STUDIO11
architecture

PETERBOROUGH ROAD, CROWLAND
VARIATION OF CONDITION REPORT

for

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1.0 Introduction

1.1 This report has been prepared by Studio 11 Architecture on behalf of Ashley King (Developments) Ltd to demonstrate that the 'fabric-first' approach taken by the developer meets and exceeds the requirements set out in policy SG7 – Energy Efficiency of the South Holland Local Plan 2006.

1.2 This report has been produced by Kristopher Baxter a Chartered Architectural Technologist, an On Construction Domestic Energy Assessor and a Certified Code for Sustainable Homes Assessor.

1.3 The calculations within this report are based on the Standard Assessment Procedure. The Standard Assessment Procedure (SAP) is adopted by Government as the UK methodology for calculating the energy performance of dwellings.

The calculation is based on the energy balance taking into account a range of factors that contribute to energy efficiency:

- Materials used for construction of the dwelling
- Thermal insulation of the building fabric
- Ventilation characteristics of the dwelling and ventilation equipment
- Efficiency and control of the heating system(s)
- Solar gains through openings of the dwelling
- The fuel used to provide space and water heating, ventilation and lighting
- Energy for space cooling, if applicable
- Renewable energy technologies

The calculation is independent of factors related to the individual characteristics of the household occupying the dwelling when the rating is calculated.

1.4 The SAP rating is based on the energy costs associated with space heating, water heating, ventilation and lighting, less cost savings from energy generation technologies. It is adjusted for floor area so that it is essentially independent of dwelling size for a given built form. The SAP rating is expressed on a scale of 1 to 100, the higher the number the lower the running costs.

2.0 Planning Policy

2.1 Current policy within the South Holland Local Plan (2006) states:

Policy SG7 - Energy Efficiency

> *Development proposals will be encouraged where they are designed to provide maximum energy efficiency, through site layout and orientation, through the layout and design of individual buildings, including maximizing solar gain especially for residential buildings, and where they make full practical use of energy from renewable resources.*
>
> *All development with a floor space of 1000 sq. m. or more, or 10 or more residential units, will be required to demonstrate good practice in energy efficiency and to incorporate renewable energy production equipment to provide at least 10% of its predicted energy requirements.*

2.2 This is reflected within the issued planning permission H02-0100-15 (See Appendix A) where condition 4 states:

A minimum of 10% of the predictable energy needs of the development hereby permitted shall be met through on site renewable energy production equipment in accordance with details that shall be submitted to and approved in writing by the Local Planning Authority before the commencement of development. The details and equipment so approved shall be provided and made operational proper to the first use of the development hereby permitted and thereafter 10% of the energy needs of the development shall be met through on site renewable energy production equipment.

2.3 It is felt that whilst this was an appropriate condition to impose on new developments when the Local Plan was adopted in 2006, recent changes to the philosophy for energy conservation within the construction industry have changed. It is now felt that a 'fabric-first' approach should be the first step in conserving energy within buildings. Prevention of the creation of Carbon Dioxide emissions rather than mitigation measures is seen as a more appropriate approach.

This is the approach taken by Ashley King (Developments) Ltd and as such section 3 of this reports demonstrates their approach and how that the 'fabric first' approach can effectively reduce the amount of carbon dioxide produced by the building over its life rather than relying upon renewable technologies of a finite lifespan.

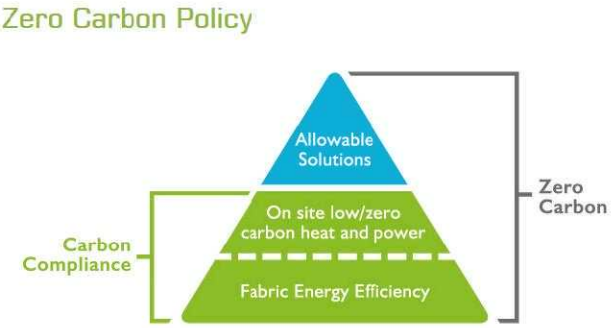
3.0 Developers 'Fabric First' Approach

3.1 Current South Holland District Council policy requires that on sites of 10 or more residential incorporate renewable technologies to provide at least 10% of its predicted energy requirements.

This policy effectively forces the use of renewable technologies such as photovoltaic modules, solar water heating and heat pumps to comply with the imposed condition. It doesn't however take into account the limited life of these technologies and that they have a reduced efficiency from the day in which they are installed through to the day that they are replaced. Current thinking on these technologies is that they will require replacement within 25 years of the date of installation.

3.2 The 'fabric first' approach seeks to improve the energy efficiency of buildings before the introduction of renewable technologies. This is achieved by maximising the thermal performance of the building envelope and ensuring the building elements work together to be as efficient as possible. A buildings energy efficiency is influenced by three dynamics, u-values, air tightness and thermal bridging. These elements must all work together to produce a tight, thermally efficient structure which will last for the life of the building with little or no maintenance.

This approach is supported by both the *Zero Carbon Hub* and the *South Holland District Council Building Control* department. The Zero Carbon Hub describe Fabric Energy Efficiency as the core base on which to be built upon to achieve Zero Carbon



Extract from Zero Carbon Hub website demonstrating the process for achieving Zero Carbon in new dwellings

3.3 Indeed the recent revisions to Part L1 (2013) of the Building Regulations now include the provision of a Target Fabric Energy Efficiency Standard which prevent the use of renewable technologies to solely comply with Building Regulations by mitigating against a poorly constructed building fabric. Ashley King (Developments) Ltd proposes to use the 'fabric first' approach when constructing all dwellings on this site and section 4 of this report demonstrates that the dwellings built will in fact make a significant carbon saving when compared to a building constructed in 2006 without the need for provision of renewable energy production equipment providing at least 10% of its energy requirements. This will be achieved by increasing insulation levels and improving air tightness as well as thermal bridging detailing.

4.0 SAP Comparison – Renewables to 'Fabric First'

4.1 The design stage SAP calculations for the site have been produced and it reveals plot 38 to be the 'worst performing' dwelling on the site in relation to the SAP calculation. Therefore this plot has been used as the base dwelling for the demonstration calculations.

4.2 Appendix B of this report is a demonstration SAP 2005 calculation for plot 38 which shows building regulation compliance as well as compliance with the Local Plan 2006 Policy SG7. Table 1 below shows the breakdown of the calculation for the use of LZC technologies.

Ene 7 - Low or Zero Carbon (LZC) Technologies

Reduction in CO2 Emissions

	%	kg/m²/year	
Standard Case CO2 emissions		50	
Actual Case CO2 emissions		44.2	
Reduction in CO2 emissions	11.6		
Credits awarded for Ene 7 = 1			

Technologies eligible to contribute to achieving the requirements of this issue must produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

The following requirements must also be met:

- Where not provided by accredited external renewables there must be a direct supply of energy produced to the dwelling under assessment.
- Where covered by the Microgeneration Certification Scheme (MCS), technologies under 50kWe or 300kWth must be certified.
- Combined Heat and Power (CHP) schemes above 50kWe must be certified under the CHPQA standard.
- All technologies must be accounted for by SAP.

CHP schemes fuelled by mains gas are eligible to contribute to performance against this issue. Where these schemes are above 50kWe they must be certified under the CHPQA.
It is the responsibly of the Accredited OCDEA and Code Assessor to ensure all technologies use in the calculation are appropriate before awarding credits.

Table 1 – Extract from Code for Sustainable Homes Report demonstrating that this calculation is in compliance with Ene 7 of the Code for Sustainable Homes and demonstrates that with the provision of 0.32kWp of Photovoltaic panels there is a 11.6% reduction in CO2 emissions from the dwelling

You will note that this calculation produces a Dwelling Emission Rate of 26.36kg/m²/year of CO2 based on a SAP 2005 calculation which would have been the current version of SAP when the Local Plan 2006 was adopted.

4.4 Appendix C of this report is a demonstration SAP 2012 calculation (current version) for plot 38 which shows building regulation compliance as well as compliance with the Local Plan 2006 Policy SG7. Table 2 below shows the breakdown of the calculation for the use of LZC technologies.

Ene 7 - Low or Zero Carbon (LZC) Technologies

Reduction in CO2 Emissions

	%	kg/m²/year	
Standard Case CO2 emissions		43.9	
Actual Case CO2 emissions		38.5	
Reduction in CO2 emissions	12.3		
Credits awarded for Ene 7 = 1			

Technologies eligible to contribute to achieving the requirements of this issue must produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

The following requirements must also be met:

- Where not provided by accredited external renewables there must be a direct supply of energy produced to the dwelling under assessment.
- Where covered by the Microgeneration Certification Scheme (MCS), technologies under 50kWe or 300kWth must be certified.
- Combined Heat and Power (CHP) schemes above 50kWe must be certified under the CHPQA standard.
- All technologies must be accounted for by SAP.

CHP schemes fuelled by mains gas are eligible to contribute to performance against this issue. Where these schemes are above 50kWe they must be certified under the CHPQA.
It is the responsibly of the Accredited OCDEA and Code Assessor to ensure all technologies use in the calculation are appropriate before awarding credits.

Table 2 – Extract from Code for Sustainable Homes Report demonstrating that this calculation is in compliance with Ene 7 of the Code for Sustainable Homes and demonstrates that with the provision of 0.32kWp of Photovoltaic panels there is a 12.3% reduction in CO2 emissions from the dwelling

You will note that this calculation produces a Dwelling Emission Rate of 21.36kg/m²/year of CO2 considerably improving on the SAP 2005 calculation within Appendix B.

4.5 Appendix D is the actual SAP 2012 calculation for plot 38 which shows building regulation compliance without the need to introduce renewables on the dwelling. Table 3 below shows the breakdown of the calculation.

Ene 7 - Low or Zero Carbon (LZC) Technologies

Reduction in CO2 Emissions

	%	kg/m²/year	
Standard Case CO2 emissions		43.9	
Actual Case CO2 emissions		41.3	
Reduction in CO2 emissions	5.92		
Credits awarded for Ene 7 = 0			

Technologies eligible to contribute to achieving the requirements of this issue must produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC of t European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

The following requirements must also be met:

- Where not provided by accredited external renewables there must be a direct supply of energy produced to the dwelling under assessment.
- Where covered by the Microgeneration Certification Scheme (MCS), technologies under 50kWe or 300kWth must be certified.
- Combined Heat and Power (CHP) schemes above 50kWe must be certified under the CHPQA standard.
- All technologies must be accounted for by SAP.

CHP schemes fuelled by mains gas are eligible to contribute to performance against this issue. Where these schemes are above 50kWe they must be certified under the CHPQA.
It is the responsibly of the Accredited OCDEA and Code Assessor to ensure all technologies use in the calculation are appropriate before awarding credits.

Table 3 – Extract from Code for Sustainable Homes Report demonstrating that this calculation is not in compliance with Ene 7 of the Code for Sustainable Homes

You will note though that this calculation produces a Dwelling Emission Rate of 21.10kg/m²/year of CO2, considerably improving on the SAP calculation which incorporates photovoltaic panels within Appendix C.

4.6 Comparison of the above Dwelling Emission Rate demonstrates that the current 'fabric-first' approach to compliance with Building Regulations reduces by some margin the amount of Carbon Dioxide produced by each dwelling on the site and therefore the addition of renewable technologies is not required.

5.0 Conclusion

5.1 Section 4 of this report has demonstrated that in accordance with current best practice the 'fabric first' approach to constructing buildings does produce a more energy efficient building over its life, than simply adding renewables to a generation standard.

It also demonstrates that the dwellings constructed on the Peterborough Road, Crowland site will produce less Carbon Dioxide on an annual basis than dwellings constructed to meet South Holland District Council Policy SG7 of the Local Plan (2006).

The current Government through the Housing Standards Review and the recent abolition of the Code for Sustainable Homes has made it clear that it considers Housing Standards including energy efficiency should be dealt with through the evolving Building Regulations and not the planning system. Only where a demonstrable need is shown should standards beyond the current Building Regulations be imposed on developments.

The enclosed calculations demonstrate that the dwellings constructed on the Peterborough Road, Crowland will be highly energy efficient and indeed will be more energy efficient than dwellings constructed in accordance with Policy SG7 of the Local Plan 2006. On that basis it is felt that this application to vary condition 4 should be approved without delay.

6.0 Appendix A – Planning Permission

7.0 Appendix B – SAP 2005 Demonstration Calculation

8.0 Appendix C – SAP 2012 Calculation wit Renewables

9.0 Appendix D – SAP Calculation Plot 38

10.0 Appendix E – Site SAP Calculations