Sustainability Report
Energy Statement

Chatburn Road, Clitheroe

May 2016

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1 Introduction

This report has been prepared on behalf of McDermott Homes & NHS property Services Ltd. This report considers the issues surrounding sustainable construction with regards to the proposed development at Chatburn Road, Clitheroe, which sees the construction of 60 dwellings consisting of a mix of detached, semi-detached and terraced dwellings. The report in particular considers and evaluates the measures incorporated into the design of the development to reduce the predicted CO_2 consumption of the site over 2013 building regulations under the SAP2012 methodology.

The following documents were considered when formulating the report.

National Planning Policy Framework 2012 – The NPPF strengthens the emphasis on sustainable development and encourages Local Authorities to adopt standards consistent with the Government's zero carbon building policy and other nationally described standards.
Building Regulations Part L1A 2013 – Approved Document L1A Conservation of Fuel and Power sets minimum energy efficiency and fabric efficiency standards for new build dwellings.

2 Sustainable Design

The building fabric, the building services and the management of a building broadly determine the energy use of a building. In understanding this, design teams can take measures to advance sustainable design from the earliest stages of a development. However sustainability is not limited to issues concerning energy consumption. Material selection, the protection of local environments, addressing flood risk and the health and wellbeing of future occupants are all issues requiring consideration. Addressing all these issues in an integrated and intelligent manner will result in truly sustainable developments.

2.1 Material Selection

Significant amounts of energy and natural resources are consumed in the production, transportation and disposal of building materials. Two issues are of significant importance in the procurement of materials: the environmental impact of materials and the sourcing of materials. McDermott Homes is dedicated to taking pro-active measures to addressing these issues.

Table 1- Green Guide Rating of Specification

BRE Green Guide Rating
External Wall A+
Ground Floor B
Intermediate Floor C
Roof A+
Internal Walls A
Windows A

The developer will choose materials which have a lesser environmental impact. This will be implemented during the procurement process. Suppliers will be obliged to produce Environmental Management System certificates covering the sourcing and production of materials. Timber or timber composite products will be sourced from responsible sources. Suppliers will be obliged to provide full Chain of Custody Certificates right through the supply chain; from the initial timber yard, manufacturing process, transformation and distribution. Secure certificates must be produced by valid accrediting bodies – FSC, PEFC, CSA, SFI & MTCC.

2.2 Flood Risk

Planning Policy Statement 25 and the Flood and Water Management Act 2010, directs developers to avoid, reduce and delay the discharge of rainfall to public sewers and watercourses through the use of Sustainable Urban Drainage Systems (SUDS) with the aim of protecting watercourses and reducing the risk of localised flooding and pollution.

This obligation is taken seriously:

- Where possible, impermeable surfaces are kept to a minimum, thus allowing for maximum infiltration (e.g. permeable paving)
- Sustainable Drainage Systems will be incorporated where feasible and will be designed in line with the guidance published in the *CIRIA SUDS Manual (2007)*

2.3 Pollution during Construction

The contractor will be required, under the terms of their contract, to minimise dust, fumes, discharges and any other form of pollution on site, in line with best practice policies:

· The Control of Dust and Emissions from Construction & Demolition: Best Practice Guidance.

· PPG 5

· PPG 6

The sustainable management and monitoring of waste generated during the construction of a development is a major concern to local and national planners. Due to the size and anticipated construction costs the developer will not be required by regulations to implement a Site Waste Management Plan. Furthermore the site will be too small to allow the successful segregation of waste on site in line with Best Practice policies. However the contractor will be obliged to adopt many of the principles of the waste hierarchy:

· Accurate specifications of materials and volumes.

· Recycling and re-use of waste on site.

· Arrange take back schemes with suppliers.

· Instruct a licensed waste contractor to segregate site waste for recycling.

2.4 Health and Wellbeing

In achieving ever stricter levels of energy efficiency, it is important that designers do not lose sight of the fact that they are building homes that people can live in and not just occupy. This is an integral part of sustainability, and a hugely important consideration if the population (and the market place) is to tolerate the sustainability agenda.

While it is quite difficult to measure or even quantify health and wellbeing, the following measures are a sample of the efforts made by McDermott Homes to address this issue.

- The proposed properties will have sufficient living/dining space. While this is obviously a marketing consideration, it does fall within this category.
- The principal living rooms have sufficient glazing to allow natural light to penetrate into the rooms. Numerous studies have shown this to be beneficial to the general health and happiness of occupants. Daylighting calculations can be undertaken to demonstrate that living rooms, dining rooms, kitchen and home offices receive adequate daylighting.
- The property will benefit from a garden or private space for recreation. This will take the form of secure rear gardens to each property.
- The property has dedicated internal recycling facilities and accessible external storage in line with the local council waste and recycling collection scheme.

2.5 Water Efficiency

The average person consumes some 150 litres per day; this represents an annual increase of 1% since the 1930s. Despite the United Kingdom's wet and temperate climate, climate change will most probably result in an increase in the occurrence of drought orders and hosepipe bans. With this in mind, it is not difficult to appreciate that within the next few decades the UK (particularly the South East) will face regular water shortages. In response to this water efficiency has gained equal billing, alongside energy efficiency. The following are the principle policy drivers.

- The new Approved Document G (2010) for the first time restricts new build dwellings to a maximum consumption of 125 litres per person per day. The Water Efficiency

Calculator of New Dwellings also includes an allowance for external water use.

- The Code for Sustainable Homes was first introduced in April 2007. Included within the Code are mandatory water efficiency standards. Homes constructed to Code for Sustainable Homes Level 3 and 4 must achieve a maximum internal water consumption of 105 litres per person per day. Dwellings constructed to Code Levels 5 and 6 must achieve an internal water consumption of 80 litres per person per day.
- Part L 2010 and SAP 2009 will take account of Part G and water consumption in the calculation of the forecasted energy demand of the dwellings.

3 Energy Use

McDermott Homes have reviewed the proposed energy strategy of the development and assessed the potential of various renewable or low carbon technologies to achieve a reduction in forecasted CO_2 consumption under SAP2012.

3.1 Determining the Base Line

Before the potential of various technologies can be assessed, it is first necessary to calculate the base line energy consumption of the development and hence the target reduction. The proposed dwellings were modelled in SAP2012 to determine the energy consumption and corresponding CO_2 emissions of the development. Standard Assessment Procedure, or SAP, is the government's approved methodology for the calculation of energy consumption and CO_2 emissions for new build dwellings.
In line with best practice the proposed energy strategy for Chatburn Road Clitheroe will adhere to theprinciples of the Energy Hierarchy;

- **Be Lean** – reduce the need for energy.
- **Be Clean** – supply and use energy in the most efficient manner.
- **Be Green** – supply energy from renewable sources.

The Energy Hierarchy

Adhering to the principles of the Energy Hierarchy has a number of benefits. The principle benefits are;

- By reducing the energy requirement of each dwelling the renewable requirement shrinks in proportion. This has obvious cost benefits.
- The sustainable credentials of each development are enhanced and are not validated by simply bolting on expensive renewable equipment. By focusing on the fabric performance and the provision of efficient heating systems each dwelling is intrinsically "green".

3.2 Fabric & Building Services Specification

The details below provide a summary of potential measures that can be incorporated by McDermott Homes into the design and construction of the development to reduce its energy requirement and carbon footprint. Within the Energy Hierarchy these measures are classified as **lean** and **clean**. They **permanently** reduce the energy requirement of each property.

· Walls can account for as much as 40% of a property's total heat loss. As such a thermal block with high performance PIR insulated board within the cavity should be

considered.
· Roofs typically account for 25% of a property's total heat loss. As such the roof construction will incorporate multiple layers of mineral quilt.
· The glazing specification could achieve a u-value of 1.20W/m^2K. This is equivalent to a 33% reduction over the minimum standard of Part L.
· Heat loss at junctions can account for a significant percentage of a property's total heat loss. This proportion is expected to increase as the thermal performance of external elements increase. As such the incorporation of *Constructive Details* thermal bridging construction details into the design of each house type will be beneficial. This produces a typical Y-value of 0.04-0.05 and is equivalent to a 50% betterment over standard Accredited Construction Details.
· Efficient independent heating systems could be incorporated into the design of each property. The incorporation of full time and zone controls with external sensors will allow future occupants to exercise full control over their energy usage with ease.
· Intelligent design and robust on-site construction techniques will ensure a low air permeability rating. A target design air permeability of 5.00 $m^3/(h.m^2)$ for all properties could be achieved.

4 Proposed Strategy

4.1 Enhanced Fabric and Building Services Specification

McDermott Homes proposes a series of fabric and building service enhancements that exceeds the minimum requirements of Part L. By placing a significant emphasis on the performance of the fabric of each property, reductions in energy and carbon will be achieved. The following table details the anticipated fabric efficiency and building services standards to be incorporated into the design.

Table 4 – Enhanced Specification Summary & Comparison

Element Part L 2012 Enhanced Specification
Wall 0.30W/m^2K 0.21 W/m^2K
Roof 0.20W/m^2K 0.10 W/m^2K
Floor 0.20W/m^2K 0.14 W/m^2K
Glazing & Doors 1.80W/m^2K 1.0 & 1.20 W/m^2K
Air Permeability 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;
· Standard construction details typically produce a dwelling Y-value of 0.06-0.08.
· Efficient independent heating systems will be provided, with time and 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 adhere to the requirements of Approved Document G– maximum internal water consumption of 125 litres per person per day.

In order to comply with the planning requirements, it is necessary for this development to show measures have been taken to ensure high energy efficiency and best practice with regards to energy consumption have been considered and incorporated into the design and

specification. The table above confirms that a carbon reduction in excess of building regulations compliance will be achieved through the use of enhanced fabric and services specifications.

5 Evaluation

McDermott Homes have reviewed the performance of the proposed Energy Strategy for the development at Chatburn Road, Clitheroe. The energy strategy was detailed previously but can be best summarised as follows;

· McDermott Homes proposes an energy strategy which addresses the two policy concerns of sustainable design and construction: climate change and energy security.

· McDermott Homes has proposed a fabric first strategy which aims to achieve long term reductions in CO_2 emissions and climate change.

· The proposed fabric and building services specification will permanently reduce emissions by approx. **2.5%**. This is a significant betterment and demonstrates that the proposed development will have a reduced reliance on national resources (gas and electricity)

After detailed analysis we can conclude that the preferred energy strategy adheres to the principles and aspirations of sustainable design and construction as advanced by national and local government and the house building industry. We therefore recommend the adoption of the preferred energy strategy by McDermott Homes.