LIFT, sustainability and low carbon:
Blue Bell Lane Primary Care Centre, Huyton, Merseyside

An innovative, sustainable, low carbon design approach

Profile
Blue Bell Lane Primary Care Centre has been designed to achieve an Excellent BREEAM rating and additionally explores how very low energy consumption and carbon dioxide emissions can be achieved through the adoption of an integrated design approach.

The building is expected to have exemplary low CO₂ output and is designed to respond to the likely scenario for a future de-carbonised energy supply.
Meeting community needs
Blue Bell Lane Primary Care Centre, commissioned by the Knowsley PCT, has been developed in the context of the now mandatory 'Excellent' requirement for BREEAM and with a view to driving the energy use down by a combination of passive design, highly efficient services and renewable energy - towards zero carbon.

The scheme provides a range of services including four GP practices, PCT services and a pharmacy to serve the community in North Huyton. It is a high profile site on one of the major approach roads into Liverpool and, with its corner location on a busy junction, will have a high visual impact.

Sustainability – our response
Given the ambition to explore continuous improvements, it was a natural step to pursue leading sustainable strategies expressed from the outset of the project in mid 2007 in the form of a ‘Sustainability Primer’ which identified the key issues available to all the members of the project.

The key issues included energy and carbon dioxide, achieving comfort in summer, water use, bio-diversity, materials and resources.

Environmental assessment
It was determined that the scheme would be the subject of a BREEAM and it was decided to anticipate the new Health version and ‘Excellent’ requirement and develop the Blue Bell scheme with this in mind. As a result, a BREEAM assessor was introduced onto the project team from the outset and a series of reviews enabled the team to understand and embed the necessary requirements.

A number of key factors emerged which included: transport accessibility, local amenities, facilities for cyclists and the provision of a green transport plan; a reduction in water consumption and water re-cycling; the use of materials rated in the Green Guide to Specification and improvements in the ecology of the site.

Good environmental design is a key element of BREEAM and this aligned with the intention to design a building which will provide a comfortable environment while achieving exemplary, low energy performance.

Environmental design
The development of the scheme was informed by research and thermal analysis and adopted a ‘mean, lean, green’ approach with the first priority given to the design of a building envelope which minimises energy consumption. Given its location by a junction on a busy dual carriageway and issues of privacy and security, the building will generally not have opening windows but adopts ‘passivhaus’ standards with high insulation, air-tightness and controlled mechanical ventilation with high efficiency heat recovery. Windows are sized to maximise daylight and enable artificial lighting energy to be controlled and reduced. The accommodation is ‘wrapped’ around a central, naturally ventilated atrium over the building’s two floors.

Achieving comfortable conditions in summer requires a combination of excluding unwanted solar gains, good ventilation and the incorporation of thermal mass - in this case the adoption of masonry internal construction. On the roof, a combination of ballast and a green roof helps to provide the time lags required to prevent overheating during occupied hours. The building can be securely flushed with fresh air overnight to assist with cooling.

Key Deliverables
• A predicted energy requirement of only 7GJ/100m³/annum
• BREEAM Excellent rating
• Comfortable internal environments including summertime conditions
• All electric building with no site fossil fuels enabling a low to zero carbon future
• 10% on-site zero carbon contribution to energy requirement

Renewable energy
On tight, urban sites the choice of effective renewable energy technologies is limited. As a thermally efficient design the requirement for heating is significantly reduced and electrical demand proportionally higher. After analysis of a series of options including biomass boilers, bio-fuelled CHP and ground source heat pumps, it was decided to adopt air source heat pumps to provide all the heating and domestic hot water requirements. While not viewed as a renewable source by the local authority, whose requirement is for 10% provision, it nevertheless provides heat very efficiently, the requirement ultimately being satisfied by the adoption of solar panels for the domestic hot water and a vertical axis wind turbine.

The resultant system has no fossil fuel requirement and is totally electrically driven. Its carbon output has been reduced to approximately 24KgCO₂/sqm/annum equivalent to a predicted 7GJ/100m³/annum operating over 3750 hours annually. As the supply side is progressively ‘decarbonised’ the CO₂ output will continue to fall.

Improving performance
The calculations assume a level of power use by the occupier equivalent to 40% of the total energy consumed. We believe that by the purchase of low energy equipment and effective local management this demand will, in practice, be reduced leading to improved overall performance. The scheme is due to commence on site early in 2009, the lessons learnt from its design now informing future projects.

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