# Water shortages – rainwater harvesting to the rescue ...

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With recent floods still fresh in the memory, it is hard to think of water as a scarce commodity - but the fact remains that water supplies throughout southern England remain under stress, seriously so in the highly populated south-east.

Surprisingly, rainfall per head of population in the south of England is lower than in the countries surrounding the Mediterranean, again particularly highlighted in the south-east where population densities are highest and average rainfall is least. With population predicted to continue rising by a further 20-million over the next four decades, the water supply situation is predicted to deteriorate critically unless effective action is taken now.

## Policies and regulations ...

This imperative has been reflected for some time by Government policy documents such as the Code for Sustainable Homes (CSH) and its counterpart for commercial buildings, BREEAM assessments. The Code includes important mandatory targets for reducing mains water consumption, initially by bringing current average usage of 150-litres per person per day down to 120-litres (CSH levels 1 and 2), then in progressive stages (105-litres for CSH levels 3 and 4) down to 80-litres (CSH levels 5 and 6).

As a matter of policy, the Government is already committed to new houses funded by public money being built to CSH levels 3 and 4, becoming levels 5 and 6 within another two or three years. With the support of the house-building industry, it is also committed to progressively upgrading Building Regulations so that the private sector follows suit with all new houses being built to Code level 5 or 6 by 2016.

This is reflected in the draft updated Part-G of Building Regulations which came into force on 6th April 2010. For the first time these introduced the concept of two water supplies in the home, namely 'wholesome' (ie mains) water for potable use, and 'non-wholesome' (from some other source) for non-potable applications such as toilet-flushing, clothes-washing and the outside tap. The regulations go on to state the need for water efficiency and identify the maximum per capita consumption of mains water permissible.

## Water substitution ...

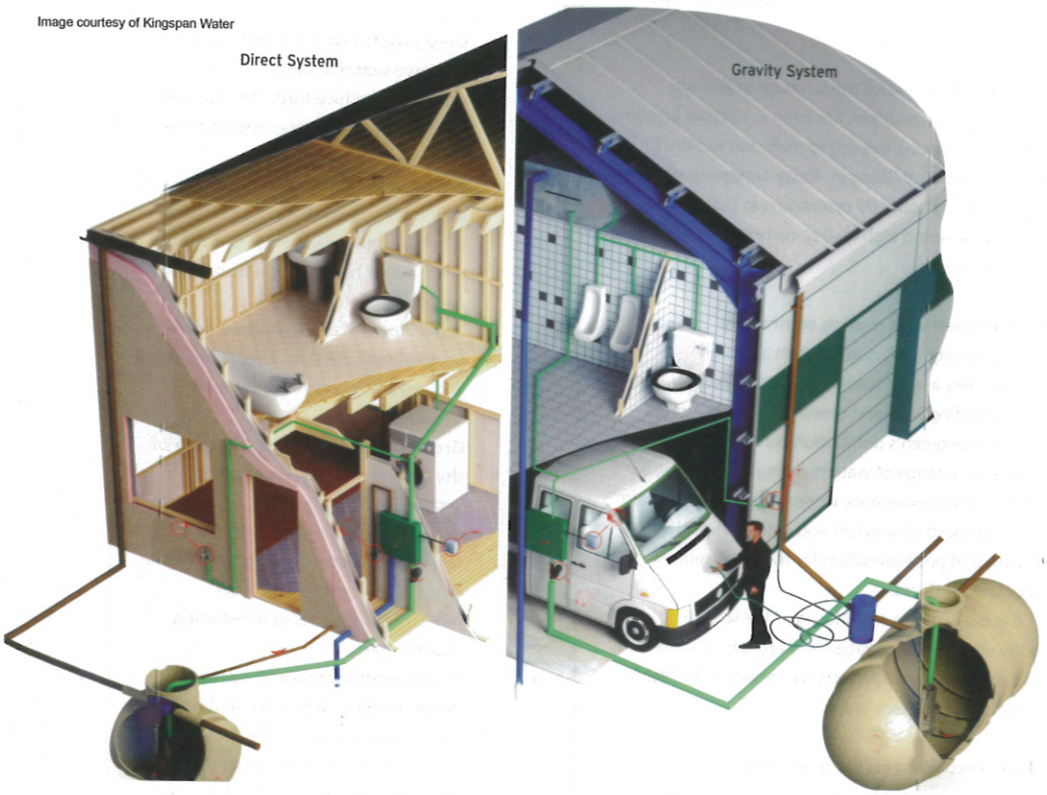
Using non-wholesome water instead of mains water helps to meet the water efficiency requirements set out in Building Regulations. The simplest and most cost-effective way of doing this is to revert to the historic practice of harvesting rainwater, with modern systems being entirely automatic and for the user indistinguishable from using the mains supply.

The installation of a modern rainwater harvesting system whilst a house is being built is very straightforward, with a storage tank being coupled to the normal guttering and down-pipes as part of the general drainage works. Separate pipework is also installed to serve the non-potable services so that at no time can the wholesome and non-wholesome supplies come into contact with each other.

Given the right balance between roof size, local rainfall and house occupancy, a correctly sized system will provide most of the non-potable water required by a household, thereby reducing mains consumption by up to 50%. In commercial premises and other ▷

buildings used by the public, this saving rises to well in excess of 80% given a large roof and a high demand for non-potable water.

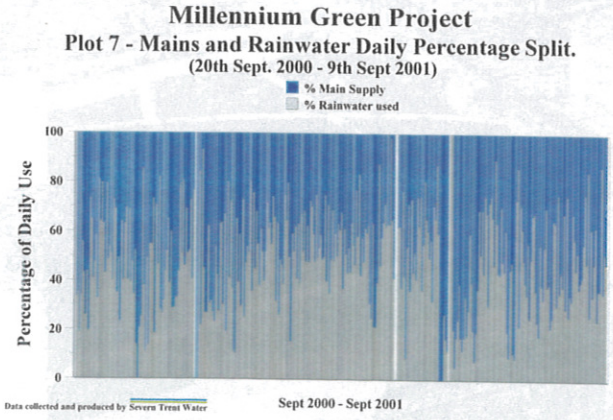
Image courtesy of Kingspan Water




## Impact on consumption ...

Applied to meeting the water consumption requirements of the Code for Sustainable Homes (progressively being mirrored in Building Regulations), levels 1 and 2 of the Code (120-litres per person per day) can probably be met by simply using straightforward economising measures such as smaller toilet cisterns, dual-flush cisterns, aerated shower and tap heads, and use of water efficient clothes and dish washers. However, this needs to be demonstrated, using the official water consumption calculator, to the local planning authority before the house can be sold, so for even this basic requirement substituting harvested rainwater for mains water might be the clearer option.

Levels 3 & 4 of the Code (105-litres) become more problematical as the benefit of all the above measures has already been reaped, leaving bath size (or omission of the bath altogether) as the only remaining economising measure. Alternatively, use of harvested rainwater to reduce mains water consumption is likely to be a more popular option for most buyers of new homes. Getting down to the 80-litres per person per day required by CSH levels 5 and 6, realistically can only be achieved by substituting non-wholesome water for mains water using technology such as rainwater harvesting.




## The big picture ...

Around 8 million new homes need to be built over the next four decades which, if fitted with rainwater harvesting systems, could reduce reliance on mains supplies by around 40 cubic metres per year per property, or 320-million cubic metres collectively. To this needs to be added the potential for fitting/retro-fitting systems to suitable public buildings which could easily double this figure, thus meeting around 10% of the country's total water needs.

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