



Creating a sustainable urban extension – a case study of Upton, Northampton



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Introduction



The final Urban Framework Plan for Upton, Northampton

Home energy use is responsible for 27 per cent of UK carbon dioxide emissions which contribute to climate change. By following the Energy Saving Trust's best practice standards, new build and refurbished housing will be more energy efficient – reducing these emissions and saving energy, money and the environment.

The Government's Energy White Paper 'Our energy future – creating a low carbon economy' highlighted the need to reduce carbon emissions by 60 per cent from their levels in 2003 by 2050. Improvements in energy and water efficiency, the use of more renewable energy and a commitment to waste minimisation are also priorities.

Most housing developments fail to deliver high standards of energy efficiency and sustainability. However, at Upton in Northampton an eight year project is under way to extend the town in a way that demonstrates best practice in sustainable urban growth.

The project partners include English Partnerships, Northampton Borough Council, The Prince's Foundation and a consultants' team led by EDAW.

A number of factors have contributed to the scheme's success. The landowners, English Partnerships, insisted on high standards. In addition, the team of project partners developed a clear and demanding design code which left potential developers in no doubt of their obligations.

This case study is designed to provide information and support to professionals working to create more sustainable and energy efficient communities. It is aimed particularly at local authorities (especially planners) and private developers.

The study traces the development of the design code and demonstrates how large scale developments can incorporate sustainable principles of urban growth. To create a sustainable community, it was essential to embed these principles in conventional forms of housing that could meet the expectations of prospective homebuyers.

As a result of the successful use of design codes at Upton, the Office of the Deputy Prime Minister (ODPM) has established seven pilot projects to examine the merits of applying this approach more widely in the UK (see www.cabe.org.uk/data/pdfs/DesignCoding.pdf).

Background

The Regional Spatial Strategy for the East Midlands has identified Northampton as a town suitable for major population and employment growth. In the Government's Sustainable Communities Plan 'Sustainable communities: building for the future' published in February 2003, Northampton was highlighted within the Milton Keynes and South Midlands growth area.

Upton lies between the existing town edge and the motorway. The local plan seeks to create 5,000 new homes, 280,000m² of industrial floorspace, a country park and associated facilities.

Originally farming land, the site was acquired by Northampton Development Corporation, before passing to the Commission for New Towns in 1985. It is now under the control of English Partnerships, the Government's national regeneration agency.

Upton is part of the south-west district of Northampton and is a strategic urban extension to the town. In 1997, Upton was granted outline planning permission for:

- 1,020 homes.
- Primary school.
- Local centre with up to 700m² of retailing.
- Medical centre.
- Nursery.
- Other community facilities.

Drawing up the master plan

Adopting the Enquiry by Design (EbD) approach (see box), the partners carried out a series of design workshops working closely with a range of local stakeholders and professionals. During the sessions, various options were tested to establish the most sustainable mix and form for the development. This process produced a draft master plan for the site.

The EbD process resulted in a number of features being incorporated into the master plan:

- A variety of housing types, sizes and tenures at higher densities.
- Improved public transport to the site and surroundings.
- A high street and main square serving as a focal point for the community.
- Local shopping facilities.
- Building designs to reflect local character and styles.
- Improved pedestrian and cycle links on and around the site.
- Innovative drainage techniques.
- The local centre to be located along the Weedon Road (the main road to the north of the site).

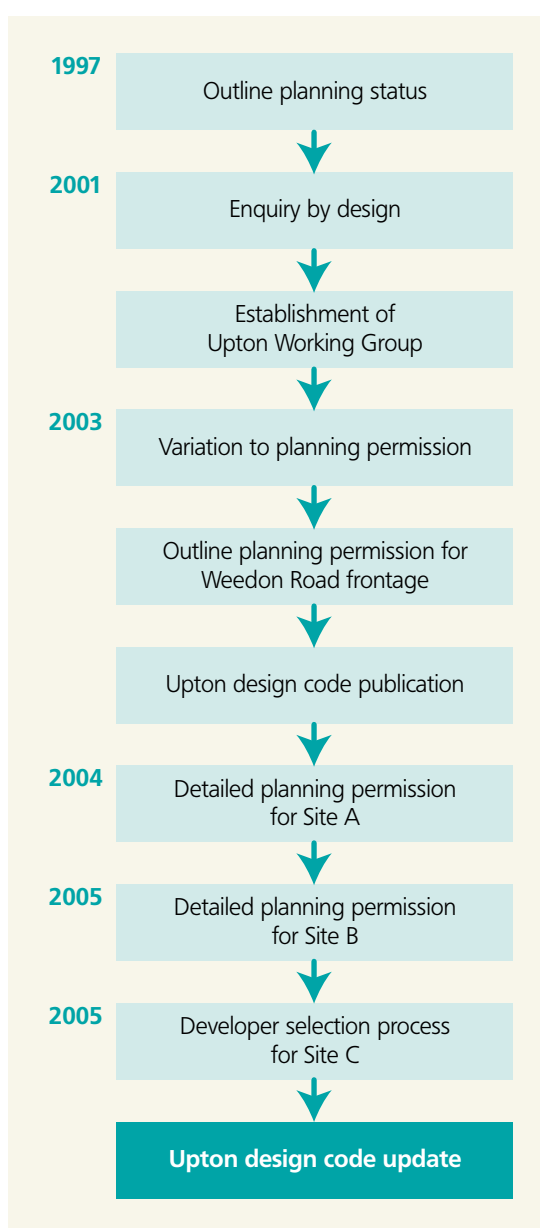
The draft master plan was finalised at the beginning of 2002 and re-presented to the stakeholders in April that year.

The decision to make the Weedon Road the focal point for the local centre meant a change to the master plan. The updated version, including a new application for the Weedon Road development, was submitted to Northampton Borough Council as a revision to the original 1997 outline consent. The Weedon Road application included:

- 300m² of small retail units.
- 3,400m² commercial offices.
- 450m² of cafes and restaurants.
- Around 10 live/work units.
- 54 residential apartments.

As part of the design process, a working group was established to oversee the project's implementation and to facilitate the continuing involvement of all the main partners. The group meets regularly to progress the project and resolve any implementation and design issues that might arise. It has also undertaken a series of visits to good practice, low impact developments with the purpose of researching different options and exploring their feasibility for Upton. In addition to the working group, a steering committee of local stakeholders was set up to maintain the involvement of the wider community.

Enquiry by Design (EbD) is not a new concept (due to its lineage within participatory planning), but has been developed in its present form by the Prince's Foundation, the architecture school established by Prince Charles. An EbD event during the course of the design process brings together relevant information about the site and sets out to harmonise this with the aims and aspirations of the key stakeholders. The result can be an endorsement of the original ideas or it may lead to a radical reworking of the design.



Progress to date at Upton

Upton design codes

Table 1 Energy and environmental requirements for each site

Site	Mandatory across whole site	Demonstration projects/technologies
A	BREEAM/EcoHomes Excellent NHER rating 10	None
B	BREEAM/EcoHomes Excellent NHER rating 10 Passive solar design Solar water heating Rainwater harvesting	Photovoltaic (PV) systems – min. 25 units Green roofs – min. 25 units
C	BREEAM/EcoHomes Excellent NHER rating 10 Passive solar design Solar water heating Rainwater harvesting	PV systems – min. 5 units Green roofs – min. 5 units
D1	BREEAM/EcoHomes Excellent NHER rating 10 Passive solar design Insulation improvements High internal air quality Solar water heating	PV systems – min. 90 units Micro combined heat and power (micro-CHP) – min. 60 units Rainwater harvesting – all freehold units without green roofs Green roofs (extensive) – min. 60 units
D2	BREEAM/EcoHomes Excellent NHER rating 10 Passive solar design Insulation improvements High internal air quality Solar water heating	PV systems – min. 45 units Micro-CHP – min. 30 units Rainwater harvesting – all freehold units without green roofs Green roofs (extensive) – min. 30 units

The design codes are crucial components of the Upton development. Where the Urban Framework Plan outlines design principles in an over-arching master plan, the design codes provide the detailed guidance that ensures coherence and consistency through the different phases of the development, protecting the aims and aspirations embodied in the Urban Framework Plan. As they have been endorsed by Northampton Borough Council, they also give developers some certainty about the planning process.

The design codes define the environmental standards and features applying to the development. All buildings have to achieve the relevant BREEAM/EcoHomes 'excellent' standard. The codes require:

- Sustainable urban drainage systems (SUDS):** these employ a combination of surface water discharge into the existing swale system (part of the infrastructure put in place by English Partnerships), new swales where necessary, and porous paving in courtyards and home zones in residential areas
- Energy and utilities:** all developers are required to procure green tariff electricity supplies. They are also requested to use a common service corridor for all the services.
- Resource consumption and energy conservation:** the design should optimise passive solar gain. CO₂ emissions to be less than 25kg/m² per year.
- Water conservation:** high efficiency fittings (e.g. low volume toilets, spray taps) to be used. Rainwater harvesting technologies to be implemented.
- Materials:** All developers to use recycled or local, sustainably sourced materials.
- Waste minimisation:** through recycling both during construction and afterwards.



Plan showing the eight sites or 'development areas'

In order to manage the development, Upton has been split into eight separate sites or 'development areas'.

The range of environmental requirements is being increased as each site is developed (see Table 1). In addition, trials or demonstrations of specific technologies are being incorporated in some buildings or groups of buildings. A brief description of each measure is given on page 7.

Site D2 will showcase winning entries from the ODPM's Design for Manufacture competition, which was launched on 1 April 2005. This aims to demonstrate that well designed, sustainable new homes can be constructed more cost-efficiently than those built to current industry standards.

The development briefs for the remaining three sites have yet to be determined. It is clear though, that they will feature the same demonstration projects/technologies as the previous sites (where possible) and, in addition, other technologies/requirements may be introduced, for example:

- Housing with zero net CO₂ emissions.
- Grey water recycling.
- Ground source heat pumps.

Revised design code – 2005

As work progressed on the first three sites, the working group and steering group reviewed the operation of the codes and concluded that some revisions were required. These changes reflected developments in the briefing and appraisal process, and took account of amendments to relevant Government initiatives and policy changes. The section relating the development to the Northampton context was also redrafted.

Design codes and developer selection

At Upton a two-stage process was used to select a preferred developer. It focussed on design issues in order to meet the design quality aspirations set out in the Urban Framework Plan.

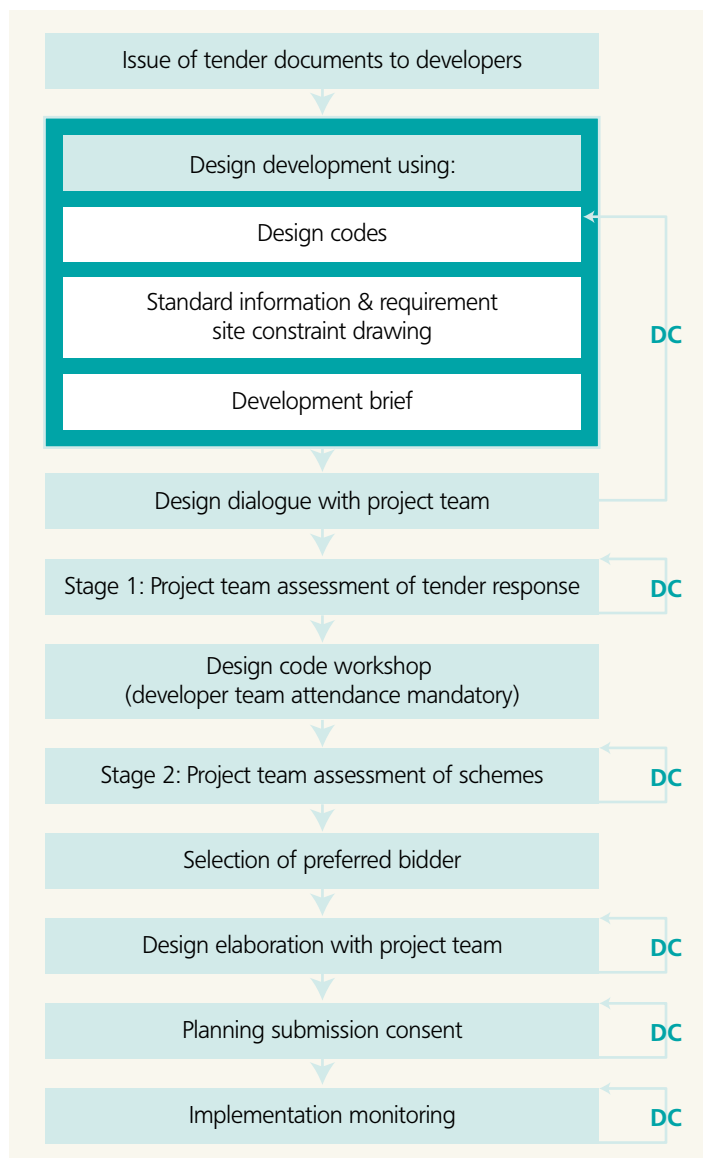
Stage 1

Included with the development brief given to each developer, was a list of submission requirements together with the selection criteria and scoring scheme. This assessment was based solely on design, with design quality being a factor in each of the criteria. Integration of the environmental technologies into the building design was also considered. The assessment was carried out by the working group. This group included representatives of all the partners as well as the lead consultant, EDAW, and other consultants as necessary. Each tender was given a score based on the submissions, with only the top scoring tenders going through. Feedback was given to all those submitting tenders.

Stage 2

At this stage finance was also considered. More detailed tenders (again based on the design codes) were assessed and scored by the working group, who had no knowledge of the financial bids. The financial offers were considered separately by the English Partnerships Implementation Team. The two scores – for the design and financial aspects – were amalgamated to identify the preferred developer.

This selection process illustrates the central role the design codes played in both the selection of the developer and the development of the site.



The developer selection process

The developments

Shenley Lodge Developments (now Paul Newman New Homes) were selected in November 2003 as preferred developers for Site A. This 3.7ha development will include 210 homes, comprising a mix of higher density townhouses and apartments as well as semi-detached and detached homes.

Cornhill Estates and Fairclough Homes were selected for Site B. This site will consist of a further 204 properties, ranging from apartments to townhouses and large family homes. Almost all will have rainwater recycling and solar water heating. The apartment blocks will have green-planted roofs and 25 of the houses will be fitted with roof-mounted PV panels. These convert daylight into electricity and will provide up to 50 per cent of demand. When consumption is low, they will supply electricity back to the national grid. A number of properties will have micro-CHP systems (boilers that heat the property and generate electricity as a by-product). They will be fitted with sheep's wool loft insulation.

David Wilson Homes were selected to develop Site C. This phase consists of 30 large family semi-detached and detached homes. Sustainable features include solar water heating and green roofs.

Some 345 dwellings, including a mix of townhouses and apartments, will be built by Metropolitan Housing Partnership on Site D1. A number of advanced technologies will be included, from water recycling to PV, and the scheme will apply ZED standards (see box) to some of the homes.

Sustainable technologies in mainstream construction

The Upton scheme aims to promote the use of green technologies in a mainstream construction setting. The development sets new standards in volume housebuilding, giving developers an opportunity to design and build sustainable, energy-efficient homes with a conventional appearance.

Lessons from Upton

With the local planning authority, Northampton Borough Council, being one of the main partners, it was possible to ensure that the detailed designs would be acceptable to the Council and their planning committee prior to submission. Applications could therefore be approved in a shorter timeframe, well within the Best Value Performance Indicators specified by the ODPM. Other pilot schemes are examining whether local authorities should take the lead in design coding. For example, they might adopt design codes as formal policy or as supplementary planning documents.

Zero Energy Development (ZED) standards are based on the experience of building and living in the BedZED development in Sutton, South London. The intention has been to create an urban eco-village with zero fossil energy emissions through the integration of energy efficiency, renewable energy, and supporting sustainable lifestyles. Bioregional's Z-Squared project aims to improve on BedZED standards through, 'zero fossil energy and zero waste communities'. The project aims to bring these standards into mainstream construction with a design for a 2,000 home, sustainable community for the Thames Gateway.



Architect's elevations showing the conventional look of sustainable housing (above) and position on site (left)

With environmental requirements unambiguously set out in the codes, developers are free to focus on the best way to integrate these in the design and delivery of a project. A study published by the Commission for Architecture and the Built Environment (CABE), entitled 'Design Coding: Testing its Use in England', suggests that in some cases developers could participate in – or even commission – the coding process.

The landowners, English Partnerships, have played a critical role in maintaining a coherent and consistent development process within which sustainable housing could be achieved. They have a commitment to translate R&D into actual, best practice, sustainable development.

Examples like Upton can help raise awareness of what is achievable in the building industry. English Partnerships have used these codes to develop a framework for the public sector, highlighting the potential for sustainable housing. There is nothing to prevent a private landowner (or consortium) following this system, and indeed there are examples of precisely this happening.

The use of design codes assists the discussions between developers and their design teams on the one hand and the developers and the decision makers on the other. Design codes have been a vital element in achieving the sustainability standards required on the Upton site.

Rolling out the approach

The Upton approach is producing more sustainable development in mainstream housing that incorporates innovative features and technology demonstrations. Design codes currently are voluntary, but they could provide a mechanism for local authorities to raise standards on all developments. At present, landowners such as English Partnerships are encouraging developers to adopt these standards by making adjustments to land values. Other demonstration projects are now under way and will provide further lessons for planners and developers alike. The ODPM and CABE websites give the most up-to-date information on outcomes and findings.

Sustainable technologies used at Upton

Green roofs. Vegetated roof structures that contribute to rainwater attenuation in a development and help mitigate biodiversity loss. There are four basic categories:

- 1 Intensive: designed for recreational use (roof gardens) including lawns, flower beds, shrubs and trees.
- 2 Simple intensive: designed to be viewed rather than accessed (usually lower maintenance).
- 3 Extensive: light weight and self sufficient, only accessible for maintenance.
- 4 Brown roofs: designed to replace natural habitats, replicating the original ecological environment of the site.

Micro-CHP

The simultaneous production of heat and power in a single building. It employs a small energy conversion unit which replaces a conventional boiler. Heat produced is used for space and water heating, while electricity is used within the building or fed into the grid.

PV systems

Systems that transform natural daylight into electrical energy. These are normally supplied in the form of photovoltaic roofing panels or bolt-on tiles.

Rainwater harvesting

The capture of rainwater for non-potable uses, reducing demand for mains water. Methods of capture range from rainwater butts for garden use, to dedicated harvesting systems integrated into a building's water systems.

SUDS

Measures to replicate natural drainage patterns on a site, delaying water drainage and so reducing flood risk. SUDS can also be used for landscaping, by providing watercourses, lakes and ponds (and adding to biodiversity).

Further information

The Energy Saving Trust sets energy efficiency standards that go beyond building regulations for use in the design, construction and refurbishment of homes. These standards provide an integrated package of measures covering fabric, ventilation, heating, lighting and hot water systems for all aspects of new build and renovation. Free resources including best practice guides, training seminars, technical advice and online tools, are available to help meet these standards.

The following publications may also be of interest:

- BedZed – Bedding Zero Energy Development, Sutton (GIR89)
- Energy efficiency in new housing – summary of specifications for England, Wales and Scotland (CE12) (for Northern Ireland CE24)
- Innovative social housing case study: Alpine Close, Maidenhead, Berkshire (CE37)
- Reducing overheating – a designer's guide (CE129)
- Renewable energy in housing (case studies) (CE28)
- Renewable energy sources for homes in rural environments (CE70)
- Renewable energy sources for homes in urban environments (CE69)
- Thamesmead Ecopark case study: Gallions Housing Association (CE130)

To obtain these publications or for more information, call 0845 120 7799, email bestpractice@est.org.uk or visit www.est.org.uk/housingbuildings

Other publications

- Best Value Performance Indicators for Local Government. ODPM. Available at: www.bvpi.gov.uk
- Code of practice on how to deliver advice on energy efficiency. Available at: www.goodenergyadvice.org.uk
- Design Coding: Testing its use in England. Available at: www.cabe.org.uk/data/pdfs/DesignCoding.pdf
- Green Roofs: their existing status and potential for conserving biodiversity in urban areas Available at: www.english-nature.org.uk
- Our energy future – creating a low carbon economy Energy White Paper. February 2003. DTI
- Reducing carbon emissions from the UK housing stock. May 2005. BRE
- Sustainable communities: building for the future. February 2003. ODPM
- Sustainable Communities: Homes for All. January 2005. ODPM
- Sustainable Energy by Design. Available November 2005. TCPA

Websites

Building Research Establishment: (BRE) www.bre.co.uk
 English Partnerships: www.englishpartnerships.co.uk/upton.htm
 Office of the Deputy Prime Minister: www.odpm.gov.uk

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