

EA-Water Resources



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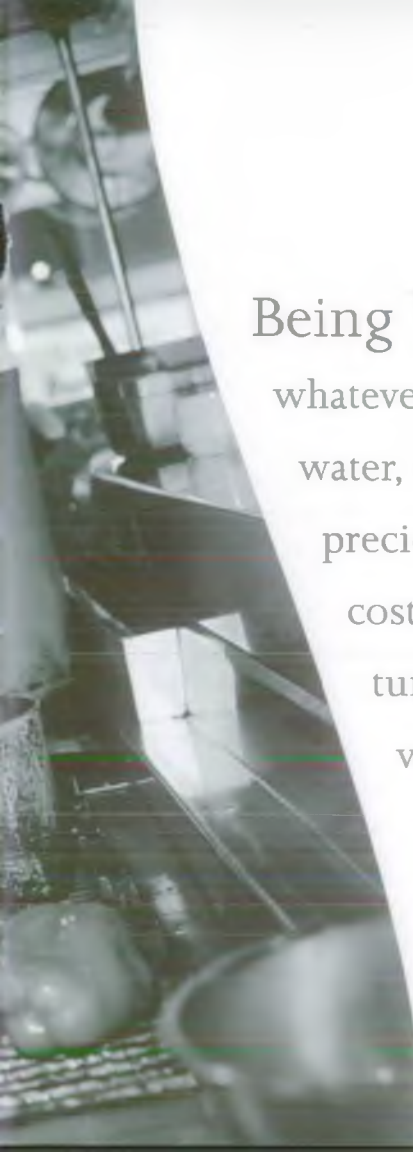
Waterwise

Good for business and good for the environment



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Being **Waterwise** is good for your business, whatever business you are in. All commercial organisations use water, but how many know exactly how much of this precious resource they are using? Water bills could be costing your company over 1 per cent of business turnover¹ and many organisations are paying more in water and associated costs than they need to.

¹ www.envirowise.gov.uk

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This *Waterwise* guide provides businesses and other organisations with a simple and systematic approach to developing and implementing a water management plan. By investing a little time and money in managing water effectively, your organisation can:

- reduce operating costs
- help preserve water resources
- fulfil corporate and social responsibilities
- establish 'green' credentials

Waterwise is part of a series of free water efficiency publications from the Environment Agency. See page 28 for more details.



How to develop a water management plan

A water management plan is an action programme for the efficient use of water in your organisation. Obtaining management and employee support and promoting successes are just as important as data gathering and setting targets. These aspects of a water management plan will enable you to achieve continuous results, rather than just a one-off hit. The six basic steps of an effective water management plan are set out below.

Effective water management plan

- Step 1** Obtain management and staff support
- Step 2** Identify the true cost of water
- Step 3** Identify your water-use
- Step 4** Re-assess your water-use
- Step 5** Identify and evaluate water efficiency measures
- Step 6** Implement your plan and report results



Step 1 Obtain management and staff support

Full management support is essential to any successful water management plan, as without adequate time and financial commitment, savings will be minimal. The principal functions that should be involved from the outset are facilities management, finance and operations. However, the active support of *all* staff is key to the success of the programme and they should be involved in the planning process.

Writing a simple water policy statement is a good way of ensuring that all employees are fully aware of the importance of the project and what role they are expected to play. This could be a part of your existing environmental statement.

Positive communication is a crucial element of any water management plan; people can be very suspicious when confronted with water efficiency measures that challenge conventional views of hygiene, such as waterless urinals or greywater recycling.

Example water policy statement

“This organisation is committed to developing and maintaining a comprehensive water saving programme. This will increase efficiency, cut costs and enable us to make a positive contribution towards enhancing the environment.”

Step 2 Identify the true cost of water

Understanding the true cost of water is crucial in managing water usage. Often, costs are unknown and mistakenly perceived to be too low to be of concern. To identify how much water is costing you:

- firstly, check water bills during the previous two to three years, noting the annual consumption and cost;
- next, identify any trends or patterns such as seasonal variations or unexplained increases, which may indicate leaks;
- consider associated costs such as energy requirements, treatment and chemical input;
- finally, read the meter on a regular basis.



A metered water bill is made up of four separate costs:

METERED WATER SUPPLY AND SEWERAGE SERVICE BILL
The period covered by this bill is 01/01/2010 to 31/03/2010

Description	Units	Rate	Amount	Total
WATER SERVICES				
Water supply charge	1000	0.1500	150.00	150.00
Water metering charge	1	100.00	100.00	250.00
SEWERAGE SERVICES				
Sewerage service charge	1000	0.1500	150.00	400.00
Sewerage metering charge	1	100.00	100.00	500.00
TOTAL AMOUNT DUE				500.00

Payment Slip Bank Giro Credit

- a standing charge for water supply, which is often dependent on the size of the water meter (the bigger the meter, the greater the standing charge);
- a charge per m³ for the amount of water used;
- a standing charge for disposal (sewerage) costs also based on the size of the water meter;
- a charge per m³ for the amount of water discharged to the sewer.

In addition to these direct costs, there can be associated costs (depending on the organisation) which include:

- energy costs for heating, pumping and treating water;
- treatment costs for treating contaminated water prior to discharge;
- maintenance costs for pumps, flow meters, and corrosion of pipework and equipment.

Established benchmark figures are available for a variety of organisation types (see '*Need more information*' on page 28). By comparing your actual water usage against these, you can identify how great the potential is for reducing your water consumption.

Benchmark figures for office water consumption

A figure of 8 cubic metres per full-time employee per year (8m³/FTE/year) has been suggested as an office benchmark.

The calculation for determining the water use per person in your office is as follows

$$\frac{\text{Annual water use (m}^3\text{)}}{\text{Number of staff (Full time equivalents)}}$$

For example, for an office with 53 full-time staff and 8 part time staff, equating to 57 full-time equivalents and a six monthly water use of 411m³ (taken from the bill) the calculation would be:

$$\frac{411 \times 2}{57} = 14.4\text{m}^3/\text{FTE}/\text{year}$$

While water costs may appear trivial in comparison with turnover, in terms of absolute cost they often represent significant amounts of money. Considerable reductions in costs can be achieved (potentially up to 80 per cent on a site where no previous action has been taken). Many actions to reduce water-use have short payback periods of 6 to 24 months.

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Save the business and grow the environment



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Water-use inventory						
Item	Number of units used	Location	Flow rate (litres/minute) or (litres/second)	Operating time (minutes/day) or (hours/day) for each unit per day	Water used (litres/day) = A x B x C	Comments
WCs	10	Toilets	9 litres/flush	4 flushes/day	360	
Shower	10	Toilets	0.5 litres/minute	4 minutes/day	200	only 10 mins showering office hours
Sinks	10	Restrooms	4 litres/minute	5 minutes/day	200	
Waters	1	Toilets	10 litres/minute	10 minutes/day	600	

The above information is for use in an example only.

Appendix 2

Example water use inventory



Step 3 Identify your water use

The next step is to carry out a water-use survey to determine how, where and why water is being used. The easiest way to do this is to draw up an inventory of all the water-using items in the building, noting the number, location, flow rates and operating times.

An example water use inventory is given here and a clean copy for photocopying can be found in Appendix 2. Remember to talk to operating staff in each area to find out how they use the water and any suggestions they may have for improvement.

Measuring/estimating flow rates and duration of flow

Where possible, measure the time taken to fill a container of a known quantity, such as a bucket, jug or plastic bag. WC cistern volumes can be calculated by gently tying up the ballcock, flushing and re-filling the cistern from a graduated bucket or jug. Water use at washbasins can be gauged by temporarily disconnecting the U bend and running the waste into a graduated bucket, using the tap water to simulate normal use such as hand washing.

Calculation of an accurate water balance also requires accurate estimates of operating hours for the water-using item. Issues to consider here include the number of operating days per week or month, seasonal variations (such as heating and cooling systems) and staff occupancy.

Once the survey is complete, you should have a "water balance" which lists and quantifies individual items of water use. This should be compared with the amount of water metered, that is, the total water use for the building. A 10 per cent discrepancy for "unaccounted" water should be expected, but anything more is likely to mean that something has been missed or, more seriously, there is an undetected leak (see page 25).

Step 4 Re-assess your water use

Now you know how much water your organisation is using and you have identified all water uses on the premises, you need to re-evaluate the necessity for this use. This step will help to focus your actions for improving water efficiency.

Consider whether the quantity of water currently being used for a particular task is actually necessary and assess whether the task could be altered to use less water, or whether the water could be used more efficiently. You may decide to prioritise your actions on the larger water-using areas of your premises, such as the washrooms.

At this stage it is important to talk to staff who use or operate the water-using appliances, as they may have a better understanding of the processes or have suggestions for improvements. Good housekeeping activities, such as ensuring that water-using appliances are turned off when not in use and fixing dripping taps promptly, can save significant amounts of water at virtually no cost.

Step 5 Identify and evaluate water efficiency measures

Having identified your organisation's use of water, the next step is to evaluate water efficiency measures (WEMs) for their potential to reduce water consumption and cut costs. As well as reducing water costs, many WEMs will give additional savings on sewerage, energy and treatment charges. In some cases, WEMs may incur additional annual costs, for example, maintenance charges. The annual savings minus the annual costs will give a figure for net annual savings. Most WEMs provide ongoing savings. A list of WEMs that may be suitable for your organisation is given on page 18.

Payback periods

By comparing the expected net annual savings with the capital costs (one-off purchase and installation costs), you can identify a simple payback period.

$$\text{Payback period} = \frac{\text{capital cost (£)}}{\text{Net annual savings (£)}}$$



Once you have decided what action you are going to take, you should commit your water management plan to paper, identifying:

- how you plan to save water;
- targets for how much water and money will be saved;
- who is responsible for carrying out the plan.

It is important to establish goals and timeframes. Actions should be detailed in full and placed in order of priority for implementation. Remember that your water management plan is a working document and should be subjected to regular review.

Step 6 Implement your plan and report results

Once your water management plan is approved and in place, it is essential that everyone in the organisation is fully aware of both the plan and their responsibilities. Remember, a plan that does not have the support of staff is likely to fail!



Ways of involving staff in your water management plan

- Communicate key messages and progress on a regular basis, either through meetings or noticeboards, in a style appropriate to the audience.
- Encourage staff participation by holding competitions for water efficiency ideas and slogans, and reward the most innovative suggestions.
- Set up a reporting system for leaking taps and faulty water-using equipment.

By starting with simple and low capital cost actions, success can be achieved quickly, providing a platform on which to build. Remember to report all WEM successes and use every opportunity to publicise the savings, both internally and externally through newsletters, press releases, annual reports and presentations.

The environment is increasingly becoming a “business” issue as customers become more environmentally aware. Many companies are actively pursuing a sustainable development approach to give themselves market differentiation, a competitive advantage or to satisfy investor or supply chain requirements. Minimising water use is part of that pursuit.

A water management plan should be reviewed and updated at least once a year.

Actions that have not achieved anticipated savings should be analysed to identify why they failed and how this can be overcome.





Water efficiency measures

This section lists some of the more common WEMs applicable to business, industry and public sector organisations. For more detailed information on the different types of WEM, together with supplier information, please consult the Agency's *Conserving Water in Buildings* publication (see '*Need more information*' section on page 28 for details).

Some business practices such as light industry involve technical water-using processes. These require a more specialist approach. The organisation Envirowise can provide free water-efficiency advice on specific industries and industrial process types (see page 30).

No or low cost WEMs

There are many no or low cost actions that can substantially reduce water consumption. These include:

- **Good housekeeping** – ensuring that water-using appliances are turned off when not in use and fixing dripping taps promptly can save significant amounts of water at virtually no cost.
- **Cistern displacement** devices such as Hippos and Save-a-Flushes reduce the volume of water required to fill a toilet cistern after each flush by up to 3 litres per flush. They are often available free of charge from your water company.
- **Collecting rainwater** in water butts can reduce the need for mains supply water when watering external plants and washing down vehicles.



Medium cost WEMs

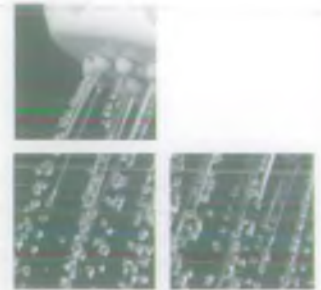
There are many medium cost WEMs; their suitability depends on many factors including building type, budget and payback periods required:

- **Low and dual-flush toilets** should be considered if replacing existing units. The maximum cistern volume of new toilets is 6 litres, compared with 9 litres for older models.
- **Supply restrictor valves** are easily fitted to supply pipes and keep the water flow constant, regardless of fluctuations in water pressure.
- **Tap controls** are an easy and cheap way of reducing water consumption and are available in both new and retrofit versions. Different types include infra-red, battery operated, simple push-top and spray taps.
- **Urinal controls** can be retrofitted to existing urinals, ensuring that the cistern only flushes during office hours, or after use, rather than continuously.
- **Waterless urinals** use either a syphonic trap, or an outlet in the urinal containing a pad impregnated with a deodorising agent.

Other measures

The following options require greater investment but should be considered, especially in the construction of a new building:

- **Washroom control systems** not only limit hot and cold water supply, but also control lighting and ventilation, therefore providing additional energy savings.
- **Rainwater harvesting systems** collect rainwater from roofs or large paved areas such as car parks. The collected water can then be used for toilet flushing or vehicle washing.
- **Greywater recycling** involves using wastewater from washroom basins and showers and using for flushing toilets or outside watering.





Other issues

An effective water management plan needs to incorporate more than just water efficiency measures. The following issues, although not water-saving in themselves, can contribute greatly to achieving your water efficiency targets.

Metering

As discussed earlier, an organisation can only manage water effectively if consumption is accurately quantified. Water companies often estimate water consumption when billing and their readings should not be relied upon. Frequent meter reading by a designated individual is essential, not only to quantify consumption, but also to understand seasonal variations and identify leaks.

Meters vary in size and design, depending on the water requirements of individual organisations. As mentioned earlier, the standing charge for water supply is often dependent on the size of the water meter (the bigger the meter, the greater the standing charge). However, meters are of little use in water management unless they are read on a regular basis and the data recorded and analysed.

Sub-metering

If your organisation has major water-using departments (such as a kitchen for example), you may wish to consider installing sub-meters to identify how much of the total water use they are responsible for. This can be extremely useful if you wish to devolve responsibility for paying the water bill in order to encourage staff to achieve greater water efficiency. Sub-metering can also be extremely useful when deciding priorities for action.



Leak detection and repair

If left undetected, leakage can result in vast amounts of water and money being wasted. Leaks can be both visible (such as a tap which cannot be turned off) or non-visible (underground piping). Your organisation is responsible for repairing underground leaks that occur on company property. Non-visible leaks are obviously harder to detect and an important method of detection is by noting any unexplained increases in metered water consumption (see the night flow test overleaf). Read meters at least on a weekly basis and analyse any sudden changes in consumption, which may indicate a leak. Other indications of underground leaks could be a change in ground surface appearance, such as unexplained damp patches or subsidence.



Identifying leaks: the night flow test

If a leak is suspected take a meter reading last thing at night when everyone has gone home and first thing in the morning before everyone arrives. If the reading has changed, indicating consumption, this is likely to be a leak. (Any known night use will have to be shut off or accounted for).

If a major underground leak is suspected, it should be located and repaired as quickly as possible, not only to save water, but also to prevent water-related damage. Detecting external leaks is a skilled job and it is advisable to use a specialist contractor (your water company may provide a free or subsidised leak detection service).







Need more information?

The following organisations can provide advice and free publications on water efficiency:

Environment Agency

The Agency's National Water Demand Management Centre publishes a range of water efficiency publications. For free copies of the publications listed opposite, or for further information on the work of the Centre, please contact the helpdesk via email:

paula.wood@environment-agency.gov.uk, by telephone: 01903 832073, or by filling in and returning the fax-back form at the back of this publication. Publications marked (*) can be downloaded in pdf format from **www.environment-agency.gov.uk/savewater**

- **Water Efficiency Awards 2001*** and **Water Efficiency Awards 2000**
– These publications from Water UK and the Environment Agency highlight good practice water efficiency case studies from industry, business, agriculture and the public sector.
- **Conserving water in buildings*** (2001) – This series of 11 fact cards provides more detailed information on the different types of water efficiency technology available in England and Wales. It is supported by an up-to-date supplier list.
- **Save water, save the environment and save your school money!** (2001)
– This leaflet explains how and why schools should be saving water and how water efficiency is linked to the National Curriculum.
- **www.environment-agency.gov.uk/savewater** – The Savewater pages on the Agency's website show you how and why you should be using water wisely, both at home and at work.

Envirowise

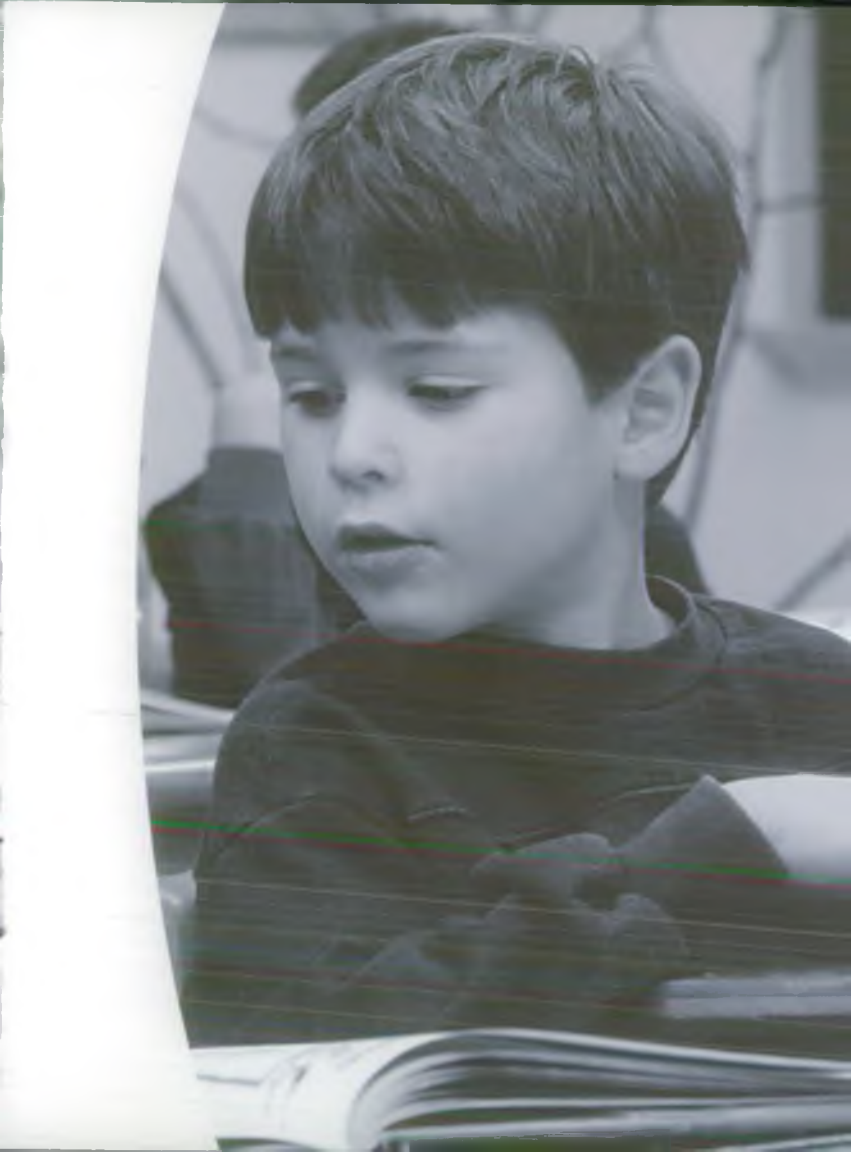
Envirowise is a government programme offering free, independent advice on practical ways to minimise waste and convert turnover into profit. Every year, the Envirowise programme helps thousands of businesses across the UK to improve profits. It has published more than 70 best practice guides, many of which relate specifically to water efficiency. Consult the Envirowise website: www.envirowise.gov.uk or call the Environment and Energy helpline: 0800 585 794.

Watermark

Watermark is an initiative from OGCBuying.solutions (part of the Office of Government Commerce in the Treasury) for public sector organisations. Participating in Watermark during the two-year pilot period could save you both water and money. Consult www.watermark.gov.uk for more information.

Your water company

Your water company will be able to provide you with information and advice on water efficiency and metering. If you are unsure who your supplier is, consult the Water UK website: www.water.org.uk





Appendices

The appendices inserted in the wallet at the back of this publication have been designed to help you implement your water management plan. The forms can be photocopied as required.

Appendix 1

Waterwise checklist

Appendix 2

Waterwise water-use inventory

Appendix 3

Publication fax-back form



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