

Enabling Water Smart Communities: Insights to date

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Shared challenges faced by water & housing sectors



**>4.8
billion
litres/day
deficit by
2050**

**1.5 million
new homes
in this
parliament**



**>60,000
homes could
be delayed in
south & east
due water
scarcity**

**8 million
properties at
risk of flooding
by 2050
(1 in 4)**

**30,000
homes
delayed by
inadequate
wastewater
infrast.**



An innovation project exploring the relationship between integrated water management, community engagement & practices, and housing development to unlock new opportunities for cross-sector delivery and stewardship.

Project Delivery Team



Independent Programme Board



What is a water smart community?



A WSC is a place where water is central to the design, where people embrace the principles of water stewardship and where they are empowered by assets and systems to use water wisely and with care for the environment

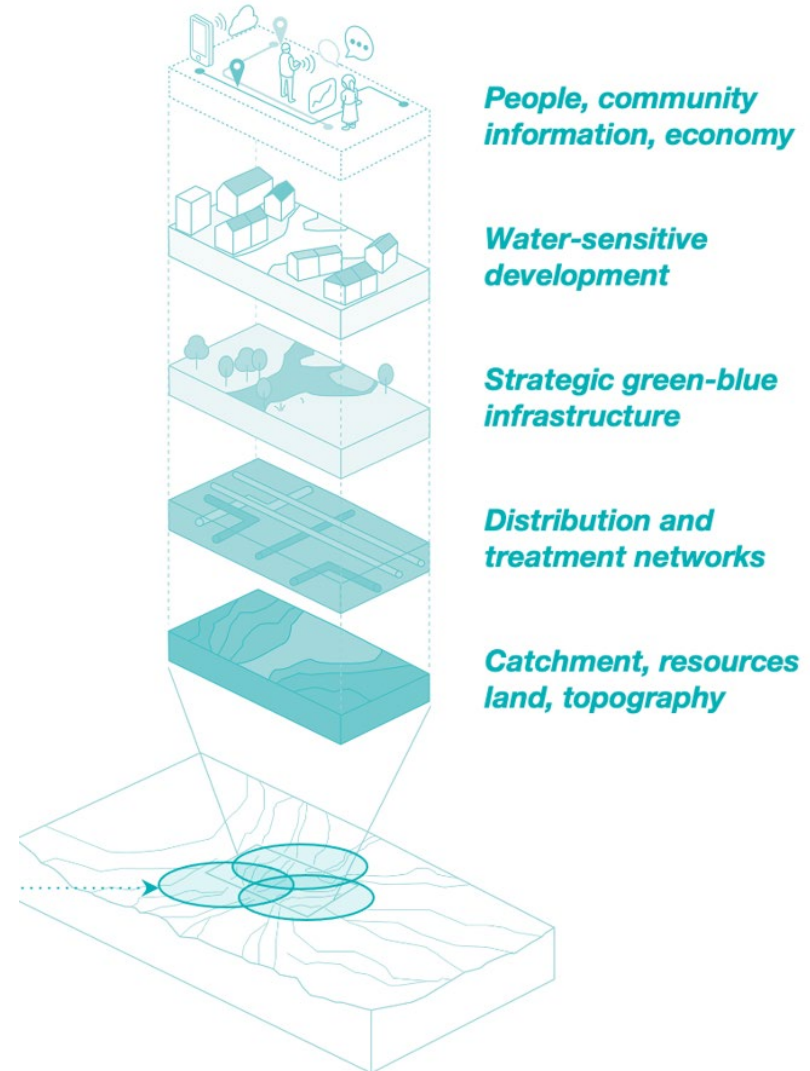
Our focus is on *Enabling...*



What is Integrated Water Management?



ARUP





The case for water smart housing

- Analysis suggests that 61,500 homes in south and east will be undeliverable due to water scarcity (based on the assumption that 1.5 million homes are delivered)
- Water scarcity 'gap' will not be met by large water resources schemes (e.g. reservoirs) in the short-medium term
- Building 'water smart' homes would help unlock housing delivery in water scarce areas
- If homes were 30% more water efficient (80l/p/d homes) then 49,000 of the 61,600 'lost' homes could be built





Guide: water efficiency and reuse in housing – design guide for a changing climate

- For architects, developers, planners, and housing associations
- Practical, evidence-based design strategies to help housing professionals deliver or exceed the government's target of 110 l/p/d
- Model specifications for fittings, layout and reuse systems
- Six case studies of water-efficient housing in action
- Developed in partnership with Good Homes Alliance, Pollard Thomas Edwards and industry leaders

Water efficiency and reuse in housing

Design guide for a changing climate



Delivered by
**Pollard
Thomas
Edwards**

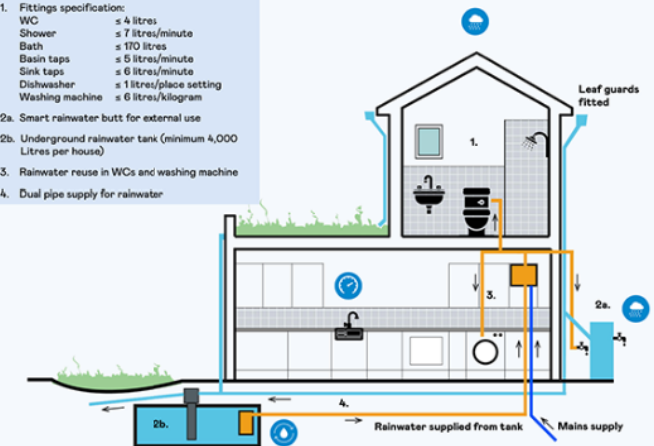
Supported by
**ENABLING
WATER SMART
COMMUNITIES**

UK Water Efficiency Collaborative Fund

Recommendations for developers - houses

- Make holistic design decisions instead of bolting on technology. This can mitigate against spiralling costs and deliver enhanced environmental, social and economic benefits.
- Allow space for water storage and treatment in site layouts.
- Following this good practice guidance and use model specification in projects to improve water efficiency.
- Follow the water neutrality hierarchy to optimise reductions and rainwater reuse on site, before offsetting in the local area.
- Remember the benefits of water efficiency including low bills, lower carbon emissions and greater resilience in water supply.
- Install dual-pipe for all new homes in water stressed areas.
- For large scale developments, consider site wide measures such as reservoirs, storm water recycling, and communal rainwater harvesting.
- Follow the Water Sensitive Urban Design principles as part of the wider site strategy.

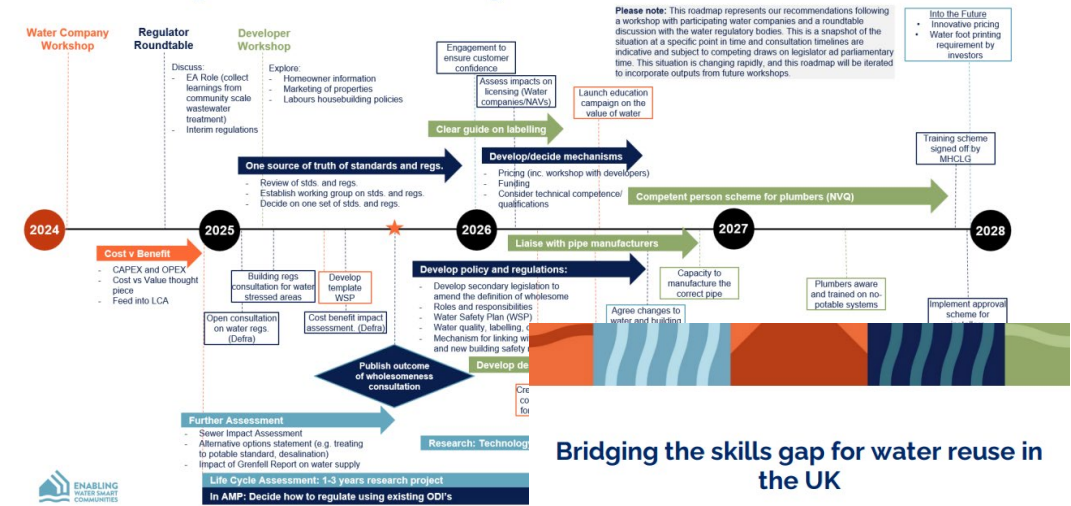
1. Fittings specification:
WC ≤ 4 litres
Shower ≤ 7 litres/minute
Bath ≤ 170 litres
Basin taps ≤ 5 litres/minute
Sink taps ≤ 6 litres/minute
Dishwasher ≤ 1 litres/place setting
Washing machine ≤ 6 litres/kilogram
- 2a. Smart rainwater butt for external use
2b. Underground rainwater tank (minimum 4,000 Litres per house)
3. Rainwater reuse in WCs and washing machine
4. Dual pipe supply for rainwater



The case for onsite water reuse

- Getting to 80l/p/d homes will require approaches such as rainwater harvesting and reuse. But reuse still relatively niche in UK
- EWSC is seeking to explore and overcome some of the barriers, setting out a **road map**:
 - public perception – next
 - installation costs (+ OPEX) – next
 - supply chain skills gap
 - impact of low flows on sewer flow & treatment – coming
- Government policy to support water efficiency & reuse:
 - Building Regs Part G – expected imminently
 - Mandatory Water Efficiency Labelling – April '26?
 - Independent Water Commission: recommended reuse
 - Review of regulations around 'wholesome water'

Roadmap for community-scale water reuse V2.0



Bridging the skills gap for water reuse in the UK

A scoping study on workforce development and professionalisation for Enabling Water Smart Communities



Impacts of Water Conservation on the sewer network

Abstract

Several UK water companies are making great efforts to reduce water consumption but often those planning water efficiency measures have little understanding of the potential impacts on sewerage infrastructure downstream. The tools and knowledge for assessing these impacts have been made available through academic research but are not in a form that is easy-to-use by the water industry. This pamphlet aims to display the information and methods available to assess these impacts in a format that is accessible for decision making.

This pamphlet has been produced on behalf of the Enabling Water Smart Communities project, supported by the OFWAT Innovation Fund, and is primarily derived from the authors PhD research and publications.

The case for onsite reuse: financial burden?

Analysed installation costs at 12 development sites, against 9 property typologies.
Considered costs of collection, treatment, external pipework and internal pipework



Greywater Recycling

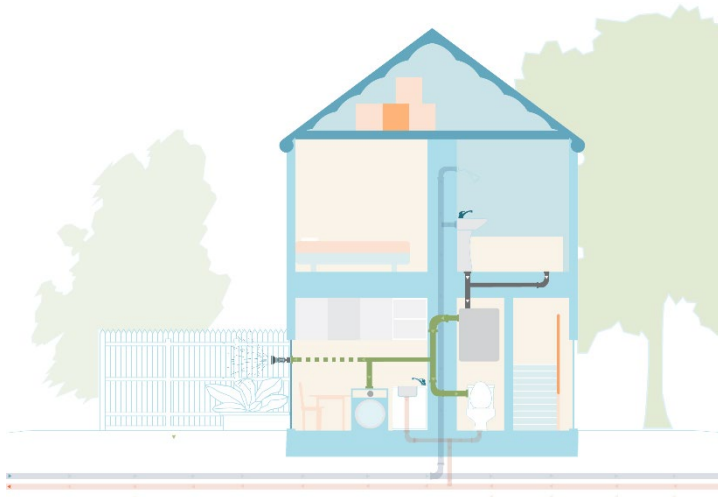
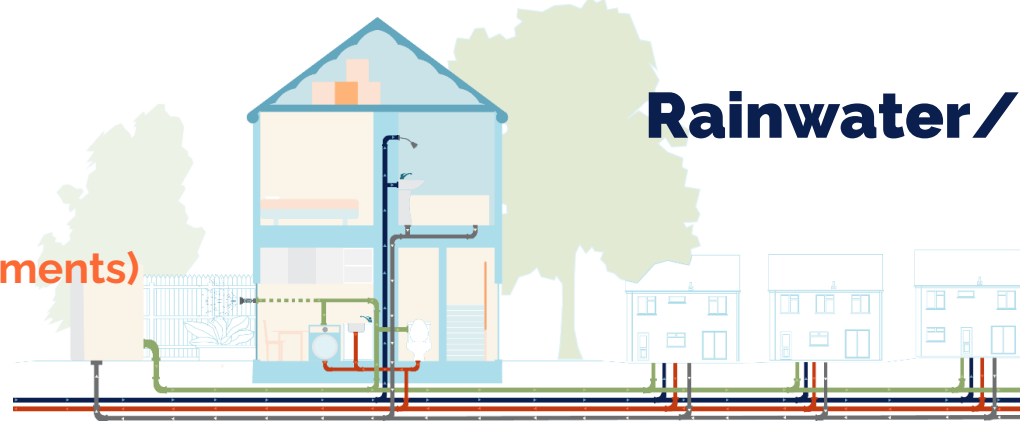
Community = c.£6k
(down to c.2.5k for dense developments)

On plot = c.£4k

Rainwater/Stormwater Recycling

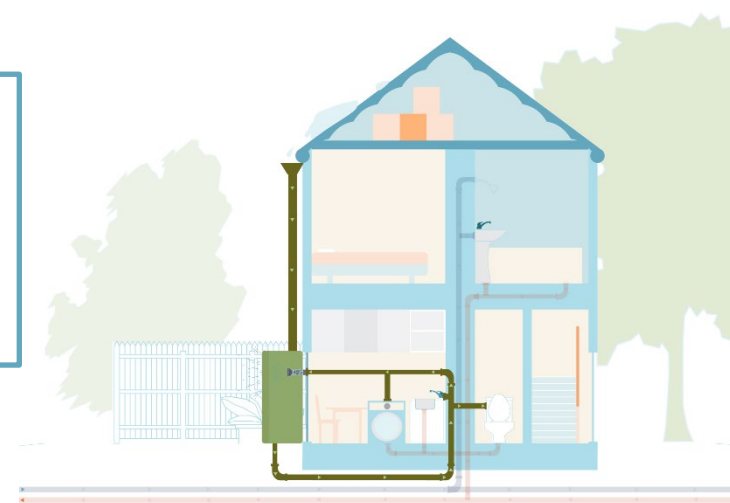
Community = c.£1.8k

On plot = c.£4k



Significant fall in costs with
development size (up to
around 100 units)

Higher density sites yield
lower costs



This analysis represents a first step: work being done to refine cost ranges and
assess the OPEX costs to get **wholelife cost and carbon estimates**



The case for onsite reuse: the public are on-board

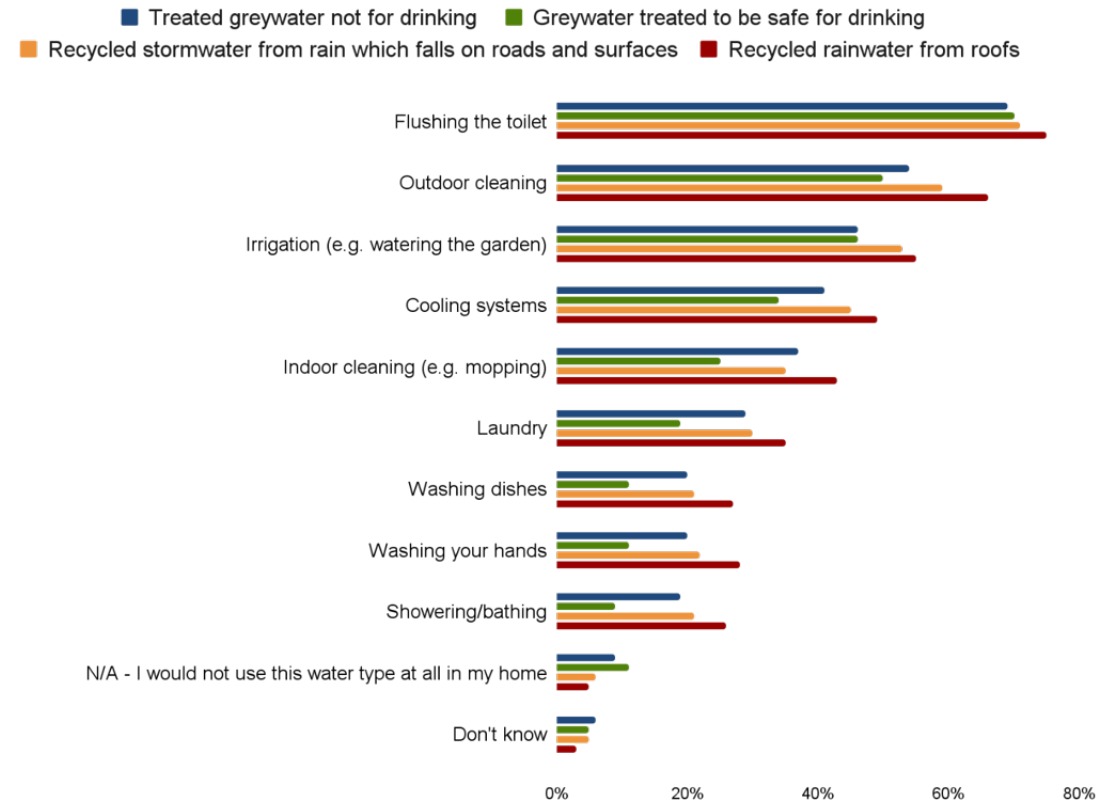
- Opinion poll with >4000
- Very few said they would not be willing to use recycled water at all
- **Type of reuse matters:** rainwater recycling is desirable; toilet water recycling is not.

People are most willing to use recycled water for flushing the toilet and outdoor tasks



- Public support for reuse is corroborated by qualitative research by **University of Manchester** which captured the nuance and conditionality of people's support for reuse: support dependent on trust in the technology itself, and in the governance of housing + water assets

Would you be willing or unwilling to use [Water Recycling Type] in your home for any of the following uses, if any? Select all that apply



Climate resilient green space: early findings from public & developer analysis into SuDS

Public perceptions: poll with > 2000 adults + immersive fieldwork:

- people value green spaces and clean air & water very highly; they are looking for opportunities to live and act sustainably
- the full functionality and value of SuDS is not well understood but, once explained, 82% are supportive
- the majority are willing to pay more to maintain green spaces and reduce flood risk - particularly strong in young people and first-time buyers
- 'SuDS premium' of approximately £4,000 per property



Developer perceptions: in-depth interviews:

- consensus around SuDS being a necessary and potentially valuable part of development
- viewed to have substantial amenity benefits for home buyers – but only where there is enough space, flexibility and regulatory coordination to make them work

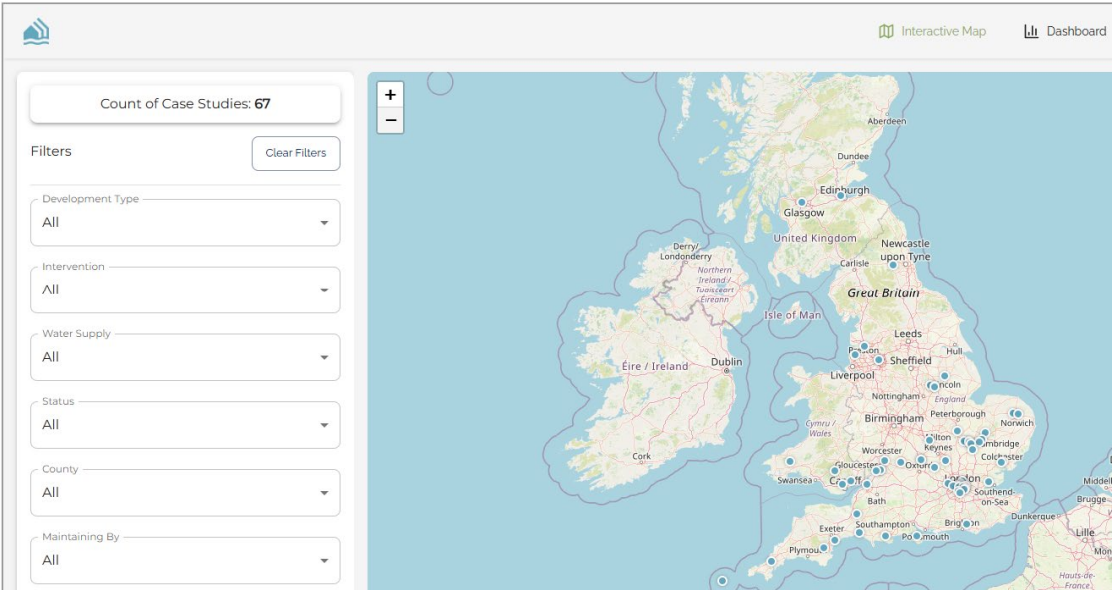
Cost-Benefit Analysis of high-quality SuDS versus traditional drainage solutions:

- similar or lower costs but significant environmental, social & economic benefits
- minimum 6x benefits compared to traditional solns
- key considerations to ensure C-B ratios are realised

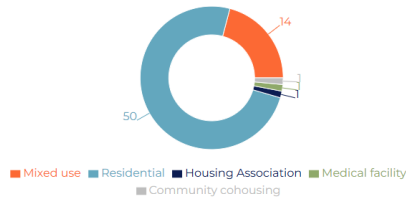
Case study dashboard

Online database of existing re-use schemes for domestic dwellings - from individual dwellings to very large regeneration schemes

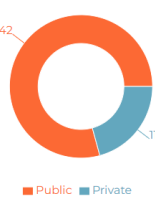
All the schemes included are using either a rainwater harvesting system, greywater recycling, or both



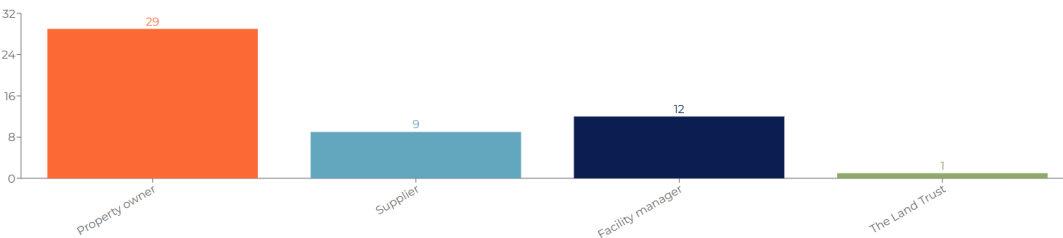
Type of Developments



Water Supply



Maintaining Intervention



Clay Farm Development, Cambridge

- Innovative approach using rainwater from hard standing as well as roofs
- 208 homes and commercial accommodation: homes arranged in quads with a central moat to store and attenuate rainwater
- Rainwater is fed through a reed bed where natural processes remove pollutants; then to a treatment plant where ozone is used to remove bacteria and viruses
- Water pumped to toilets through a dedicated non-potable pipe network
- Reuse system is fully remote controlled, allowing remote diagnostics and maintenance on demand
- Rainwater can be topped up with mains water during periods of low rainfall



Achieving consumption of 80 L/p/d
- to meet CfSH Level 5

Planning & Design: Pollard Thomas Edwards

Construction: Hill Construction for Countryside
Properties

Water reuse design: Aquality and AECOM



Summary of Water Company Environmental Incentives



All English water companies now offer incentive payments to developers for stormwater management measures and building homes that consume less water than required by building regs.

Uptake of incentives has been low to date. This new resource from EWSC attempts to address this by compiling all the environmental incentive offerings into a single document



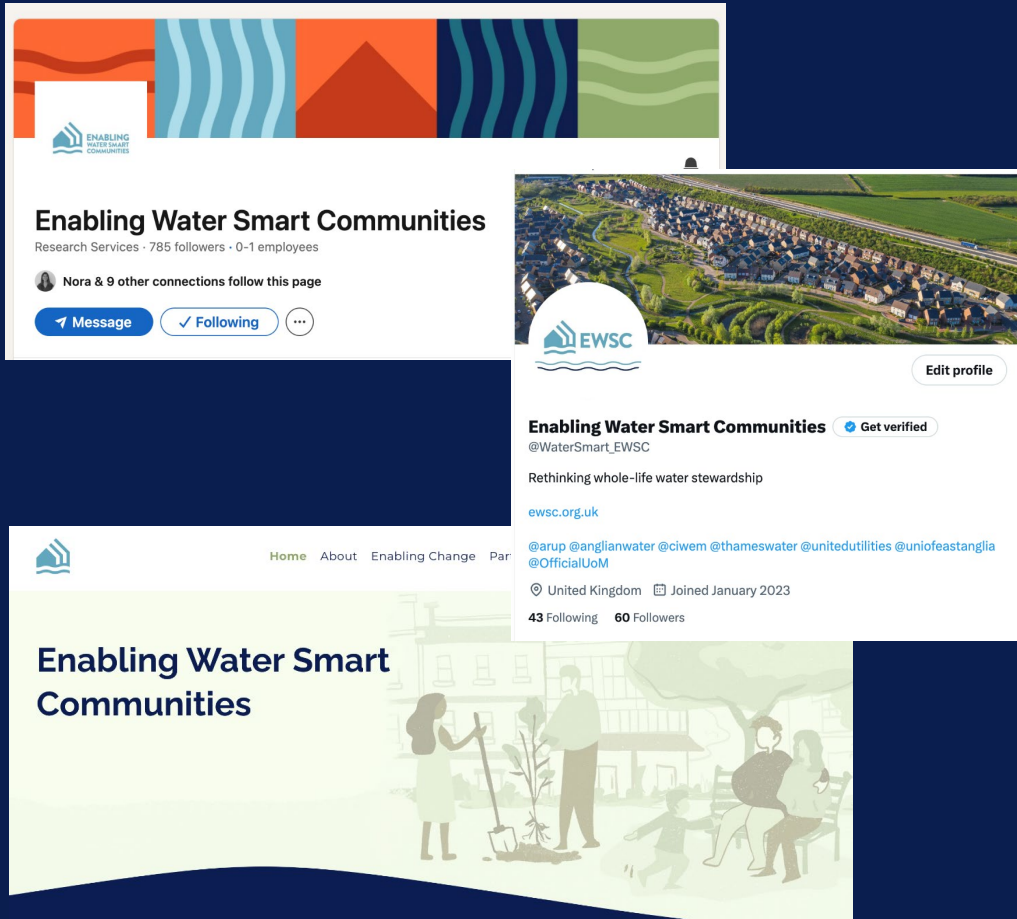
Water and Sewerage company: Water Environmental Incentives

Water company	Total Water Infrastructure charge	Water Environmental incentive Tier 1	Water Environmental incentive Tier 2	Water Environmental incentive Tier 3
Anglian Water	£602	£500 for <90L/p/d		
Northumbrian Water	£395	£350 for <100L/p/d		
Severn Trent Water	£446	£250 for <100L/p/d	£300 for <90L/p/d	£350 for <85L/p/d
Southern Water	£645	£250 for <100L/p/d or 10L/p/d < value in building regs	£800 for Water recycling	Equivalent of £300 contribution per property for Water neutrality
South West Water and Bournemouth Water	£573.72	£177 for <100L/p/d or 10L/p/d < value in building regs	£354 for <90L/p/d or 20L/p/d less than building regs	£382 for rainwater harvesting or £1453 for greywater recycling
Thames Water	£1,730	£400 for <110L/p/d or < value in London Plan	£2,100 for greywater recycling or rainwater harvesting	£700 for water neutrality
United Utilities	£471.26	£172 for <100L/p/d or £272 for <100L/p/d and 14 L/min flow regulator	£400 for water reuse	£664 for water neutrality
Wessex Water	£254.50	£100 for <100L/p/d		
Yorkshire Water	£632	£100 for <100L/p/d		

Water company	Total Waste Infrastructure Charge	Waste Environmental incentive Tier 1	Waste Environmental incentive Tier 2	Waste Environmental incentive Tier 3
Anglian Water	£403	£202 all surface water removed from the public combined or foul sewer		
Northumbrian Water	£83	£75 no surface water drains into existing public sewer		
Severn Trent Water	£548.16	£100 Rain garden	£275 Permeable surface	
Southern Water	£699	£100 no surface water drains into existing public sewer with SuDS		£699 Offsetting so no new wastewater from new site enters network
South West Water and Bournemouth Water	£966.77	£168 water butt or raised rain planter	£363 no surface water drains into sewer	£357 for rainwater harvesting or £1370 for greywater recycling
Thames Water	£525	£280 SuDS to reduce surface water entering network by >95%		
United Utilities	£501.39	£20 water butt, rain garden, or rain planter	£150 for permeable surface or £288 for now surface water draining to network and permeable surface	
Wessex Water	£1,251	£402 No surface water connecting to public sewer		
Yorkshire Water	£581	£200 Discharge via SuDS treatment train	£300 No discharge to public sewer	



EWSC – stay engaged



Enabling Water Smart Communities (EWSC) is an innovation project exploring the relationship between integrated water management, community engagement and practices and housing development to unlock new opportunities for cross-sector delivery

For news or to get involved, please get in touch:

Website | <https://www.ewsc.org.uk/>

LinkedIn | <https://www.linkedin.com/company/92882504>

Email | ewsc@anglianwater.co.uk

Reports



Webinars:

- * 19 September Rethinking skills, systems & solutions for a resilient future 13:00 – 14:00
- * 24 September Water Efficiency & Reuse in Housing - Design Guide 13:00 – 14:00

