
Case Studies

An update on the SPD

By
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Prepared for
Leeds City Council



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1. Energy Research Building' (Page 12)

The building successfully attained an 'excellent' BREEAM rating in post construction assessment. The building achieves a low energy consumption through the use of energy efficient mechanical and electrical systems, concrete thermal mass wall fabric and solar shading devices on its facades. The building is rated B on energy efficiency (A+ being the highest rating). Other prominent features include lighting controls with presence detection, low energy fume cupboards and ventilation systems with thermal wheel heat recovery, low energy lift, and use of natural ventilation where possible and making use of the thermal mass of the structure. There is also a green roof on the outbuildings.



*Designed by Fairhurst Design
Group Ltd for Leeds University*

2. Innovate Green Office, Thorpe Park, Leeds (13)

Completed in 2007, the Innovate Green Office at Thorpe Park is a commercially viable, sustainable building. It was given the highest BREEAM Excellent rating (87.55%) ever given to a building in the UK in 2008 before other buildings surpassed it in 2014. The building has no renewable energy generation but boasts of its effective implementation of the passive design system and theories. This project epitomises what passive design can accomplish, starting from first principles - orientation, exploitation of thermal mass, optimisation of plan depth and building section to maximise daylight, and a heavily insulated envelope. It features a central atrium offering solar gains, solar shading and thermal mass, and saves over 25% of materials compared to what a conventional building could have used.



*Designed by Rio Architects for
Innovate Property*

3. York Environmental Centre (Page 14)

The centre is set in St Nicholas Fields Local Nature Reserve was opened in the year 2000. The Centre was built on a disused garbage site, it is used by the local community and a number of environmental education projects are based in York. The building is a low energy, high thermal mass, passive solar design powered by site generated renewable energy from photovoltaics and a wind turbine. Windows are triple glazed to reduce unwarranted heat loss/gain. Hot water is preheated by solar panels. The need for space heating is reduced to a minimum and is provided by efficient wood stove feeding the few radiators from a back boiler. Human sewage is biologically treated through dry compost toilets. Potable water is provided by collecting and purifying rain from the roof. The centre is run in a manner that reduces carbon emissions by among other things having a zero-carbon electric recycling vehicle.



*Designed by Ecoarc for Friends of
St Nicholas Fields*

4. Greenhouse, Citu (Pages 16-17)

Greenhouse, located in South Leeds, was officially opened on 1st October 2010. The development is a pioneering sustainable development of 166 flats with work spaces, on site gym, video conferencing facilities, deli café and other amenities.

The building has won over 28 awards since 2010 including the RIBA White Rose Award for Sustainability in 2010. The development comprises part refurbishment of a 1930s hostel together with supplemental new build to comprise one of the most sustainable and progressive developments in the UK whereby everything is designed to increase sustainability in the broadest sense. The building has exceptional levels of insulation vastly reducing the U values of the building envelope. The building's energy efficiency is outstanding as is demonstrated by its 'A' rating. The original brick structure has been externally clad with 120mm of insulation. This, together with an increased level of air tightness significantly reduces the heating requirements of the building. A ground source heat pump draws water from an aquifer 80m below the building and via a heat pump, provides heating and cooling to all apartments. Solar thermal panels mounted on the roof provide all of the hot water during the summer months, with the ground source heat pumps providing top up of the solar thermal in the winter. With various means of heat recovery between the different systems the overall result is a very efficient system for heating and hot water. The two roof top mounted wind turbines provide electricity for powering the communal areas, and with dedicated energy efficient and LED lighting throughout, PIR's to corridors, A/A+ rated appliances and a host of other energy saving means, the overall result is a vastly reduced electricity requirement.

The building boasts of a full rain and grey water recycling system which re-uses the recycled water for flushing the dual flush toilets and operating the washing machines. All taps and shower heads are also aerated to reduce the water usage by around 40% from standard fittings. Materials were all carefully chosen with GGBS (Ground Granulated Blast Furnace Slag) concrete, bamboo floors, natural carpets and recycled yoghurt pot signage to name but a few.

The entire building is linked via an IP Network where each apartment or office receives their energy information directly to their TV/Screen so that real time energy, heating and water usage can be viewed and compared over time to the average. The next generation network provides high speed internet to the building enabling IPTV, video on demand, voice over IP telephony as well as a high speed internet connection.

This IP Network also allows people to view real time transport information via their TV's including bus, train and car hire, ultimately making public transport that bit more convenient. There is also a community section on the TV to allow residents to communicate messages to others, for example, what they're growing in the local allotments.



*Designed by West and Machell
Architects (and architectural advisors
Sturgeon North) for Citu Ltd*

5. Gledhow Bank Eco-Houses (Page 19)

A development of three houses built in a single terrace by the individual owners of the properties. The whole experience of building the houses and settling in by the owners is also a story of people with same inclinations coming together to live their dream lives. The construction is post and beam timber frame based on the Segal method of construction using materials with low embodied energy, high energy efficiency through the highest affordable levels of insulation and efficient heating methods. The Segal method of construction – or rather an approach towards building, is one that is ecologically sound and can be done with little wet construction trades.

The houses are independent of the mains sewer, featuring compost toilets and reed bed treatment. The houses were designed to completely rely on water other than from the mains but two years after occupation, the mains water supply was connected.



*Designed by Jonathan
Lindh and LEDA L*

6. White Willows – Sheffield (Page 22)

The White Willows was awarded BREEAM Multi Residential 'Excellent' accreditation in December 2009 based upon a final score of 70.4% this being the first Extra Care built development in England to reach this standard. The development has a superior energy efficiency rating of **B**. These feats were achieved through close cooperation between the client, contractor and design team which reduced any proliferation of performance gap triggers. The main sustainable design and construction features include the use of natural light within an appropriately orientated building with solar gain and a night cooling system reducing service input. An increase in insulation, efficient use of under floor heating and photovoltaic panels all helped to maximise and retain energy input. A 'green' sedum roof compliment the photovoltaic panels, increasing insulation, helping store water run-off and attracting wildlife to the whole site. Harvested water is held in a reservoir incorporated into the sanitation of the building while also being integrated into the 'fi re-engineering operation which uses a fire sprinkler and misting system.



7. City House (Page 23)

The refurbishments have not happened yet.

8. Rose Bowl (Page 24)

The Rose Bowl is a new state of the art £32m project commissioned by Leeds Beckett University. The building has a unique intriguing exterior created from translucent and transparent glass and pressed metal spandrel panels, which are formed to create a stunning curved facades. The building beautifully contrasts the skyline with the grade II listed millennium square buildings opposite it while the outside mix of hard and soft landscape blends the two buildings into a diverse beautiful city centre.

This aspirational city centre new build educational development had clear sustainability goals to meet tough BREEAM 'Excellent' credentials and be a design landmark educational building with lecture halls and conference facilities. The building successfully achieved the 'Excellent' BREEAM rating which among many was achieved due to lowered energy requirements, use of highly efficient cooling, and low water use fittings and rainwater harvesting/grey water use for WCs.



*Designed by Shepherd Robson for
Leeds Metropolitan University*

9. Carnegie village (Page 25)

An aspirational and innovation based student accommodation development of about 480 rooms, achieved a BREEAM 'Excellent' rating. The development has one of the blocks for flats built to Passivhaus design standards with highly insulated envelopes as its character. Built with timber frame and prefabricated pods, the building used materials with low embodied carbon. The choice of sustainable materials meant reducing construction material waste and having a whopping 13% recycled material content right on site. Moreover, most of the materials could be recycled at the end of the building's lifespan. Solar thermal collectors generate up to 70% of each building's annual hot water requirements and also provide central heating support.

The aim was to deliver a landmark scheme for low carbon and energy efficient student accommodation, incorporating motion controlled lights, rainwater harvesting, solar thermal heating, water saving taps, heat recovery ventilation systems, sustainable sourced materials and A+ rated white goods. The construction company was recognised for its high standard of Corporate Social Responsibility.



*Designed by GWP Architects for Leeds
Metropolitan University*

10. Broadcasting place (Page 25)

The Broadcasting place was completed in 2009 and was recognised as “Best Tall Building Overall” in the 2010 Council for Tall Buildings and Urban Habitat Awards Program. It is well-considered sustainable approach building with six key design principles of flexibility, orientation and glazing angles, use of natural light, 10% target for use of renewable energy, stringent acoustic requirements with effective mechanical ventilation. One of its outstanding architectural feature is the irregular elevations which have been tailored to optimize daylight and reduce solar penetration. The proportions of the glazed façade were carefully examined and derived using special software

The development boast of a car free, bike friendly environment, with sheltered cycle storage as well as changing and shower facilities. The building achieved a BREEAM ‘Very Good’ rating, with at least 10% of the building's energy use from renewable sources. This feat was achieved by introducing a ground source heat pump and a flexible design to allow for a variety of uses and is adaptable enough to ensure that it can be used effectively over a long lifespan. The developments have an overall energy performance rating of B, which is very intriguing as buildings of similar nature could be rated F if just built in a conventional manner.



*Designed by Fielden Clegg Bradley
Studios for Downing and Leeds
Metropolitan University*

11. Trinity Leeds (Page 27)

The Trinity Leeds development is a new retail and leisure development that has transformed the retail quarter around Boar Lane, Briggate, Commercial and Albion streets at the centre of Leeds city. The development was a removal and regeneration of existing retail stock and the encasement of the entire development under a glazed roof. The glazed roof provides the walkways of the shopping mall with sufficient natural lighting in lieu of artificial lighting which is saving a lot of energy.

The development achieved a BREEAM 'Excellent' rating which was realised through a number of initiatives including a process of generating energy through waste and by ensuring the project achieves its goal of sending zero waste to landfill, a target achieved by the developer at six previous sites. The Trinity Leeds' escalators are also a marvel of technology that strives for energy sustainability as they move at varying speeds according to the busyness of the mall, being faster during peak times and slower during low business hours.



*Designed by Chapman Taylor for
Land Securities*

12. The Green Building, Holbeck Urban Village, Leeds (Page 28)

The four storey office building was constructed on the site of the former David Street Café and was designed and implemented with an energy conscious approach. It is one of the projects that illustrates how best a regeneration concept is put to use with high sustainability accomplishments. Its sustainability targets saw the building having 17 car parking spaces and 13 covered bike racks which is worth emulating.

The main features of the development are:

- an insitu concrete frame for fabric energy storage (FES);
- the primary energy supply being a biomass burner;
- the building having a narrow footprint and optimising on the position, scale and height of glazing to allow maximum use of natural daylight, ventilation and solar heat control;
- recycling of 'grey' rainwater run-off in WCs;
- the use of locally sourced materials, plus at least 10% recycled materials in the construction, with materials reclaimed from the demolition of David St Cafe being used in the hard landscaped courtyard to the north of the building;
- a loose-fit, long life design approach to allow flexibility and adaptability of use.
- an aim to continuously deliver CO₂ emissions reduction that is 30% better than the level laid down in Building Regulations, and 24% better than the level laid down in Holbeck Urban Village Revised Planning Framework (which proposes a 52% reduction from the Kyoto protocol baseline);



*Designed by BDP Architects for Igloo
Regeneration Ltd and CTP St James Ltd*

13. Allerton Bywater Millenium Community (Page 33)

The first development of the project was completed in 2005 and the other two phases followed later. Bywater Court uses a light steel frame system and has achieved an EcoHomes 'Excellent' rating with a range of highly energy efficient features, cycle storage and the potential for home office working. At least 75% of the timber and timber products are reused, recycled or come from renewable sources with a low environmental impact and during build construction waste was reduced by 50%. The energy efficient features include; low emission gas boilers, solar hot water for domestic use and a sustainable drainage system. Bywater Court also aims to improve daylight reach within each home, improve noise proofing and increase fire safety measures.



*Designed by PRP Architects for Fleming
Developments UK Ltd*

14. Ice Works (Page 36)

Developed jointly by the Urban Edge Group and Yorkshire Housing, this regeneration project occupies a prominent corner location on a brownfield site in the Exchange Quarter of Leeds City Centre.

The scheme provides 54 one and two bedroom apartments for sale and 25 apartments for rent to help meet the shortage of quality, affordable housing in Leeds. At over 30%, this project has the highest provision of affordable housing in the centre of Leeds.

The apartments were built using offsite construction to reduce the programme time and to help overcome some of the constraints of this tight city centre site. In addition to that, the use of prefabricated units offsite and only assembled on site helped reduce the amount of waste generated on site. Ice Works also used modular bathroom pods to further reduce time spent on site. The envelope is highly insulated and achieved an energy performance rating of **B** which is among some of the highest in buildings of similar nature.



*Designed by Cartwright Pickard
for Urban Edge Group and
Yorkshire Housing Association*

15. Round Foundry (Page 37)

Round Foundry is a mixed use regeneration project in Holbeck Urban Village, Leeds. Derelict industrial buildings have been conserved and new ones added which together combine residential, leisure and commercial uses in a vibrant location. Round Foundry is thought to be the oldest surviving engineering works in the world and its careful conservation has contributed to its special sense of place. Here is a project which shows all the strands of sustainable development - economic, environmental and social. The regeneration that utilised the existing materials and infrastructure for the new inspirational development. This reduced the amount of materials to be hauled onto and off the site.



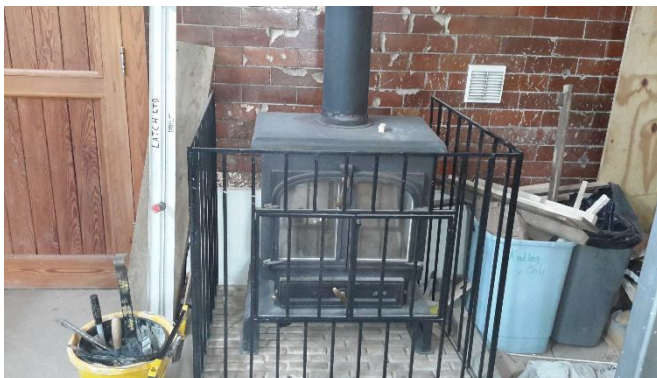
Designed by BDP Architects for CTP

16. LATCH – Hands On (Page 37)

Hands On, run by Leeds Action to Create Homes (LATCH), has seen a derelict grade two listed former coachhouse in Chapeltown ecorenovated by volunteers and is now home to an innovative project teaching woodworking and other construction skills. The main aim of the project was to renovate the coachhouse so that it is highly energy and resource efficient but still maintains the historic character of the building. This was achieved by using reclaimed, recycled and natural materials and preserving many of the buildings original features.

The building is very well insulated with timber frames constructed inside the roof and walls and filled with sheep's wool. The walls are plastered with traditional lime or clay plaster to enable the walls to be fully breathable at the same time helping to regulate moisture levels and reduce damp problems. The building is heated by a clean-burning wood stove that provides heating and houses a kitchen work top that is made from recycled plastic from fridges. The wood burner uses in many cases wood waste from the woodworking lessons.

The project involved volunteers in the renovation, giving them the opportunity to develop construction skills, while people attending courses can also learn how to reduce the environmental impact of their daily lives with practical information and training on topics like energy efficiency at home. The decision was made to focus on energy conservation rather than energy generation, partly due to the unsuitability of the building for renewable energy and partly to demonstrate that on a small building reducing demand is more important than generating energy.



17. Back to Back in Leeds (38)

As part of the 'Back to back' strategy, Leeds, in partnership with the Building Research Establishment, looked at options to improve the thermal efficiency of a pre-1919 back to back property in Beeston Hill. Testing of the property showed poor thermal efficiency and air tightness, with significant heat loss through all of the external elevation. A system of works was developed to bring the property up to the highest possible standard within a realistic budget. Works included sealing the new roof with breathable foam to improve the air tightness and insulation, installation of 'A' rated windows and a highly thermally efficient door with triple glazed fanlight.

External cladding was considered initially to improve the thermal efficiency of the walls. However, neither the initial thermal render or the proposed brick slips proved to be suitable for the external covering of the building. It had been hoped that this could be carried out sensitively while preserving or replicating architectural detail. Unfortunately, neither could be satisfactorily developed within the time scales available for the project so internal insulation was used with new material so as to improve the U value without too much egress into the limited living space of the back to back. It is hoped that external cladding of some form will be undertaken in the near future on similar properties to allow the effectiveness of this form of treatment on the pre-1919 stock to be tested.

Meanwhile, home owners can implement measures that reduces energy demand by installing energy efficient electrical equipment and low carbon energy sources such as solar panels.

18. Solar panels on Council houses (Page 38)

Leeds City Council is leading the way for renewable energy sources by initiating a program to install solar photovoltaic panels on a minimum of 1,000 council owned homes by 2016. Tenants will be able to use the electricity generated for free, reduce their energy bills and CO₂ emissions. It is estimated that this will cumulatively save an individual tenant around £120 a year on fuel bills for the next 20 years and reduce CO₂ emissions by around 1,700 tonnes a year.

The council believes that with the programs of renewable and low carbon sources of energy, a lot more home owners and developers will emulate the initiatives and reduce the cost of renewable energy sources while saving more CO₂ emissions.



19. Broad Gate, The Headrow, Leeds (Page 40)

Originally built in 1932, the redevelopment of Broad Gate has been carefully undertaken to consider sustainability principles throughout all stages of the design and construction. The development targeted a refurbishment BREEAM rating of 'Excellent' and went on to achieve the feat. Key sustainability highlights of the project include the refurbishment of an existing building, reuse and recycling of materials and energy and water efficient fittings. The building has an energy performance rating of **C** which is commendable compared to performance of similar projects elsewhere.

Over 80% of the existing building structure has been retained and two thirds of the existing building façade. As a result, fewer materials have had to be imported to the site resulting in a reduced resource and energy usage.



*Designed by Fairhursts
Architects for Highcross*

20. Skelton Grange Environmental Centre (Page 43)

Winner of the Leeds Architecture Award 2004 for Sustainability and Landscape, BTCV's demonstration centre is an innovative environmental education project that showcases sustainable solutions. The centre uses waste heat from National Grid's mains power cable serving Leeds. The materials used, which included timber, has the least embodied carbon possible to enhance the flagship status the building has on sustainability and comfort.

The centre was also designed to maximise the benefits of solar energy in all its guises: providing good daylighting, warmth in winter from south-facing windows, heating water from solar panels and generating electricity from PV panels on the roof. The building also has a ground source heat pump installed to top up heating requirements for the already highly insulated building envelopes. A south facing conservatory space acts as a sheltering layer and passive solar collector, with photovoltaic cells on the roof and a 2.5kw wind turbine.



Designed by LEDA Ltd for BTCV

21. Park Lane College (Page 44)

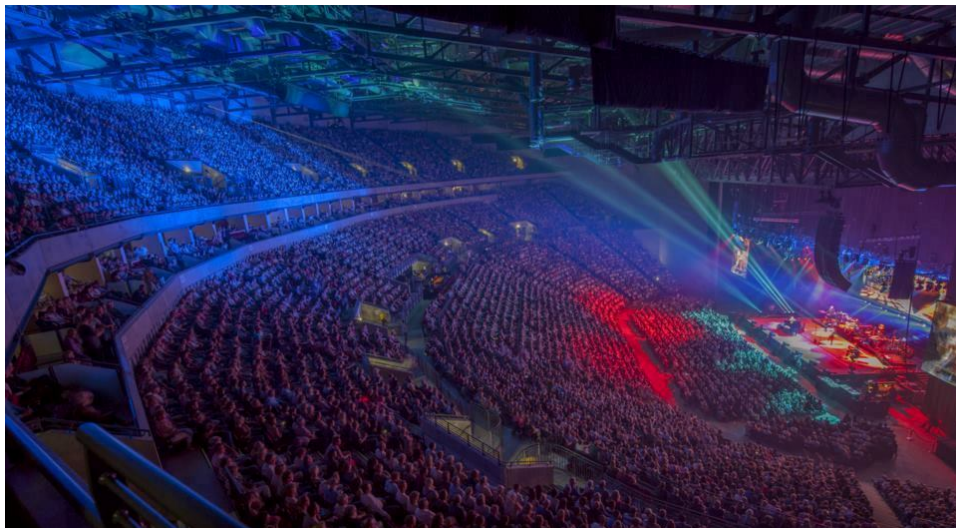
The building was the first stage of a site strategy devised in 2002 to optimise the use of the Park Lane site. This was a south facing site and the existing buildings suffered from solar gain. The design approach orientated the new building so that the main elevations faced east and west leaving the south elevation available to collect energy. Grant assistance for the photovoltaic facade meant that there was no additional cost to the college. The new facade supplies 10% of the buildings electrical demand, while the design further supports the sustainable objectives of the project with additional wall and roof insulation, a sedum green roof, natural ventilation and timber rain-screen cladding.

Designed by Ian Tod, Ian Tod and Company for Park Lane College (and front cover image).

22. Leeds First Direct Arena (Page 45)

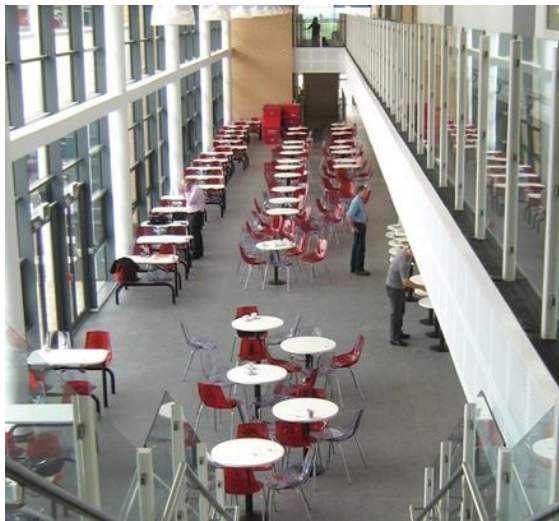
This state of the art 13,500 capacity “super-theatre” was completed in 2013 and attracts some of the biggest names and events in the world of entertainment. The building is a ground breaking achievement in energy efficiency and environmentally friendly construction of theatres. Features include having open air source heat pumps, the roof collects rainwater to be reused in the running of the building and an area with a green sedum roof to help enhance the environment. The arena achieved a ‘Very Good’ BREEAM rating, a milestone for a large capacity infrastructure.

Through the WRAP commitment, the contractor eliminated unnecessary waste going to landfill by 8%. In addition to that, good site management and project design saw the contractor saving in excess of £350,000 through clash detection. Meanwhile, the arena operator has committed to a green travel plan which aims to reduce single occupancy car journeys and encourage sustainable travel choices among arena employees and visitors. In addition to that the arena is accessible through cycle lanes.



23. Pudsey Grangefield School (Page 46)

Pudsey Grangefield rejoices in an engaging palette of materials and a double-decker internal street that is spacious, naturally lit and airy. Abundant hot-desks for personalised ICT learning permeate the building and bring education right up to date. The inspirational educational building achieved a BREEAM 'Very Good' rating. Integration of the educational and community function of the building has been thorough, with some degree of pupil involvement. Designed to be flexible over a proposed 60-year lifespan, the building incorporates good use of daylight, night time cooling and roof mounted solar panels, while utilising online building system management.



*Designed by Mentor Architects for
Leeds Education Partnership*

24. Carnegie Pavilion (Page 52)

The Carnegie Pavilion is a joint venture between Leeds Beckett University and Yorkshire County Cricket Club and has been awarded BREEAM 'Excellent' status for its environmental features. The building is incredibly rated B on its envelope/fabric energy performance. The co-occupation of the building (over 70% of the rooms have been designed for 'dual-use') dramatically reduces running costs as well as the carbon footprint.

Low carbon innovative technologies such as air source heat pumps are utilised to provide heating, cooling and (part of) the domestic hot water load for the building, while the use of low-energy fluorescent lights, which are controlled via manual switching, presence/absence detection and are also daylight-linked, minimise energy consumption. Automatic water shut-off and major leak detection systems help to ensure that wastage of water is minimised. A minimum of 10% (by spend) of materials used within the build are recycled materials.



*Designed by Alsop Sparch for
Leeds Metropolitan University*

25. Tao Housing, Magbate, Leeds (Page 56)

The Tao housing development in Mabgate, Leeds, uses historic Japanese architecture principles to provide six apartments on a narrow 'slice' of land between three existing buildings. The small site limited the potential for renewable energy systems, resulting in heavily relying on the use of a high insulation concrete formwork (ICF) system to increase the thermal efficiency of the building. The concrete units (blocks) were mainly made offsite to reduce need for storage space on site and the time the contractor spends on site considering that the site is confined.

The efficiency gains allowed a large glazed area to be used to increase the natural light within the building and reduce the need for electric lights, while light is also filtered into the stairwell to further reduce electricity consumption. The development is rated C in energy performance assessment.



*Designed by Architecture 2b for
Citu Ltd*

26. Council Housing (Page 58)

A pilot council house scheme was delivered on three sites in West Leeds, which were built to key requirements for the Code for Sustainable Homes Level 3.

The key sustainability features of the units are:

- The homes are designed to use no more than about 105 litres of water per person per day;
- The properties are fitted with solar panels in order to collect heat from the sun's radiation.

All dwellings will incorporate solar hot water heating utilising the Alpha Solar Smart system. With Solar Smart, the stored volume of hot water is heated only by the collected solar energy, so no gas is used in maintaining the cylinder temperature. Should the solar heated water be exhausted, the combination boiler (Could not verify)

27. Crossway Passivhaus (Page 59)

The UK Passivhaus Awards 2013 runners up development in the private housing category is an illustration of individual willingness to live in a green and sustainable building. The design strived to use natural and local materials as much as possible. It has a timber arch clad in clay bricks that were sources 4 miles from the site The Crossway in Kent is the first building to combine two innovative technologies to help move it to passivhaus specification; PV-T (Photovoltaic Thermal) and a PCM (Phase Change Material) heat store.

PV-T is a unique renewable technology that combines electricity generating PV cells with a solar thermal system. This technology cools the PV cells using a solar thermal system running behind the PV, making them work more efficiently and generate more electricity (25% extra in the UK environment). The by-product of this cooling is heat, which can be harnessed and stored in a pioneering PCM heat store that holds three times more heat than the same volume of water and stores the heat as latent heat. Two technologies helping to make each other more efficient yet share a single panel, reducing the space taken up on the roof.



Designed by Hawkes Architecture

28. Denby Dale Passivhaus (Page 60)

This is a recently completed private three-bed detached house in Denby Dale, West Yorkshire. Built to the stringent Passivhaus standard, the project has sought to provide a solution to the urgent need to drastically cut the CO₂ emissions from buildings in the UK and has tried to create a low-cost and easily replicable template for low energy Passivhaus construction, using techniques and materials familiar to British builders.

The house is the UK's first cavity wall Passivhaus standards built house, the original design details developed for the project are usable as a template for the construction industry for how to minimize thermal bridging, improve energy efficiency and maximise the airtightness of projects built using cavity wall construction, whether the project is aiming for the Passivhaus standard or not. The Denby Dale Passivhaus achieves radical levels of energy efficiency, with a space heating need of 15kWh/m²/year (using approximately 90% less energy for space heating than a typical UK house) and has high levels of airtightness.

It has solar panels



29. Richmond Hill Primary (Page 60)

Richmond Hill is one of six schools involved in the first phase of Education Leeds's Primary Capital Programme (PCP). The ageing existing school buildings are being replaced with an innovative new facility that has met the revolutionary Passivhaus design standards. The school is one of the educational facilities to be built to the standard as it is prevalent in private homes. Passivhaus buildings have very well insulated shells and require much less heating, therefore reducing their environmental impact and running costs. The glazed openings have horizontal shading devices to reduce unnecessary solar gain. Richmond Hill is one of the most energy efficient school buildings in the UK. The building has so far achieved an outstanding airtightness result of 0.25ach @50Pa, which has been achieved with vibrant design implementation.

The building has many educational features such as wide 'learning streets' in place of narrow corridors and small group rooms for personalised learning. The school provides dedicated community space open throughout the day and large multi-purpose areas that can be accessed by the community after school hours. The school grounds will also provide opportunities for local people to benefit from the new facilities. The project, as much as it benefits the community in education, is also poised to help reduce deprivation hence the many community engagement facilities.



Designed by _space group and (the former) Education Leeds, with Interserve Project Services

30. Garforth Library; Library and One Stop Centre (Page 61)

The new library and One Stop Centre in Garforth has recently opened after being awarded £1.4 million by the Big Lottery Fund to extend and improve the original building using green technologies. The main feature of the new building is the living sedum roof which assists temperature regulation as well as attracting wildlife. The library is fitted with sun pipes, reducing the need for unnatural lighting, and solar panels that provide the building's hot water. Even the desks are eco-friendly having been constructed from recycled items such as fridges and washing up liquid bottles.



31. St Margaret's Church Hall (Page 68)

A community based development with clear aims to improve and support community activities and cohesion through the building (in keeping with the listed church) of an environmentally friendly community hall, including ground source heat pump, insulation made from recycled glass, heat recovery ventilation and rainwater collection for WCs. Made from locally sourced materials, this is a very commendable community based low impact development. (Could not verify the technical targets, the respondent said the hall is being sold and can therefore not be used for a survey or publishing at the moment)

32. Hollybush School (Page 72)

Hollybush is the first of a new generation of schools, specifically planned from the very start of the design process to incorporate sustainability into its basic design. The school maximised the use of passive energy, together with improved insulation techniques. The building achieved tremendous levels of natural lighting at the same time being low in glare and heat loss/gain. A longevity of use was incorporated into the design, aimed at a minimum 60-year life span together with best practice installation and construction use. Timber was selected as a reusable low carbon material, with an acknowledgment to the BRE green guide to construction. Consultation and feedback from staff and pupils from Hollybush School was initiated and carried through the project so that it reflects what the users want at the same time meeting environmental and technical standards.

Designed by ADS of Leeds City Council

33. Epicentre – Meanwood Valley Urban Farm (Page 73)

Opened in 1999, the Epicentre provides Meanwood Valley Urban Farm with exhibition space, classrooms and a library, as well as a central focus for the learning and inspiration of the farm's aims. The building is constructed using the Walter Segal concept of modern and adaptable sustainable design.

The building utilises recycled materials, the majority of which is locally grown timber, including the main structure of larch from the Harewood Estate. Locally available and other recycled materials have low carbon footprint as they are not transported from far places and they also lead to economic benefits for the locals.

The building has a green roof that minimises the impact of the building from the north and east facing facades. Other features include a glazed 'greenspace' to optimise solar gains, compost toilets and a reed bed drainage system.



34. York Eco-Depot (Page 74)

The £8 million York's Eco-Depot project, finished in 2006, has won multiple awards including a Green Apple Gold Award for its sustainable design and construction and is seen as an excellent example for future developments. The Eco Depot in York has an array of approximately 10 by 5 metres of PV solar panels. In addition to that, The Eco Depot in York also has a wind turbine and this generates modest amounts of energy but provides an excellent educational resource and is a visible commitment of York's ambition to create a sustainable city.

The building is energy efficient and one of the reasons for this achievement is the use of locally sourced straw bales and timber as the main construction materials for the walls of the office building. Not only are straw bales highly insulating, they also have low embodied energy because straw, along with timber, absorb carbon dioxide as they grow, unlike more common building materials that release a lot of carbon dioxide during construction. The straw bale walls of the building provide super insulation - three times better than building regulations demand!

Other features of the building such as underfloor heating combined with heat absorbing concrete floors, well planned building orientation and rainwater harvesting, have all contributed to the buildings high levels of sustainability. The result of this innovative design is that the current office building is 76% more energy efficient than a traditional building and the Eco-Depot will save approximately 176 tonnes of carbon dioxide every year. If converted to monetary terms, the eco-depot runs on 85% less the costs of running a conventional building in energy costs.



35. Town Centre House (Page 75)



This redevelopment of an existing 'tired' office section of a larger city centre shopping centre achieved a BREEAM rating of 'Excellent'. The building has a low energy design and predicted CO2 emissions are 74% lower than a typical office development of the same scale. This has been achieved through a state of the art cooling and heating system which incorporates a heat recovery stage and natural ventilation. The building achieved a 70% recycling rate for construction waste, used locally sourced York sandstone cladding and incorporated a sedum green roof to improve biodiversity and help attenuate sudden rainfall events.

*Designed by BDF Architects and SMC
Gower (now known as Archial) for
Town Centre Securities plc*

36. Ferns Wharf, Leeds (Page 84)

The development consists of 3000m² (32,000sqft) of high quality office accommodation and achieved a BREEAM 'Excellent' rating. It has a superior energy performance rating **B** which has been achieved through having an insulated wall and egg-crate with longer horizontal sun shading devices. These techniques stop heat loss and gain. Other sustainable features of the building include the overall design and construction as a heat sink with natural ventilation.

The building is built along the river Aire which exposes it to the risk of flooding, the design adapted to this risk by having a carpark on most of the ground area and most habitable rooms in the first floor and up. The carpark has a section of an enclosed cycle storage facilities to encourage cyclists to use them when coming to work.

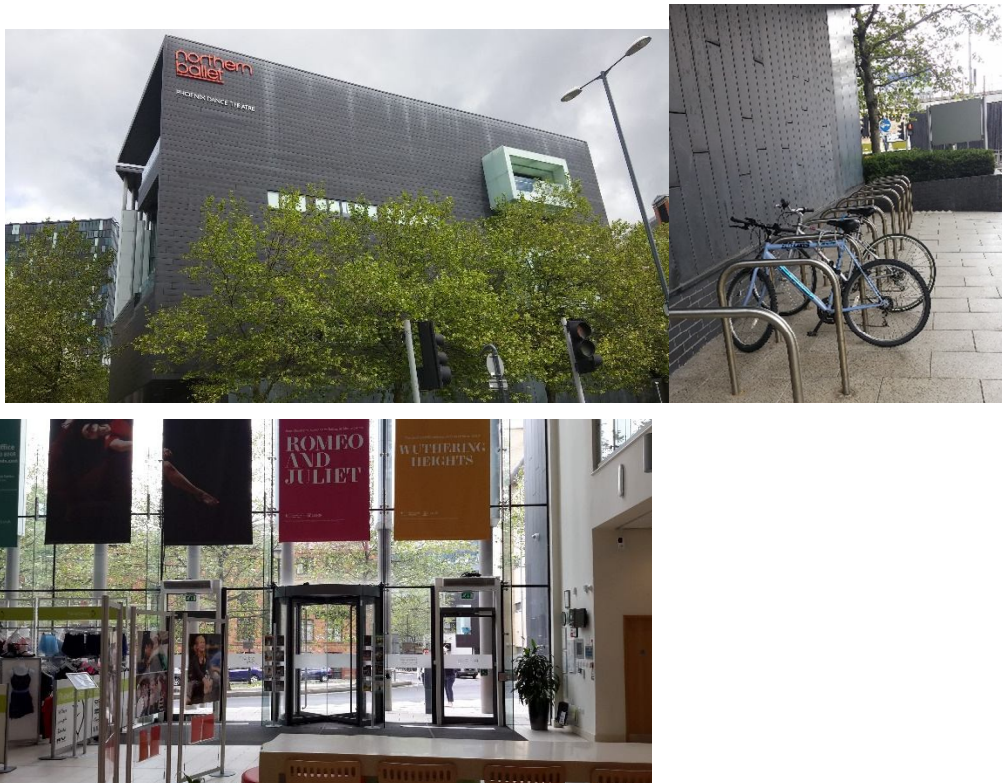


*Designed by Brewster Bye Architects for
Bracken Developments (Yorkshire) Ltd*

37. Northern Ballet (Page 88)

From the outset environmental considerations were central to the design of the Northern Ballet and Phoenix Dance Theatre, with all parties fully committed to creating the most sustainable and environmentally friendly building possible. The energy efficiency of the building in use resulted in the inclusion of a number of specific features; a green sedum roof to provide insulation and reduce the run-off of water, the provision of solar panels to reduce the reliance of the building on the national grid, and heating and ventilation controlled by a computerised building management system to allow localised temperature control and reduce waste. Water fixtures are aerated and reduces wastage by almost 20% if compared to normal fittings.

The building is designed in two sections, the dance studios are on the southern side with solar shading built in to cover large areas of glass, the offices are located on the northern side to minimise solar gain. In terms of construction, wherever possible materials have been sourced from sustainable sources. The contractor has minimised the amount of waste going to landfill and received a very good score under the Considerate Contractors scheme. Sustainable travel is encouraged through the provision of cycle parking and public transport information. The building achieved a BREEAM rating of 'Very Good' in post occupancy assessment.



38. LILAC (Page 95)

LILAC is a pioneering project of 20 sustainable low impact living housing development in Leeds and has a common house all built to high ecological standards. The project was based on core values of low impact living, affordability and community living. It used co-housing design principles and gradually moved to being permanently affordable through the formation of a Mutual Home Ownership Society (MHOS). The LILAC project, which stands for Low Impact Living Affordable Community, has homes that are super-insulated, use natural and locally sourced materials, such as straw and timber, and makes use of heat from the sun to warm the houses and reduce energy bills. For a three bed house, energy costs are around £400 a year for gas and electricity combined (£7 a week). Each house has 1.25kw PV array. 28 KW total on site. Houses have solar thermal panels for domestic hot water. MVHR ventilation systems installed and advanced triple glazed argon filled windows.

The project subscribes to the Passivhaus standard and was also built to level 4 of Code for Sustainable homes. One of the main benefits to this design, aside from the ecological advantages, is the increased sense of community provided by the mixture of private dwellings and shared facilities. The common house includes communal facilities such as a meeting space, kitchen, laundry, play area, guest bedroom and a workshop. These shared facilities also help reduce energy use and save money for residents. Included in the concept design is limited on-site parking, cycle storage and a car share scheme.



Proposed scheme designed by White Design for LILAC

39. Rutland Lodge Medical Centre (Page 96)

Rutland Lodge has been designed as a healthy building to house a new medical centre. It features solar panels for hot water, photovoltaic panels for electricity and large south facing windows for solar gain. Recycled and filtered rainwater is used to flush the toilets.

(Could not find further information)

*Designed by OSA Architects
(now Stack Architects)*

40. St Mary's Close Live/Work Studio – Yorkshire Housing (Page 96)

This terrace of five family houses incorporates live/work studios and have been designed to enable flexible living and working under one roof. On completion in 2005 they achieved an Eco-Homes 'Excellent' rating and are also built to Lifetime Homes criteria. Being highly fuel efficient, with provision made for zoned heating, the houses costs a minimum of about £8 a week to run in energy costs. They were also designed to allow for future conversion to solar energy. With age, the developments' average energy performance rating is **C**.



*Designed by Brewster Bye Architects
for Yorkshire Housing*

41. Gipton Housing, Leeds (Page 97)

This new affordable housing scheme in Gipton, Leeds, features PV panels and a carefully designed layout with an emphasis on solar orientation to maximise sunlight. Where space is limited, Juliette balconies offer a way of engaging with the outdoor environment.

Could not find further information

*Designed by EDAW and Knapton &
Knapton, for Bellway and Leeds City
Council*

42. New Bewerley School (Page 102)

New Bewerley School has specifically incorporated sustainable and ecological design precepts into its build design. This encompasses passive energy use, better insulation, light wells and a controlling use of ventilation all of which are variable and adaptable during the yearly cycle. The school's circular snail-shell design compliments its sustainable attributes and promotes elegant educational opportunities. The design dramatically reduces any external exposure to the school, while avoiding limited day-lighting opportunities through light-wells and 'sun pipes'. This approach also reduces heat loss during winter and heat gain in summer. It incorporates a strong management system and best practice construction process as well as a 60 year minimum use life cycle.

The school has won regional RICS awards for Regeneration and for Community Involvement. It has also won "Project of the Year" in the RICS Pro-Yorkshire Awards and the 2007 Built Environment and Architectural Heritage National Green Apple Awards.

*Designed by Leeds City Council's
Strategic Design Alliance for
Education Leeds*