



Alternative Water Systems Information Leaflet and Guide

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 **WaterRegsUK**

Introduction

Alternative water sources are often considered for use in homes and business premises, as a way to be more sustainable for the future. Water undertakers are aware of an increasing level of alternative water systems, particularly borehole supplies and rainwater harvesting units that have been installed incorrectly or have not been adequately maintained, leading to serious public health risks at the properties involved, and potential wider risk to public water supplies.

The following guidance covers the key areas which must be adhered to and areas that need careful consideration for anyone designing installing and using these systems in premises where there is a mains water supply, even if this is only a backup supply.

Wherever an alternative source of water is being considered or used, to ensure the end users are not exposed to undue risk the system must be able to deliver an appropriate level of water quality.

What do we mean by alternative water?

Alternative water is a term covering a wide variety of sources including boreholes, river water, industrial process water, as well as water reuse such as rainwater harvesting and greywater.

The purpose of these systems is to provide an alternative to mains drinking water. The most common systems used in the UK are rainwater harvesting, private boreholes (with mains water backup) or greywater treatment.

Rainwater harvesting – what is it?

In simple terms it is a means for diverting rainwater that falls on roofs, or other collection surfaces of a property, and storing it, usually in an underground tank, for later reuse.

Collected rainwater will contain atmospheric and environmental pollutants and is likely to contain some animal and bird faecal matter. The extent of such contamination will vary from site to site, but some degree of contamination must always be assumed.

Greywater – how is it different?

Greywater is the domestic wastewater from our homes and businesses, excluding the wastewater from toilets and urinals, which is known as blackwater because it is likely to contain faecal matter, and bodily wastes.

Greywater can be sub-divided by the source. Kitchen greywater is likely to contain high levels of fats, greases and organic matter, bathroom greywater is also likely to contain these but theoretically at lower levels. Ideally greywater should be collected and treated before reuse.

What other sources can be used?

There are a great many sources of water that can be used, but it is often the amount of treatment needed to bring it up to a suitable quality that limits its use.

Whilst in most cases groundwater sources are relatively clean and can be used without treatment for irrigating crops and for animal drinking water, it cannot be assumed that they will be contamination free.

Water Fittings Regulations

When do regulations apply?

The Water Supply (Water Fittings) Regulations, byelaws in Scotland apply to properties which are connected to a mains water supply.

These regulations play an important role in protecting water supplies and public health by setting legal requirements for the design, installation, operation and maintenance of plumbing systems.

Anyone with a mains water supply, even if it is only a backup supply, is legally obliged to comply.

Yes, you need to tell the local water undertaker about your alternative water system installation.

One requirement of the regulations/byelaws is to provide the local water undertaker with advanced notification of proposed plumbing work. This is in effect a free safety service, a check to help minimise the risks to water supplies.

Although there are some exemptions to advanced notification, in the case of alternative water supplies notification of any proposed plumbing work, even that undertaken by an approved contractor, requires notification.

You can find out who your local water undertaker is by visiting: water.org.uk/advice-for-customers/find-your-supplier/

What sort of risk do alternative waters pose?

Backflow occurs when fluids flow in the opposite to the intended or normal direction of flow. Contamination of public water supplies by backflow of contaminants from customers' premises is a real threat to both water quality and public health, which is why water undertakers take their role in preventing such incidents very seriously.

Essentially all alternative water supplies will be considered a fluid category 5 risk, that is to say it poses a serious health hazard.

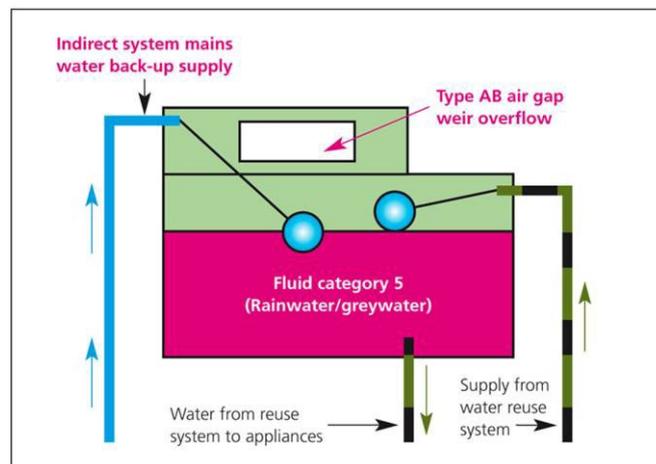
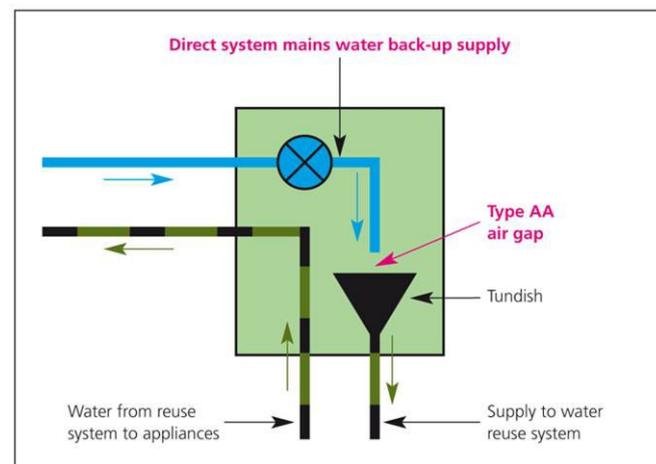
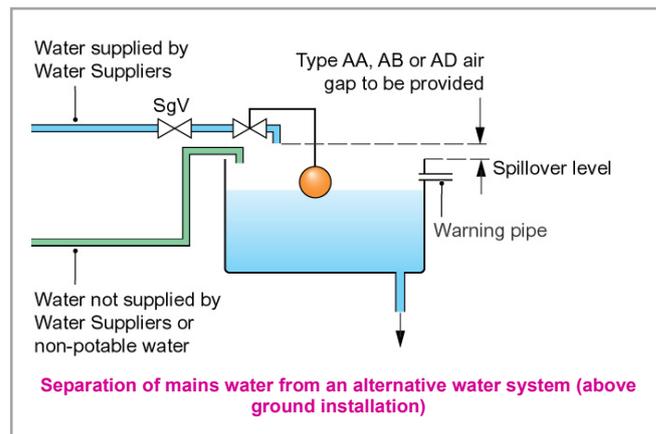
Rainwater will contain atmospheric pollution and due to the nature of the surfaces from which rain is collected, means it is also likely to contain faecal, biological or pathogenic contaminants. Similarly, greywater and collected wastewater from washing etc., is also likely to contain faecal and pathogenic organisms.

Other alternative water supplies from boreholes and rivers are likely to have a wider range of pathogenic organisms and possibly faecal matter and are therefore placed in the same category.

What backflow protection is required for a mains water back-up supply?

Fluid category 5 protection is required to separate the mains water supply from the alternative water system. This can only be achieved through the installation of either a Type AA, AB or AD air gap, or through the use of a Type DC pipe interrupter. The most common methods are through a Type AA or AB air gap.

Examples of Backflow protection



Internal back-up supply module with twin supplies and Type AB air gaps.

No direct or removable cross-connections are allowed. If a customer cross-connects to their mains water supply, it can have severe consequences.



A cross-connected borehole supply pumped un-wholesome water into the public mains supply (now disconnected) because of the difference in supply pressures.

Clothes washing machines

Standard domestic machines do not have the fluid category 5 protection capability that is needed; therefore, these must not be connected to both domestic hot/cold water and the alternative water supply.

Dead legs

In normal operation the back-up supply should not be needed on a regular basis. Due to the low frequency use, there is the opportunity for water to stagnate and this should be avoided. Where this is not avoidable, additional backflow protection, such as a single check valve, must be installed at the branch supplying the back-up supply system to protect the drinking water supply.

Additional protection

Some water undertakers may require additional backflow protection to ensure cross contamination between premises is adequately prevented.

Do I need special pipework?

Pipes must be made from materials that are suitable for location, temperature range, and the type and quality of the alternative water to be used. This will ensure there are no adverse effects, for example corroding pipework, due

to factors such as low pH or other chemical effects.

Do I need to label and mark?

To ensure users are fully aware of the type of water being conveyed to a particular installation or appliance, labelling and marking in accordance with BS 1710: 2014 must be applied. Further guidance on this can be found on the [WaterRegsUK](https://www.waterregs.uk) website. This will draw attention to the presence of an alternative water supply and help ensure appropriate precautions are taken by users and future occupants.



Example of poor installation, with no marking to clearly identify rainwater from mains water.

Do these systems need maintenance?

Maintenance is vital to make sure maximum benefit can be gained by users. It is essential to follow the maintenance requirements specified by the manufacturer of the alternative water system.

Back-up water supply

What happens when there's no alternative supply?

All rainwater harvesting is reliant on frequent rainfall, and this will vary across the country. Even the areas of the country with the highest rainfall will experience dry periods. When this happens, it is essential to have a back-up supply to keep appliances operating.

Greywater systems are reliant on occupiers using baths, showers etc to provide it with an

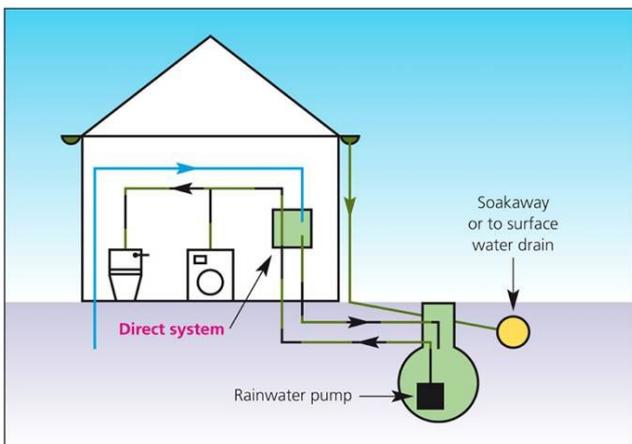
alternative water supply. Should there not be enough untreated greywater to process, or the treatment system fails for some reason, systems should be designed so that it is able to continue to operate by using an alternative supply. If there is no alternative water to supply it, the system will stop working.

Typical backup designs

In general, there are two basic plumbing designs used to distribute alternative water to the end use appliances, direct and indirect.

Direct systems

This is where water is pumped directly from a borehole or storage such as the underground tank, direct to the points of use, for example toilets and outside taps.

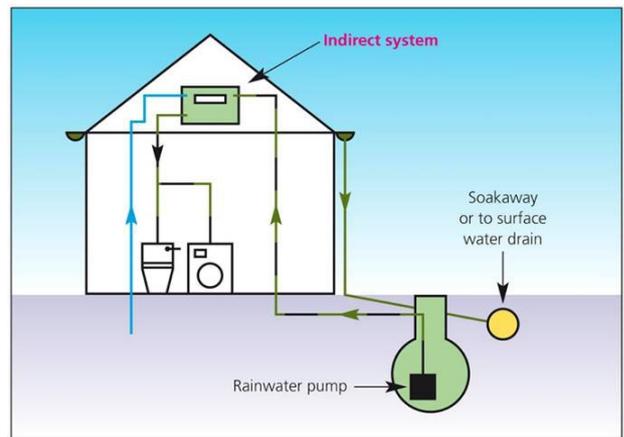


In the event of a failure involving any of the sensors, pumps, controls or a power cut there will be no water for the appliances supplied, for example, toilets, outside taps etc. Even the mains water supply back-up would be of no help, as this normally fills into the low level storage tank or treatment system and needs further pumping.

Indirect systems

This is where the alternative water is pumped from the borehole or storage tank up to an intermediate cistern at high level, for example in the roof space, from where it can then feed by gravity to the points of use.

Having the mains water supply as a backup, connected into this cistern may address the problem of system or power failure.



This system typically provides low pressure water to the appliances and potentially low flow rates.

Summary

Alternative water supply systems can offer a way to help save on mains water use, providing they are installed and maintained correctly.

A few simple checks are:

- Notifying the local water undertaker if you are planning to install an alternative water supply system. You can find out who your local water undertaker is by visiting: water.org.uk/advice-for-customers/find-your-supplier/
- Selecting a design that can ensure a constant supply of water is available for critical appliances such as toilets.
- Make sure there are no cross-connections.
- Ensuring the backflow protection is of the correct type.
- Apply labelling and marking
- Make sure users are fully conversant with the systems, particularly operation and maintenance requirements.

DISCLAIMER AND LIMITATION OF LIABILITY

This document is non-statutory guidance and intended for general guidance purposes only. No reliance should be placed on it for the purposes of designing, producing, installing or otherwise dealing with any product. This guidance does not guarantee compliance with the Water Supply (Water Fittings) Regulations 1999, the Water Supply (Water Fittings) (Scotland) Byelaws 2014 and the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 and should not be taken as guaranteeing no enforcement action will be taken in respect of it by water undertakers.