The Blue Bell Centre

Roger Burton      nvirohaus
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• one of a series of LIFT projects delivered in a framework for Renova
• provides a range of primary care services - GP practices, community healthcare, pharmacy. 2,500 sq m
• conceived in 2006, a BREEAM excellent scheme
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- high profile site
- a busy junction on a major route into Liverpool
- need to address noise and pollution
- a framework seeking continuous improvement
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PCT services, pharmacy, and shared accommodation at ground level

Four GP practices at first floor
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design strategy

- compact form – good surface to floor area ratio
- high performance fabric
- natural ventilation and mechanical ventilation with heat recovery
- solar shading
- thermal mass
- night time cooling
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occupier satisfaction

• A BUS survey was undertaken - generally
  Blue Bell is very well perceived by
  occupants, scoring either close to or better
  than benchmark values with few issues
• Blue Bell scored highly in the ‘Overall
  comfort’ section but thermal comfort, in
  both the winter and particularly the
  summer, could be improved.
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the gap................

- **EPC projecting a B rated performance**
- **in practice, while better than the benchmarks and peer group performance, only achieving E rating**
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the study

• initial energy analysis identified space heating and cooling, DHW and ventilation as the bulk of demand

• so the focus of study and the area with greater potential for energy saving

• main issues – heating and ventilation strategy, domestic hot water and building operation and management

end use SBEM heating + DHW 28%
lighting + SP 61%

logbook 27%
69%

measured 2012 – 14
48%
42% (incl. small power)
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heating and ventilation

- *roof mounted air source heat pumps*
  provide space heating
- *fresh air by mechanical ventilation and openable windows, with natural ventilation in the core waiting areas*
- *air handling unit in roof plant room with supply and extract, heating and cooling coils, heat exchanger, dampers*
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heating and ventilation - issues

• confusion about the installation –
  dampers specified but only one installed
  – no summer bypass
• as a result free cooling was not available
  and reliant on chillers
• information about operation of dampers
  not available on BMS
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domestic hot water

- *domestic hot water is provided by a combination of a solar thermal system, dedicated heat pump, immersion heater*
- *solar system forms part of the 10% renewable energy requirement*
- *in practice the study determined that almost 100% of the demand satisfied by the immersion heater*
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domestic hot water - issues
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domestic hot water - issues

• unresolved design and poor integration of system and components

• almost no BMS control and no metering so limited operational information

• oversized storage capacity using guidance for healthcare buildings to satisfy relatively low demand
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domestic hot water - issues

- Use of solar system driven by requirement to achieve renewable energy target
- Low demand, system performance and storage losses resulted in higher energy consumption
- An instantaneous design would have been a simpler more effective solution
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lighting

• All lighting is low energy with the intention to maximise daylighting in occupied areas and the central space using control sensors.

• In many rooms off the central core, lighting is controlled by occupancy sensing. Manual switching is also an option.

• Sensors were ultimately omitted and the central space lighting manually controlled.
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BMS system

- complex environmental systems design - intended to be fully BMS controlled
- but systems not fully linked, some operation information and controls hidden from FM
- an ‘A’ type building has become a ‘C’ type resulting in performance penalties
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BMS system - issues

- O&M manual needed further development and detail of control philosophies
- perception of the BMS as a 'black box' – difficult to know what control routines are programmed, what they are doing and when they are operating
- distrust of optimisation routines led to inefficient operation
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Improving performance

- Progressive build up of data and better understanding of operation enabled the team to make interventions to improve performance, particularly over the heating season
- Over two years the energy demand was reduced by 26 per cent giving a saving of £11,544.17
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Improving performance
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Lessons learnt

• *This building does not operate as a typical healthcare building – its services and energy requirements are more similar to an office.*

• *Benchmarks used in early stage design need to be developed to include newer healthcare buildings like Blue Bell*
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Lessons learnt

• *It is thought that the basic environmental design strategy was sound but engineering systems and their controls were mismatched and complex.*

• *The procurement route, with services design based on a performance specification, led to a separation of responsibilities in several areas with resultant performance problems.*
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Lessons learnt

- **Sustainability requirements from planning, Part L, and BREEAM** can often result in more complex energy systems being installed in a new building, such as at Bluebell.

- **Where this is the case, a special focus needs to be applied to their control and integration with other control systems.**
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Lessons learnt

• **Sole reliance should not be placed on BMS, or its optimisers, to operate a building effectively.** Better BMS visualisation and accessibility are required

• **The O&M manuals needs to have a more complete description of how systems are controlled, how they were set up, why and when to change**
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Lessons learnt

• Package systems, like the AHU and solar thermal systems at Blue Bell, need to be fully integrated with the BMS, with control through the BMS supervisor

• The specifications were light on specifics around BMS and sub-metering requirements which would have better helped to interpret performance and improve management.
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Lessons learnt

• Overall, the ‘fabric first’ approach sought should enable less complex engineering systems to be adopted – particularly important as future legislation will demand higher performance

• Keep it simple!