CASE STUDY

New Community Building – Over Haddon Village Hall

Figure 1. Over Haddon Village Hall

A new purpose built community facility to replace the existing village hall provided an opportunity for the parish to consider function, design and sustainability. Refurbishment of the old village hall had been considered but the fabric of the building was poor and heating was provided by 6 double bar heaters on the wall which provided less than adequate heating and for which the fuel bills were very high.

Central to the design brief of the new village hall was:

- Provision of a dual purpose hall
- To reduce the carbon footprint of the building.
- For the building to be as sustainable as possible.
- Provision of disabled toilet facilities and baby change.
- Better toilet and kitchen facilities.
- A design which reflected the design of the old hall on the footprint of the new building.
- A design in keeping with the area.
- Provision of green space to the front of the building.

The replacement village hall demonstrates the advantages of sustainable building design in terms of reduction in carbon emissions, running costs and water usage. It achieved an A rated Energy Performance Certificate and is a building of traditional design.

Features:
High levels of insulation
Thermostats and Monitor
Energy efficient lighting
Energy efficient underfloor heating
Energy efficient underfloor heating
Air source heat pumps
Solar photovoltaic panels
Rainwater harvesting

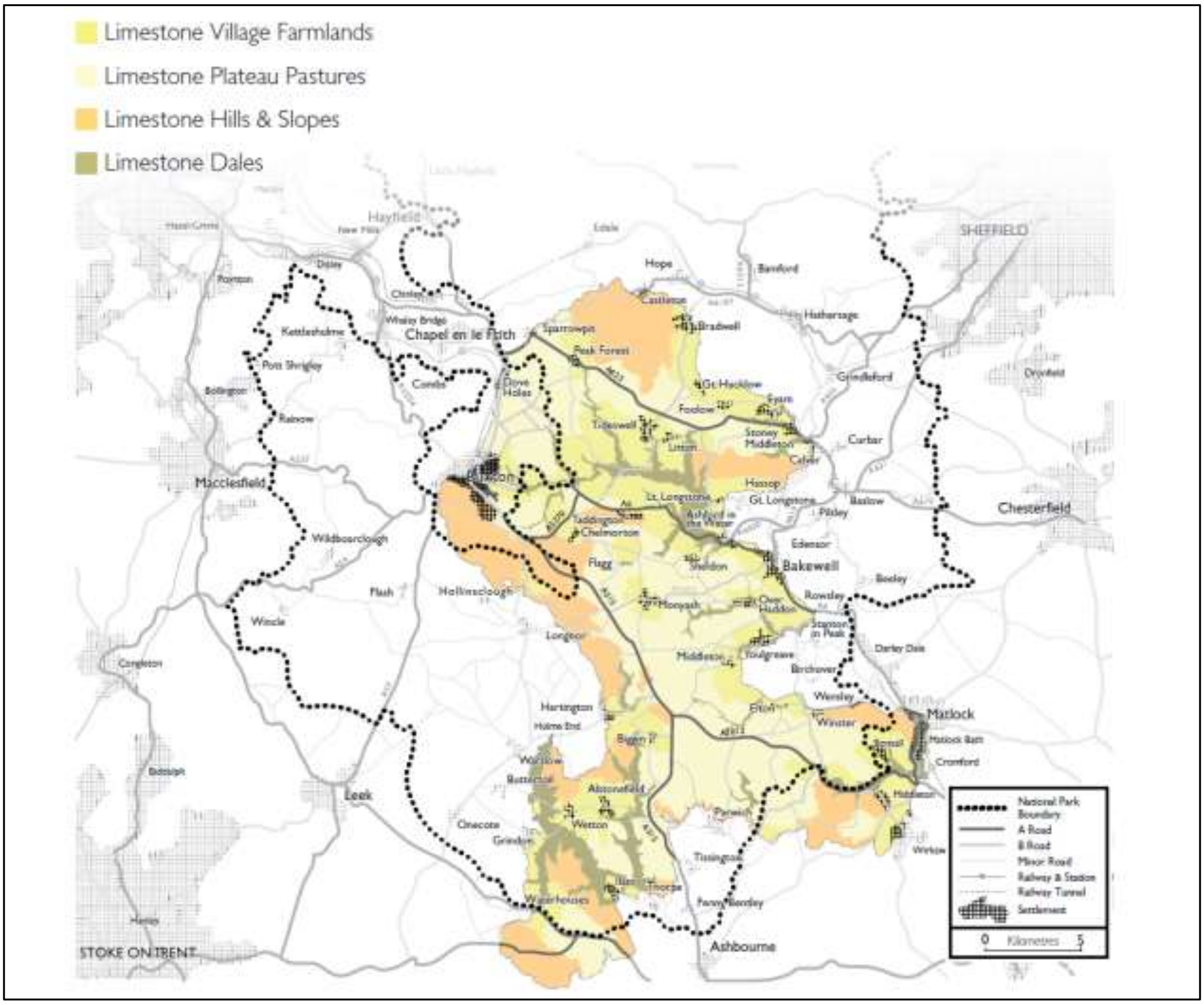

Figure 2. Landscape Character Types

The village hall stands prominently in the landscape of the Limestone Village Farmlands where the key characteristics are:

- A gently undulating plateau
- Pastoral farmland enclosed by drystone walls made from limestone
- A repeating pattern of narrow strip fields originating from
- medieval open fields
- Scattered boundary trees and tree groups around buildings
- Discrete limestone villages and clusters of stone dwellings
- Relict mine shafts and associated lead mining remains
- Localised field dewponds

Figure 3. Over Haddon Village

A new building with a high thermal mass was proposed to reduce carbon emissions and to improve the ambient temperature, in order to significantly reduce running costs. Energy efficient heating and lighting systems, renewable energy installation and rainwater harvesting were also proposed. The replacement of the former village hall provided an enhancement in its landscape setting; the design and massing is in keeping with other buildings in the street scene.

Figure 4 LED lighting

Benefits

Use of the village hall by the local community and others has increased since it was rebuilt because it now provides a light and comfortable environment.

Use of the heating system, using the air source heat pump and under floor pipe work, has been minimal because the ambient temperature of the building is high as a result of its design and insulation.

Rainwater harvested is used to flush the toilets, which saves on water bills. If there is insufficient rainwater a valve shuts off the harvesting system and water is fed from the mains.

The photovoltaic panels supply electricity to the building: any extra electricity produced is providing a useful source of income via the “Feed in” Tariff.

Figure 5 Solar photovoltaic panels

Figure 6 Monitor demonstrates benefits of system

<u>Lessons learned</u>

The replacement village hall has been grant funded both in terms of the building fabric and the low carbon and renewable energy installations. Had there been a limited budget for low carbon and renewable energy installations, the Energy Performance certificate for Over Haddon Village Hall shows how much can be achieved simply through careful design and insulation.

Originally a vertical bore ground source heat pump was specified instead of the air source heat pumps but a perched water table in the vicinity of the village hall meant that this was not feasible.

Figure 7 Air Source Heat Pump

The Energy Performance Certificate suggested that the energy performance of the building could be further improved. Recommendations in the short term, (less than 3 years) to improve the energy performance of the building included:

- Solar control measures such as the application of reflective coating or shading devices to windows.
- An optimum start / stop to the heating system.
- Replacement of T8 lamps with retrofit TS conversion kit.

Over Haddon Village Hall is a very good example of a low carbon building, which demonstrates that low carbon emissions can be achieved in a traditional style building.

The Target Emission Rate (TER) for the hall was 28.5 kg CO_2 / m^2 per annum, and the calculated Building Emission Rate (BER) was 11.6 kg CO_2 / m^2 per annum, 59% less that the Target Emission Rate. The Energy Performance Certificate for the building gave an Energy Performance Asset Rating of A7.

Comments from users of the hall:

“Great example of solar power in a ‘traditional style’ building.”
“Excellent new village hall and great that it is sustainable.”

Technical Details:

Insulation

Ground floor slab – underfloor heating pipes in 75mm screed on 75mm Eco – Therm Eco Versal in 125 mm dense concrete slab “U” value = 0.18.

Walls – 100 mm cavity filled with 100mm Dritherm cavity slab32 Ultimate “U” value = 1.27.

Roofs – 170 mm Eco Therm Eco Versal between trusses with 37.5mm Eco Therm Eco – liner under trusses. “U” value = 0.14.

Low Carbon and Renewable Energy Installations.
Mitsubishi 5 kW and 14 kW Ecodan heat pumps – Annual energy performance estimated to be 13333 kWh being the running time of the heat pump based on 2400 heating hours.
Sundog Energy Powerglaz (BP Solar Modules)
Solar photovoltaic integrated panels.
Estimated annual generation – 6502.00 kW

Monitoring and Controls
Heatmiser Touch Pad Controller – Underfloor Heating.
Heatmiser Netmonitor Programmable room thermostats.
Photovoltaic energy output / carbon reduction monitor

Rainwater Harvesting System
WPL system
Polythylene tank with lid.
Filter.
Pump and control module with 2011 (?) litre mans water tank with AB air gap, a pressure sensor, pump with integrated 3 way valve and float switch.