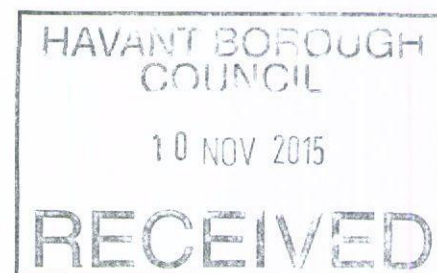




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Carbon Analysis Report

Phases 3-4 Dukes Meadow



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Company Profile

FES was established in 2006 as a Building Surveying firm specialising in sustainable design and construction. The company has since expanded and has developed a nationwide footprint with offices in London and York. Key services offered include;

- Energy Strategy Studies
- Compliance Assessments
- BREEAM Assessments
- Code for Sustainable Homes Assessments
- Building Surveys
- Design Services

The Company works with a range of clients: from national and regional house builders, construction contractors, architects, M&E consultants, town planners and commercial developers. In recognition of the firms specialisation in sustainable assessment FES has been invited to join the Yorkshire & Humber Planning & Climate Change Review Panel to assist local authorities in the formulation and implementation of climate change development policies.

Executive Summary

- *Taylor Wimpey* is directed by *Havant Borough Council* and *Winchester City Council* to achieve a high level of carbon compliance in line with Code for Sustainable Homes Level 3.
- *Taylor Wimpey* has opted to develop a fabric first strategy which has the potential to achieve a significant reduction in CO₂ emissions, when measured against the Building Regulations 2010. Such a strategy will be in line with the sustainable development policies of *Havant Borough Council* and *Winchester City Council*.
- Following an assessment *FES* can conclude that the proposed strategy exceeds the minimum standards of Part L and Code Level 3 and achieves on average 12-15% reductions in CO₂. The reductions achieved are permanent and not dependent on the performance of renewable or other low carbon technologies.

1 Introduction

This report has been prepared by FES on behalf of *Taylor Wimpey Southern Counties*. This report considers the issues surrounding sustainable design and construction with regards to the proposed residential development known as Phases 3-4, Dukes Meadow.

The report in particular considers and evaluates the measures incorporated into the design of the development to reduce the predicted carbon emissions of the development over the Target Emission Rate as calculated by SAP 2009.

The following documents were considered when formulating the report.

Planning Policy Statement 1 (2007) – PPS 1 strengthens the emphasis on sustainable development, and requires new developments to “secure the highest viable resource and energy efficiency and reduction in emissions.”

Building Regulations 2010 – Approved Document L1A Conservation of Fuel and Power sets minimum energy efficiency and fabric efficiency standards for new build properties.

Havant Borough Council Core Strategy – Core Strategy policies CS14 and CS16 direct developers to demonstrate a robust level of sustainability. Level 3 of the Code for Sustainable Homes is identified as the principle measure of assessment.

Winchester City Council Sustainable Design Guidance – This SPD provides developers with guidance on sustainable design measures concerning energy and water conservation. The SPD recognises the Building Regulations and the Code for Sustainable Homes as key measures of assessment.

2 Carbon Reduction Strategy

Taylor Wimpey proposes the adoption of a **fabric first** construction specification which will considerably better the minimum fabric efficiency standards of Part L 2010 and thus achieve a significant CO₂ emissions reduction when measured against CSH Level 3.

2.1 Fabric Specification

The table and details below summarise the proposed fabric and internal building services specification.

Table 1 – Enhanced Specification (Figures in W/m²K unless stated)

	Part L 2006 Minimum Standard	Part L 2010 Minimum Standard	Enhanced Standard
Wall	0.35	0.30	0.20
Party Wall	n/a	0.20	0.00
Roof	0.25	0.20	0.08
Floor	0.25	0.25	0.15
Glazing & Doors	2.20	2.00	1.32
Air Permeability	10 m ³ /(h.m ²) @ 50 Pa	10 m ³ /(h.m ²) @ 50 Pa	5 m ³ /(h.m ²) @ 50 Pa

In addition to the summary above the following additional measures will be incorporated into the design;

- Taylor Wimpey's standard construction details have been tested and approved by the *Building Research Establishment*. These typically produce a dwelling Y-value of 0.04-0.05, thus reducing heat loss at junctions by 50% when compared to CLG's Accredited Construction Details.
- Efficient independent heating systems will be provided, with time & temperature zone control. These will allow the eventual occupants to exercise maximum control over their heating system and thus reduce energy consumption.
- Energy efficient lamps will be installed in each light fitting.
- Water consumption is now included in the calculation of a property's energy consumption. Thus each property will have a maximum internal water consumption of 105 litres per person per day.
- Whole house mechanical ventilation with heat recovery (Greenwood Fusion 2) will be installed in each property. This system recycles the waste heat generated in wet rooms to condition other areas of a property, thus reducing a property's energy requirement.

It is clear that the proposed strategy places a very great importance on the efficiency of a property's thermal envelop and internal building services. This emphasis is to be encouraged. It recognises that it is inherently more sustainable to invest resources in reducing a property's long term energy consumption in contrast to short term generation benefits.

2.2 Carbon Saving

This specification, together with a representative sample of the proposed house types were modelled in SAP 2009. SAP, or Standard Assessment Procedure, is the Government's approved methodology for the calculation of a building's energy requirement and CO₂ emission rate.

Table 2 – Calculated Emissions Rate

House Type	Description	TER (kg/m ² /year)	DER (kg/m ² /year)	Saving
D1735	Detached 2.5 storey	16.51	14.62	11.52%
D1536	Detached 2 storey	17.96	15.28	14.90%
P736 - End	Semi/end terrace 2 storey	18.31	15.27	16.60%
P736 - Mid	Terraced 2 storey	16.23	14.11	13.10%
Ground Floor Flat	Ground floor flat	18.71	16.09	14.00%
Mid Floor Flat	Mid floor flat	15.60	13.70	12.20%
Top Floor Flat	Top floor flat	17.94	15.38	14.30%

The table above confirms that significant carbon savings are achieved, with the lowest calculated saving being equivalent to an 11.52% reduction over Building Regulations 2010/CSH Level 3. The emission reductions calculated are a result of proposals which endeavour to achieve long term reductions in energy usage which in turn produce a carbon benefit. Because these reductions are achieved through the performance of the building fabric they can credibly be described as **permanent**. In addition to the betterment over Building Regulations, this fabric first energy strategy will produce energy cost savings into the future for the eventual occupants.

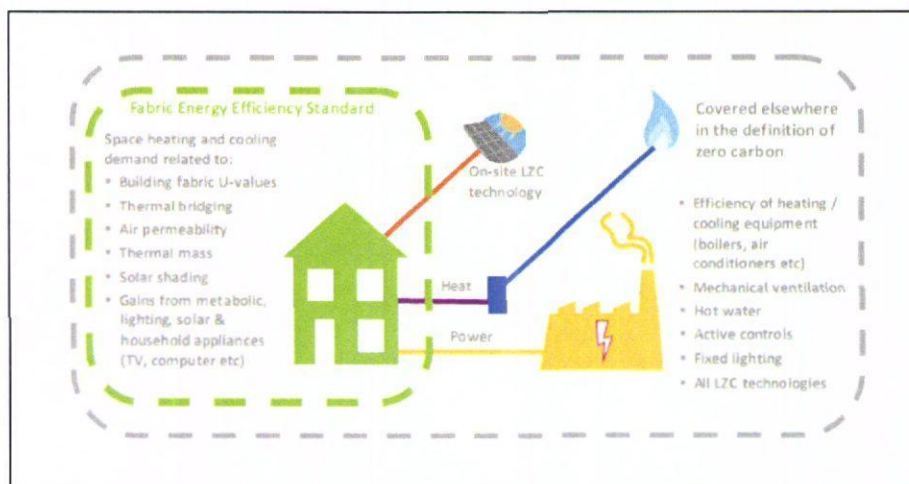
2.3 Fabric Energy Efficiency

In response to *Taylor Wimpey's* proposals to adopt a **fabric first** Energy Strategy, *FES* has calculated the Fabric Energy Efficiency of a sample of house types to determine if a high level of sustainability is achieved against this standard.

The FEE standard is a comparatively new measure of assessment. The standard was developed by the Zero Carbon Hub as part of their deliberations in determining the definition of "Zero Carbon". The FEE of a building measures the amount of energy required to heat and cool its internal space. Issues such as fabric u-values, solar gain, thermal mass, thermal bridging and air permeability are assessed in the calculation. It is important to note that issues such as space heating systems and renewable technologies are excluded. Thus the FEE standard gives a true measure of a property's inherent energy efficiency and is not influenced by expensive trade-offs.

The Zero Carbon Hub has set minimum FEE standards in their proposed definition of Zero Carbon. Furthermore it has been suggested that the proposed 2013 amendments to Part L in 2013 will include minimum FEE standards. The CSH Nov 2010 Technical Guidance includes suggestions as to what these standards will be.

Fabric Energy Efficiency Standard



The FEEs of a sample of the proposed house types at Phases 3-4, Dukes Meadow were calculated using SAP 2009. The table below details the calculated results and provides a comparison against the proposed FEE standards suggested for Part L 2013.

Table 3 – Calculated FFE

	Calculated FEE (kWh/m ² /year)	Proposed 2013 FEE (kWh/m ² /year)
D1735	48.19	52.00
D1536	50.15	52.00
P735 - End	40.37	52.00
P735 - Mid	34.63	52.00
Ground Floor Flat	36.62	43.00
Mid Floor Flat	24.97	43.00
Top Floor Flat	32.65	43.00

The calculated figures in Table 3 clearly exceed the suggested minimum FEE standards for Part L 2013 and thus a high and demonstrable level of fabric energy efficiency is achieved. This is a robust validation of the proposals included in *Taylor Wimpey's* development proposals.

3 Conclusions

FES was instructed by *Taylor Wimpey* to assess the carbon saving potential of the proposed fabric and internal building services specification for the site known as Phases 3-4, Dukes Meadow. The specification has been developed in response to the sustainable design and construction aspirations of *Havant Borough Council* and *Winchester City Council*.

Taylor Wimpey has opted to develop an enhanced **fabric first** energy strategy which will achieve significant reductions in CO₂ emissions when measured against the standards of the Building Regulations 2010 and Code for Sustainable Homes Level 3. The strategy has been selected in preference to an LZC centred solution. This preference can be justified on a number of grounds:-

- The CO₂ reductions calculated are permanent and will persist for the lifetime of the development.
- The reductions calculated are not dependent on the efficiency of lifespan of bolt-on technologies.
- The eventual emissions footprint of the development will be entirely determined by the lifestyles and habits of the owner/occupiers. By designing a sustainable solution into the fabric of each property it is felt that the anticipated energy reductions will be dependent on few other factors and thus the calculated reductions are realisable and permanent. This outcome is not achieved with a LZC centre strategy.

Furthermore, it can be stated that the preferred strategy is in line with the current direction of national policy: long term energy reduction is preferable to short term energy generation. It should be noted that both strategies reduce a development's reliance on national resources (in particular gas and electricity). However developers should adopt a strategy which reduces a development's "resource appetite" in the long term. This emphasis has been approved by Building Regulations 2010, the Code for Sustainable Homes and the future definition of Zero Carbon:

As part of our assessment of the preferred carbon reduction strategy, the DERs of a representative sample of house types were calculated. Our calculations determined that reductions in the range of 11-16% are achievable and thus *Havant Borough Council's* and *Winchester City Council's* benchmark measure of CSH Level 3 will be comfortably exceeded. In addition to this assessment the Fabric Energy Efficiencies of the sample of house types were calculated and found to be lower than those anticipated for Part L 2013. This outcome represents a robust demonstration of the full potential of the energy strategy.

In conclusion, the proposed Phases 3-4 Dukes Meadow Carbon Reduction Strategy adheres to best practice guidance and exceeds the aspirations of both local authorities. We

therefore recommend the adoption of the proposed strategy by *Taylor Wimpey* and its approval by *Havant Borough Council* and *Winchester City Council*.