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# Reducing Water Usage to 80 litres per day - How to meet the Code intelligently

**Achieving Level 6  
RIBA South  
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# Managing water sustainably is a mandatory part of the Code at all levels.

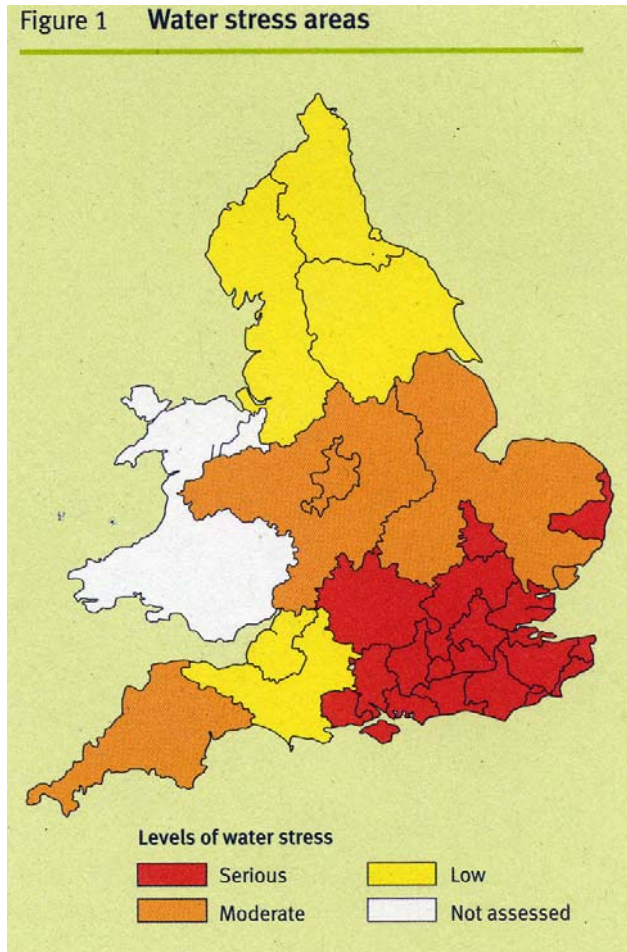


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# The Code for Sustainable Homes

Figure 1 Water stress areas



- The Code for Sustainable Homes has minimum standards for water use at every level.
- 120 litres pcc at levels 1 and 2
- 105 litres pcc at levels 3 and 4
- 80 litres pcc at levels 5 and 6

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# Meeting the Code – the Maths



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## The calculations behind the Code

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- Assumptions are made on usage of appliances. 5 minute showers, a bath 40% full, 8 uses at 28 seconds per use at the basin and sink, just under 5 WC flushes. If a shower and a bath assumes a 60/40 usage split
- The property will have connections for a washing machine and dishwasher. If no particular appliance specified a default figure is used of 49 litres per load for washing machine and 13 litres per load for dishwasher
- Water softeners will add to the load
- No penalty for en-suite bathrooms

With thanks to Elliot Carter and Jean Pierre Wack at

eight  
associates

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## 80 litres/person/day – with water efficiency

Appliance	Flow rate or volume	Total litres
WC	Dual flush 4/2.6 litres	14.72
Basin	2.25 litres/min	7.94
Shower	5 litres/min	25.00
Bath	No bath!	0.00
Sink	3 litres/min	10.59
Washing machine	None specified (default used)	16.66
Dishwasher	None specified (default used)	3.90
<b>Total</b>		<b>78.81</b>

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## 80 litres/person/day – with power shower and greywater (Pontos Aquacycle)

Appliance	Flow rate or volume	Total litres
WC	6 litre single flush	28.80
Basin	2.25 litres/min	7.94
Shower	13 litres/min	39.00
Bath	100 litres	16.00
Sink	3 litres/min	10.59
Washing machine	None specified (default used)	16.66
Dishwasher	None specified (default used)	3.90
Greywater recycling	From bath, shower and basin for WC flush and washing machine	-45.46
Rainwater harvesting	No	0.00
<b>Total</b>		<b>77.43</b>

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# 80 litres/person/day – with power shower and rainwater harvesting

Appliance	Flow rate or volume	Total litres
WC	4/2.6 litre dual flush	14.72
Basin	2.25 litres/min	7.94
Shower	13 litres/min	39.00
Bath	100 litres	16.00
Sink	3 litres/min	10.59
Washing machine	None specified (default used)	16.66
Dishwasher	None specified (default used)	3.90
Greywater recycling	No	0.00
Rainwater harvesting	Used for WC flush and washing machine <i>(if sufficient supply)</i>	-31.38
<b>Total</b>		<b>77.43</b>

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# Meeting the Code – the Effect on Carbon



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**Any sustainable water strategy should reduce the load on the mains water supply and should not increase the carbon load of the water supplied**



# The carbon load of water 1

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- It takes 1.2 kWh of (mostly) electrical energy to supply and treat 1m<sup>3</sup> of mains water.
- This results in 0.7 kg of CO<sub>2</sub> emissions per m<sup>3</sup> of mains water used
- Carbon emissions from the water supply industry are only 0.6% of total UK emissions but when we add domestic hot water use this figure rises to 5%.

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## The carbon load of water 2

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- Specifying alternative sources of water with a higher carbon load than the mains to enable more powerful showers is not a carbon literate choice.
- The carbon load of the water used in many “sustainable homes” will increase and less mains water use is far from assured

## The 5 minute shower.....

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- Any underestimation of shower use will have a large knock-on effect on both water use and carbon emissions



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## Meeting the Code – effect on Carbon

	Water use @	Water use @	Water use @	Carbon difference/year
Duration of shower	5 litres/min	8 litres/min	13 litres/min	Between 8 and 13 l/min (gas)
2 mins	10	16	26	31 kgCO <sub>2</sub>
5 mins	25	40	65	78 kgCO <sub>2</sub>
10 mins	50	80	130	156 kgCO <sub>2</sub>
15 mins	75	120	195	234 kgCO <sub>2</sub>
30 mins	150	240	390	468 kgCO <sub>2</sub>

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# Meeting the Code – A Smarter Way?



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# Rainwater harvesting



- Rainwater harvesting reduces localised stormwater run off and reduces demand for potable water.
- Rainwater can be used for garden watering with no further treatment needed
- Collecting and storing winter rainfall for use in summer reduces strain on the mains at peak times, should be compulsory in new build in the south and east of the UK and be better rewarded under the Code

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# Greywater recycling



- Use greywater on the garden, not back in the building
- The Watermatic system diverts greywater directly to drain during winter months
- Greywater is filtered and pumped immediately to garden in the summer so no chance of anaerobic decomposition
- Must be sub-surface irrigation
- Low carbon load

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## A smarter way??

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- The Code is designed to be ‘not prescriptive’ but by the very nature of the points allocation it actually becomes extremely prescriptive
- The Code should recognise reducing demand for water per se as the best option
- The Code should recognise the use of rainwater or greywater in the garden as at least equal to use in the building
- The Code needs to reward *intelligent* low carbon solutions



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**ech<sub>2</sub>o work with councils, developers, housing associations, architects and engineers, at both a strategic and individual site level, to successfully incorporate sustainable water and low carbon solutions into the built environment.**

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