

## Position statement

### The use of rainwater harvesting systems

#### Who this document is aimed at

This position statement outlines our current position on the use of rainwater harvesting, broken down into key areas of relevance.

#### An overview of our position

Rainwater harvesting can be a useful means of enhancing water supplies and reducing the demand on water resources. Rainwater harvesting also has the potential to contribute to the improved management of surface water run-off. However, we consider that:

- Each proposal should be examined on a **case by case basis**.
- The effectiveness of rainwater harvesting schemes varies considerably and **depends on the sector and scale**.
- Simple water efficiency measures should always be considered before rainwater harvesting.

This document outlines our position on rainwater harvesting and provides sector-specific links to further information.

#### Differences across sector and scale

Rainwater harvesting systems vary significantly in their function and form. The garden water butt is the simplest and cheapest way of collecting rainwater. Rainwater collected in a water butt for garden watering requires no treatment or pumping and therefore has minimal environmental impact. More complex systems are available that include treatment and pumping and allow water to be used for wider uses, such as toilet flushing or supplying washing machines. However these systems have a greater environmental impact themselves.

Systems with high-volume tanks and large collection areas, such as those often used in agriculture, can maximise the potential to store water throughout the year and may significantly reduce mains water demand or dependence on water from rivers or groundwater sources.

However, in some circumstances, rainwater harvesting systems can be expensive and have long pay-back periods. Systems with a small tank, installed in high density, urban areas (such as single domestic systems) can be costly and the volume of rainwater collected and used can be low. They also require ongoing maintenance in order to maintain effectiveness and are typically more energy and carbon intensive than alternative water supply and efficiency measures.

## Other considerations

Our position on the use of rainwater harvesting is presented in more detail below and broken down into several key areas.

### ▪ **Demand management**

Rainwater harvesting systems:

- provide a larger potential resource in areas with regular and abundant rainfall. If we experience fewer, more intense rainfall events in the future as a result of climate change, this would reduce rainwater yield and therefore reduce the potential benefits of rainwater harvesting systems. Systems may be better to supplement existing sources of water, rather than being relied upon as a sole source;
- may reduce demand for mains water, but are unlikely to reduce overall water consumption. They provide an alternative supply, which may have a smaller or larger environmental footprint than local mains water or other alternatives;
- should not be used as a substitute for water efficiency. All cost-effective water efficiency measures should be put in place before alternative supplies are considered. We would always endorse a water audit to recognise and benchmark water use before investment is made in a rainwater harvesting system.

### ▪ **Flood risk management**

Rainwater harvesting systems:

- can form part of a Sustainable Drainage System (SuDS) for new build or retrofit developments, where practicable, reducing the amount of rainfall run-off that enters infiltration systems, watercourses or sewers during or shortly after a rainfall event;
- may help to reduce the frequency of operation of existing combined sewer overflows and thereby increase capacity of the existing sewerage infrastructure to accommodate foul flows from new development;
- contribute to surface water management and can impact favourably on the design of other SuDS if designed to BS 8515:2009;
- must be designed to ensure that flood risk is not increased when the storage tank is full or out of operation. This means including safe, above-ground exceedance flow routes, sized to take the maximum potential inflow to the system.

It is important to ensure that flood risk is not increased as a result of the installation of a rainwater harvesting system, for example, under extreme conditions or when the system is not operating correctly.

### ▪ **Sustainability and reliability**

Rainwater harvesting systems:

- normally include a backup mains water supply. This can cause mains water to be wasted and contaminated, if inappropriately installed or inadequately maintained;
- require maintenance. If maintenance is inadequate, reliability can be an issue, leading to increased costs and reduced benefits. BS 8515:2009 provides detailed guidance on design and the correct installation and maintenance.

## ▪ **Greenhouse gas emissions**

Rainwater harvesting systems:

- are generally more carbon intensive than mains water<sup>1</sup>, particularly where rainwater is treated beyond basic filtration. The carbon footprint of all aspects of a system, including manufacture, pumping and treatment of harvested water, needs to be considered and compared against any water demand reduction associated with the system;
- vary greatly and so does their environmental impact. Factors that influence this include the roof and tank size, location and design of the system;
- can increase carbon emissions. Our research<sup>2</sup> concluded that total emissions from manufacture, installation and usage over 30 years for an average household system are between 1.25 – 2.0 tonnes of carbon dioxide. This is equivalent to the total annual emissions from a home built to meet Code for Sustainable Homes level 3. Most of these emissions are associated with tank materials and pumping energy. Opportunities to reduce emissions include development and use of lower embedded carbon materials and more efficient pumps;
- that are designed to have both surface water run-off and water demand management functionality will be substantially larger than those designed for water demand management alone. The carbon implications of these systems therefore needs to be considered carefully.

## ▪ **Applicability**

Rainwater harvesting systems:

- may be appropriate where:
  - all feasible water efficiency measures are already in place;
  - the planned system is cost effective (including ongoing maintenance costs);
  - the planned system will be competently maintained and monitored;
  - energy use and carbon emissions are minimised;
  - the planned system will not have unacceptable impacts on a sensitive water body;
  - they offer a more sustainable solution to manage surface water run-off than could be provided by other SuDS approaches.

## ▪ **Internal Environment Management (IEM)**

Rainwater harvesting systems:

- may be an appropriate Internal Environmental Management option for businesses. However, any decision regarding installation of a system should be considered very carefully, as the long term carbon cost may be higher than alternative options. For example, an office with a flat roof and a small storage tank will not gain much benefit. Factors to consider include:
  - office location and design (e.g. type and size of roof, local rainfall, pumping requirements);
  - size and design of system;
  - number of staff;
  - pay-back period (carbon and financial);
  - current method of surface water run-off management.

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<sup>1</sup> Excluding water butts.

<sup>2</sup> Energy and carbon implications of rainwater harvesting and greywater recycling. Environment Agency, Energy Saving Trust, National House Building Council Foundation, 2010. SC090018. (<http://publications.environment-agency.gov.uk/pdf/SCHO0610BSMQ-e-e.pdf>)

## **Additional information**

Rainwater harvesting is a complex area with no easy answers. This position statement only scratches the surface in terms of the many aspects which need consideration when deciding whether a site may benefit from a rainwater harvesting system.

There is additional information in the public domain which provides further advice and guidance regarding the costs and benefits of rainwater harvesting within particular sectors (i.e. commercial, domestic or agricultural):

- [Harvesting rainwater for domestic uses: an information guide](#) (Environment Agency)
- [Conserving water in buildings, Chapter7: using greywater and harvesting rainwater](#) (Environment Agency)
- [Rainwater harvesting: an on-farm guide](#) (Environment Agency)
- [UK Rainwater Harvesting Association website](#)

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