSED RESIDENTIAL DEVELOPMENT

Wakefield Road, Mapplewell, Barnsley

CARBON REDUCTION REPORT

Application Ref 2014/0249

July 2019

Introduction

This report has been prepared by Award Energy Consultants in connection with the proposed residential development of up to 250 dwellings at Wakefield Road, Mapplewell.

This report considers the issues surrounding sustainable construction with regards to the proposed development. In particular, it considers and evaluates the measures incorporated into the design of the development to achieve carbon reductions as per Barnsley MBC's development policies.

Policy Context

The following documents were considered:

Building Regulations Part L1a 2013 – Part L1a sets minimum standards for fabric and energy efficiency for new build dwellings

National Planning Policy Framework 2018 – 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

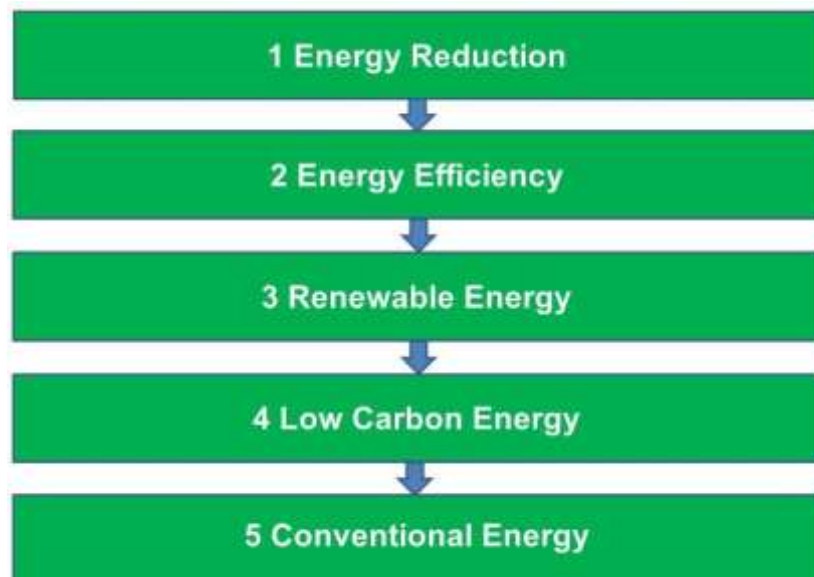
Condition 8 of Planning Application Ref 2014/0249: Prior to commencement of development, details of a scheme to reduce the developments carbon dioxide emissions by at least 15% by using decentralised, renewable or low carbon energy sources or other appropriate design measures shall be submitted to and approved in writing by the Local Planning Authority. The development shall be carried out in accordance with the approved details and upon completion of the development a report shall be submitted to and approved by the Local Planning Authority demonstrating that at least a 15% reduction in carbon dioxide emissions has been achieved. In the event that the use of other decentralised, renewable or low carbon energy sources or other appropriate design measures are also required to achieve a 15% reduction in carbon dioxide emissions, full details of such proposals and a timetable for their implementation shall be submitted to and approved in writing by the Local Planning Authority prior to installation.

Proposal

The performance of the building fabric, the efficiency of the building services and the management strategies of the occupants of a dwelling broadly determine the energy consumption and carbon emissions of a dwelling. Netherton Homes has appointed Award Energy to use SAP 2012 to analyse the potential carbon emissions reduction and energy demand savings that can be achieved through an enhanced fabric specification and, subject to feasibility and viability, a bolt-on renewable technology strategy.

The proposed Energy Strategy places a great importance on the efficiency of a property's thermal envelope and internal building services; this emphasis is to be encouraged as it recognises that it is inherently more sustainable to invest resources in reducing a property's long term energy demand and carbon emissions than shorter term generation benefits as per the Energy Hierarchy.

Energy Hierarchy



The design team proposes a hybrid solution to meet the requirements of Condition 8 which provides for the following:

- Enhanced fabric specification of all dwellings to be built on site which achieves a **10.45%** reduction in carbon emissions over and above the 2013 Building Regulations.
- The installation of Showersave Waste-Water Heat Recovery units (a renewable technology) to reduce carbon emissions by a further **5.10%**.

Method

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 typical 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 L1a with the intended enhanced specification, as shown in Table 1. Within the enhanced specification, all heat loss elements have been insulated beyond regulation.

Table 1

Element	Value required by AD Part L1a 2013 (u-value)	Enhanced specification (u-value)
Walls (w/m ² k)	0.30	0.24
Party Walls (w/m ² k)	0.20	0.00
Roofs - plane (w/m ² k)	0.20	0.09
Roofs - slope (w/m ² k)	0.20	0.14
Floors (w/m ² k)	0.25	0.14
Windows (w/m ² k)	2.0	1.4
Doors (w/m ² k)	2.0	1.4
Design air pressure test (m ³ /h/m ²)	10	5

Results of Carbon Reduction Calculations

Table 2 below shows the predicted Carbon Emissions for each house type. The baseline predicted carbon emissions were calculated, with all house types meeting the minimum requirements of Part L1a 2013. The predicted carbon emissions with the proposed enhanced specification and subsequently the addition of Waste Water Heat Recovery units were then established.

Table 2

House Type	Carbon Emissions (KgCO ₂ /Year/m ²) Baseline specification	Carbon Emissions (KgCO ₂ /Year/m ²) Enhanced specification + WWHR	% Carbon Reduction (Fabric)	% Carbon Reduction (WWHR)	% Carbon Reduction (Combined)
Allington	19.89	16.81	9.11	6.39	15.50%
Rochester	19.85	17.07	10.79	3.22	14.01%
Alto (End)	19.31	16.11	12.45	4.14	16.59%
Alto (Mid)	17.80	14.19	15.82	4.44	20.26%
Bolberry	17.41	14.39	11.28	6.66	17.97%
Edge (End)	19.21	16.39	10.95	3.9	14.85%
Edge (Mid)	17.77	14.39	13.68	4.22	17.90%
Hampton	19.81	16.17	10.82	7.57	18.39%
Harlow	21.19	18.28	13.73	0	13.73%
Kingsley	15.38	13.97	5.21	3.97	9.18%
Leedale	17.63	14.52	11.19	6.46	17.65%
Salisbury	17.14	14.75	10.62	3.32	13.94%
Whitwell	17.22	15.83	4.75	3.31	8.06%

*calculated using SAP2012 software. Award Energy can, upon request, provide reports from SAP2012

Results of Carbon Reduction Calculations cont.

Table 3 below shows the weighted percentage reduction in carbon emissions, establishing that the site-wide carbon reduction using an enhanced fabric specification and renewable technology in the form of waste-water heat recovery is predicted to be 15.55%, exceeding the requirements of Condition 8.

Table 3

House Type	Number of Plots	% Carbon Reduction (Fabric) Weighted	% Carbon Reduction (WWHR)
Allington	28	1.07	0.75
Rochester	20	0.90	0.27
Alto (End)	20	1.04	0.35
Alto (Mid)	5	0.33	0.09
Bolberry	58	2.74	1.62
Edge (End)	36	1.65	0.59
Edge (Mid)	4	0.23	0.07
Hampton	10	0.45	0.32
Harlow	2	0.11	0.00
Kingsley	15	0.33	0.25
Leedale	18	0.84	0.49
Salisbury	12	0.53	0.17
Whitwell	11	0.22	0.15
Total	239	10.45	5.10
Weighted Average Carbon Emission Reduction = 15.55%			

Energy Efficiency Measures

The following summarises the proposed additional energy conservation measures that will be incorporated into the proposed dwellings.

- Highly efficient space and hot water heating systems. The heating systems will be accompanied, where practical, by thermostatic controls, zoned heating and programmers to ensure that heating is optimally controlled to use the least amount of energy
- High levels of insulation across all thermal elements within the build
- High levels of air tightness to be achieved within the construction of the dwelling to reduce unnecessary heat loss

Energy Efficiency Measures cont.

- Addressing Thermal Bridging limits heat loss across junctions; the design team have looked at the standard details for thermal bridging and, in consultation with the Aircrete Products Association, the Concrete Block Association and the Energy Savings Trust, have modelled and proven enhancements from ACD standard details
- 100% dedicated low energy lighting
- Windows and doors will be at least 30% more efficient than minimum standards with the Building Regulations
- All external light fittings will be provided with energy efficient light bulbs with appropriate control systems for efficient usage
- The benefits of passive solar design are well documented and have been considered by the design team. Sufficient glazing will be provided to the principal living rooms of each dwelling to ensure sufficient natural lighting, thus reducing the energy consumed in artificially lighting the room. In addition, it is well known that developments which are orientated to ensure that the principal glazed elevations are within 30 degrees of due south are most effective at utilising solar gain, thus reducing energy consumption. Where practicable and feasible this has been incorporated into the site design.

Conclusion

This report demonstrates that the proposed enhanced fabric specification in combination with the addition of Waste-Water Heat Recovery units achieves carbon emission reduction of the site of **15.55%**, meeting the requirements of Condition 8 of Planning Application ref 2014/0249.

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.