

# Best practice guidelines

for water conservation in  
commercial office buildings  
and shopping centres

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# Best practice guidelines

for water conservation in  
commercial office buildings  
and shopping centres

Sydney Water's Every drop counts business program works closely with businesses to achieve sustainable water savings.

The **Best practice guidelines for water use in commercial buildings and shopping centres** bring together the vast water conservation experience of the Every Drop Counts Business Program. They are a practical resource to help building managers improve water efficiency.

Since the program started in 2001, we have teamed with 375 business partners, representing over 1,900 sites. Together, we have implemented projects that save 34 megalitres of water a day. The successes of the program and significant work of our business partners was recognised with the prestigious 2006 Stockholm Industry Water Award. This was the first time an Australian organisation has received the award.

We work with the owners and managers of over 450 Sydney-based commercial properties. Practical ways to save water are identified through management diagnostic sessions, detailed water efficiency audits and real-time water monitoring. Feasibility studies to assess specific water conservation measures are another feature of the program. The areas covered include harvesting condensate from cooling systems, reducing water use to test fire suppression systems and assessing cooling tower performance.

We will continue to help our partners improve their business water use efficiency and make a significant contribution to the NSW Government's Metropolitan Water Plan to secure Sydney's water supply.



**Kerry Schott**  
Managing Director  
Sydney Water

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# Part 1

## Understanding your water use

Part 1 of Best practice guidelines for water conservation in commercial office buildings and shopping centres presents benchmarks for water use in commercial buildings and information to help you manage your water better.



## Chapter 1

# Why save water in your commercial building?

These guidelines provide information that will help you save water in your commercial building. But why should you be interested in saving water?

### It saves you money

If you use less water you pay less in water, sewage and trade waste charges. Using less water means you are heating, pumping and treating less water. By buying smaller pumps and hot water heaters you will reduce energy, chemicals and capital costs.

### It gives you a competitive advantage

Benchmarking studies by Sydney Water show that many buildings have not implemented water saving projects that have a return on investment of less than two years. If you put simple water conservation measures in place you will be ahead of the competition and make easy cost savings. As the cost of water and energy increases, water conservation becomes more and more cost effective.

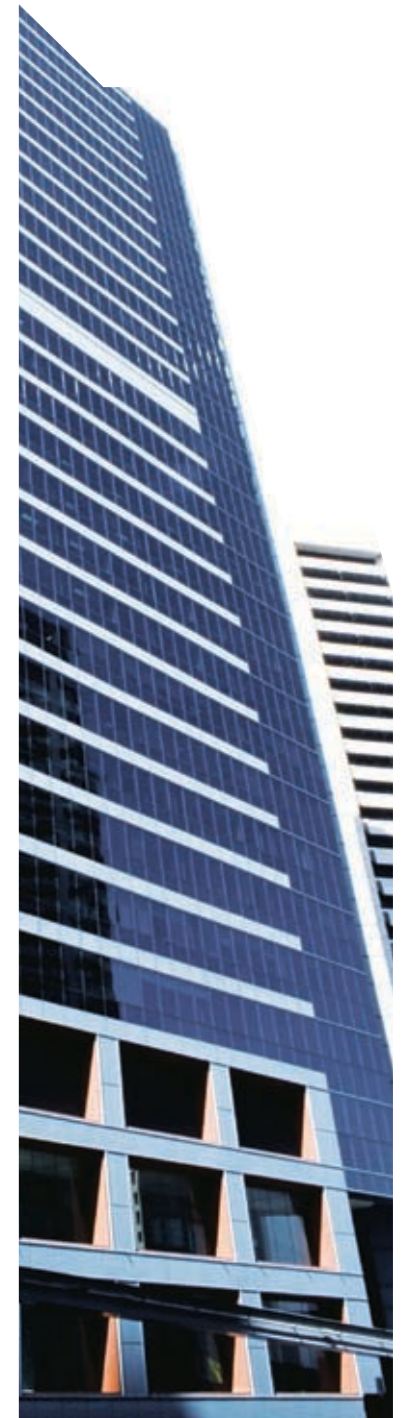
### Saving water today means water is available tomorrow

Long term changes to rainfall, population growth and climate change will reduce the volume of water available from our catchments. Being more water efficient means you can run your businesses and still have water available tomorrow.

### Businesses that manage water well are better businesses

Managing water means improving the communication, record keeping, adaptive management and decision making abilities of your business. These improvements flow on to other aspects of your business to make it more efficient and adaptable.

Read on to find out how to save water in your commercial building.





## Chapter 2

# A snapshot of commercial buildings in Sydney

### How much water do Sydney's commercial buildings use?

Sydney Water data shows that commercial buildings account for almost 20 per cent of business water use in Sydney – or nearly 75 million litres of water every day. This figure includes water used by the many cafes and restaurants that are located in commercial office buildings and shopping centres.

### Commercial office buildings

The amount of lettable office space in Sydney, the Blue Mountains and the Illawarra is increasing. Data compiled by the Property Council of Australia shows that at the beginning of 2007 nearly 7.4 million square metres of lettable office space was located in the region.

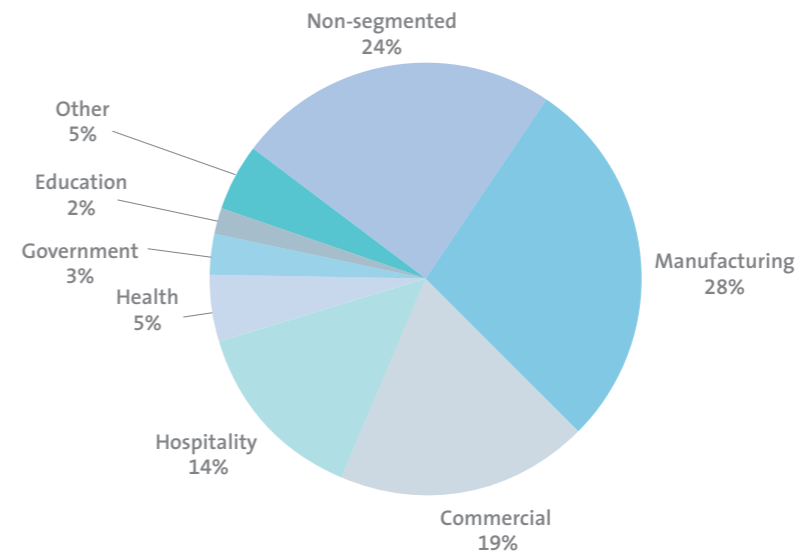


Figure 1 – Water used by commercial buildings in Sydney in 2006 as a proportion of total business water use.





Figure 2 shows that office space in Sydney Water's area of operations increased by 30 per cent from January 1997 to January 2007. Office space vacancies have fluctuated, as illustrated in Figure 3, but increased overall by 1.1 per cent during the same period. The overall increase in occupied office space emphasises the importance of improving water efficiency in commercial office buildings and indicates that building owners and managers are in an increasingly strong position to influence water efficiencies in commercial buildings.

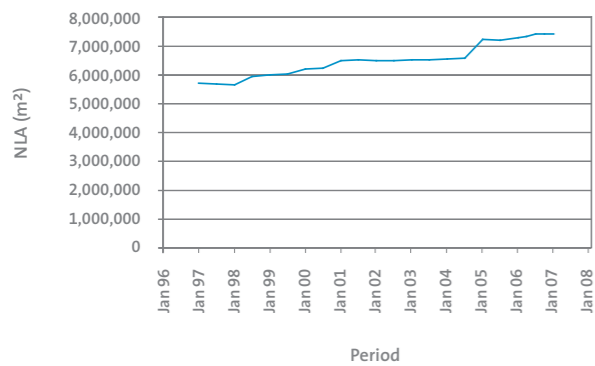


Figure 2 – Trends in the area of lettable office space in Sydney, Blue Mountains and Illawarra from January 1997 to January 2007.

**Shopping centres**

According to the Property Council of Australia, 278 shopping centres in Sydney, the Illawarra and the Blue Mountains contain supermarkets and specialty stores. This represents more than half the 408 centres in New South Wales and the ACT.

A breakdown of the number of shopping centres by centre type is provided in Figure 4. The total lettable area of shopping centres located in Sydney Water's area of operation stands at more than 4 million square metres.

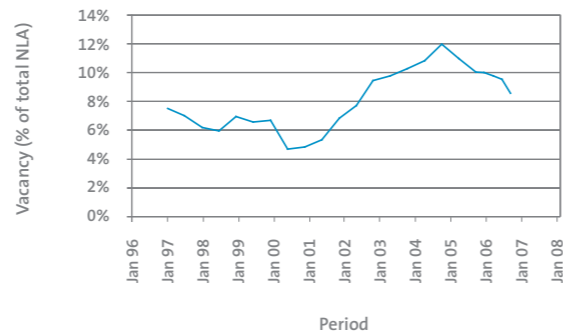


Figure 3 – Trends in office space vacancies in the Sydney, Blue Mountains and Illawarra regions from January 1997 to January 2007.

Major regional centres account for the largest proportion of available gross lettable area (GLA) in Sydney Water's area of operation. This is in contrast to all of New South Wales where sub regional shopping centres are the largest contributor to GLA.

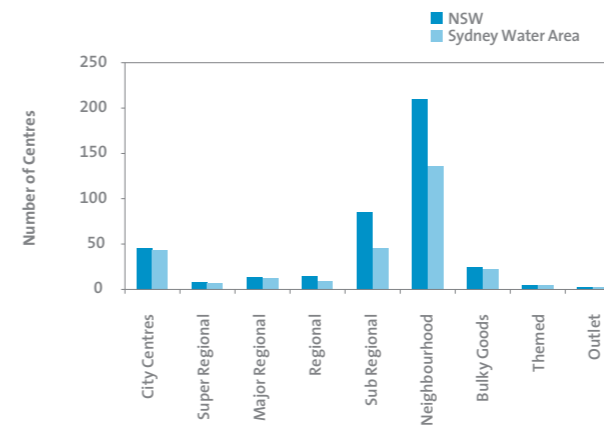


Figure 4 – The total number of shopping centres (by type) in the Sydney, Blue Mountains and Illawarra regions.

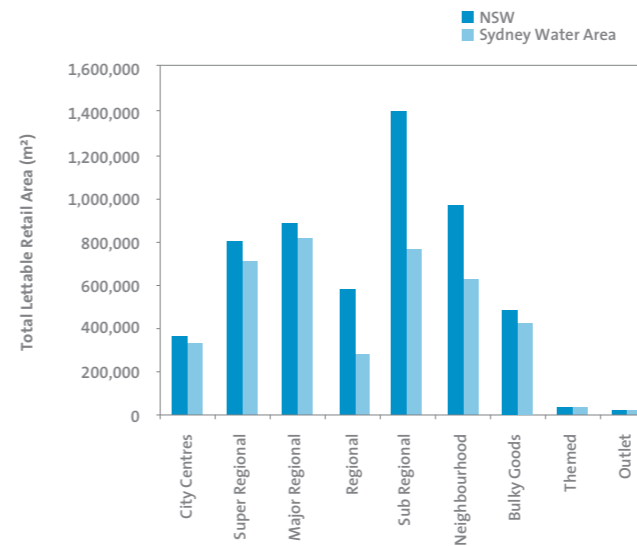


Figure 5 – Breakdown of total gross lettable area by shopping centre type in the Sydney, Blue Mountains and Illawarra regions.

Table 1 – Classification of shopping centres as defined by the Property Council of Australia (2006).

Classification	Definition
City centre	Retail premises within a CBD arcade or mall with a gross lettable area (GLA) greater than 1,000m <sup>2</sup>
Super regional centre	GLA greater than 85,000m <sup>2</sup>
Major regional centre	GLA 50,000–85,000m <sup>2</sup>
Regional centre	GLA 30,000–50,000 m <sup>2</sup>
Sub-regional centre	GLA 10,000-30,000m <sup>2</sup>
Neighbourhood centre	GLA less than 10,000m <sup>2</sup>
Bulky Good centre	Dominated by bulky goods retailers, GLA generally more than 5,000m <sup>2</sup>
Themed centre	A specialty centre typically located in resort areas to cater for specialist tourist needs



## Chapter 3

# Water use benchmarks for commercial office buildings

Sydney Water has developed water consumption benchmarks for commercial office buildings in Sydney. These benchmarks allow you to assess opportunities for cost effective water savings in your commercial building.

Sydney Water benchmarks use information gathered in 31 water efficiency audits conducted by the Every Drop Counts (EDC) Business Program. They are for Sydney office buildings only. They should not be used for buildings in other climate zones.

An explanation of the Sydney Water benchmarks is provided below.

### Median market practice with no leaks

Table 2 shows how much water an average office site in Sydney will consume if it is leak free. If the water consumption of your office building is higher than these benchmarks, there is a good chance the building's water system has substantial leaks. You should investigate this immediately.

### Economic best practice

Economic best practice in water efficiency projects is the level of performance that you should be able to achieve to attain a two year return on investment. This benchmark should be your performance target for good business practice. Fixing leaks and improving the efficiency of amenities are some of the most cost effective ways of reducing water consumption in your building.

### Very well managed building

A very well managed building demonstrates an exceptionally low level of water consumption. To achieve this you will probably need a building with good design, strong management attention to water and the use of long term technical measures, some of which may not be financially viable on water savings alone.

Table 2 – Benchmarks for water efficiency in Sydney office buildings.

Benchmark	Offices with cooling towers	Offices without cooling towers (extrapolated figures)
Median market practice with no leaks	1.01 kL/m <sup>2</sup> /year	0.64 kL/m <sup>2</sup> /year
Economic best practice (median of implementing water saving projects with two year paybacks)	0.84 kL/m <sup>2</sup> /year	0.47 kL/m <sup>2</sup> /year
Very well managed building	0.77 kL/m <sup>2</sup> /year	0.40 kL/m <sup>2</sup> /year

### How to calculate your water consumption benchmark

To assess your water consumption against these benchmarks, you need to know the net lettable area of your building in square metres and its annual water consumption, as follows:

#### The net lettable area of your building in square metres

The net lettable area of your building is usually the area that determines the rental rates for your tenants, as assessed under the Property Council 1997 Method of Measurement.

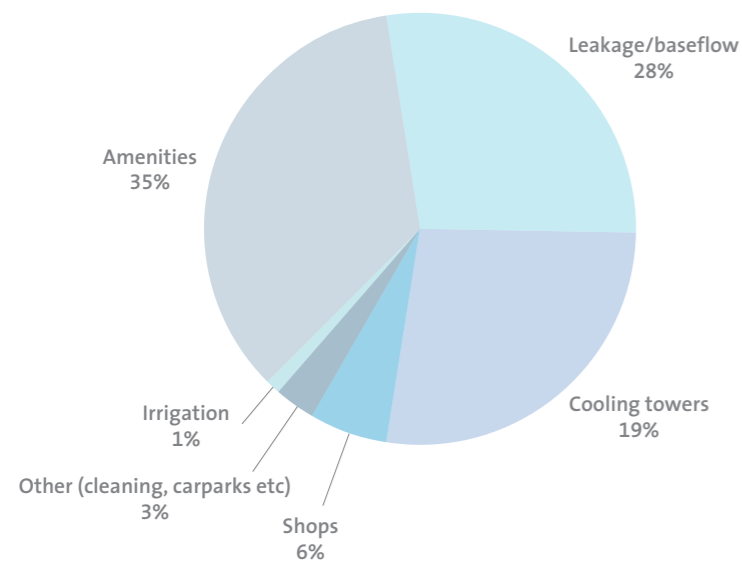


Figure 6 – Typical water distribution in a commercial office building, including leaks.

### Your building's annual water consumption

The annual water consumption of your building is all water consumed for the office building. If you have other facilities attached to your building such as retail, gyms or hotels, you may exclude the water consumption of these spaces. You should be able to find the total water consumption in kilolitres for a full year from your water bills. If you are not billed in kilolitres you may need to convert the units of your water bill.

Once you have accessed this data, divide your total water consumption by your total net lettable area. This will provide your benchmark water consumption in kilolitres per square metre per year (kL/m<sup>2</sup>/year).

These benchmarks give you a guide to your building's current performance and indicate the savings you will be able to make. If your building fails to meet the benchmark for eliminating leaks or for economic best practice, you are most likely to have substantial water saving opportunities in your building and should act to improve your water consumption.

If you have a very large shopping centre linked to your office building you should sub meter the water consumption of the shopping centre. You can then benchmark water use in the shopping centre against the benchmarks provided in Chapter 4 of these guidelines.

If you have only a few retail leases in your building and cannot effectively sub meter them, your office water consumption is likely to be affected. To compensate for this you can refer to the adjusted benchmarks in the Appendix of these guidelines.

### How these benchmarks relate to NABERS

The Sydney Water benchmarks provided in these guidelines are designed to give you more information about the performance of your building and your likely opportunities for saving water.

Sydney Water benchmarks do not replace star ratings provided by the National Built Environmental Rating Scheme (NABERS). The NABERS assessment process provides a more formal, quality controlled rating for your building and will make sure that

water consumption is adjusted for hours of occupancy.

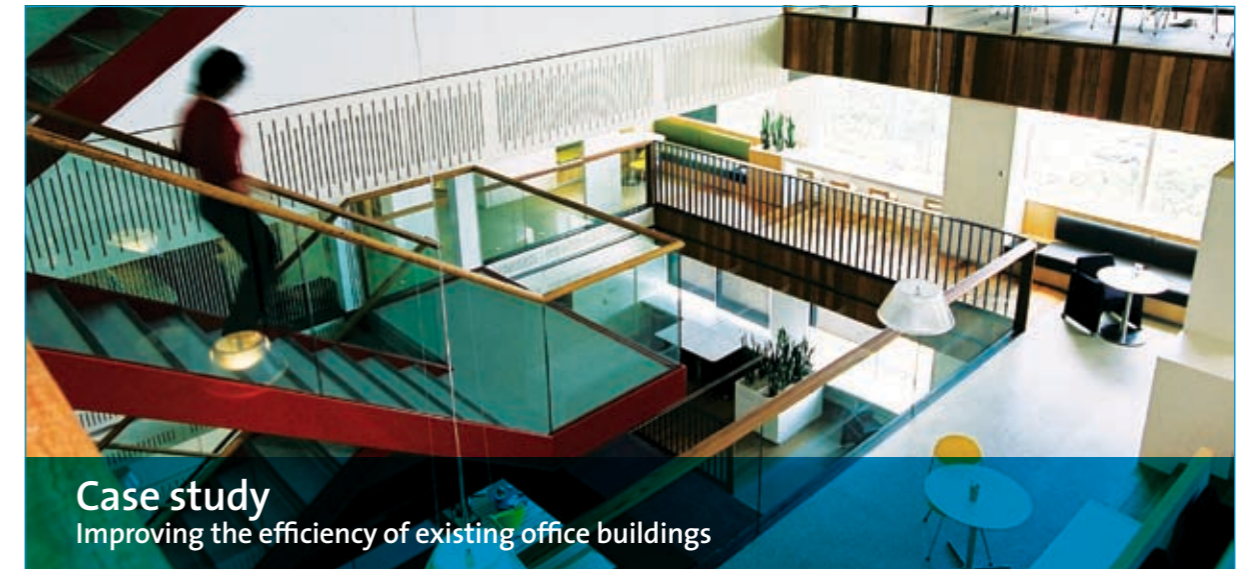
At September 2007, more than 80 commercial buildings in Sydney had been assessed for efficiency by the NABERS rating process.

Table 3 shows how your water consumption relates to the Sydney Water benchmarks and NABERS Water star ratings. It shows if you are within the target water consumption zone for a building of your type and if you have opportunities to reduce water consumption.



Table 3 – Comparison of Sydney Water performance benchmarks and NABERS water star ratings for a commercial office building in Sydney

Water consumption (kL/m <sup>2</sup> /year)	Sydney Water performance benchmarks	NABERS water star rating	
1.80		1 star (1.73)	Leak Zone
1.75			
1.70			
1.65			
1.60			
1.55			
1.50			
1.45			
1.40		2 star (1.39)	
1.35			
1.30			
1.25			
1.20		2.5 star (1.21)	
1.15			
1.10			
1.05		3 star (1.04)	
1.00	Average practice for buildings with cooling towers and no leaks (1.01)		Cost effective improvement zone for water cooled buildings
0.95	Economic best practice for buildings with cooling towers (0.84)	3.5 star (0.87)	
0.90			Target zone for water cooled buildings
0.85	Well managed building with cooling towers (0.77)		
0.80		4 star (0.70)	
0.75			Cost effective improvement zone for buildings without cooling towers
0.70	Average practice for buildings without cooling towers and no leaks (0.64)		
0.65			
0.60	Economic best practice for buildings without cooling towers (0.47)	4.5 star (0.52)	
0.55			Target zone for buildings without cooling towers
0.50	Best practice for buildings without cooling towers (0.40)	5 star (0.35)	
0.45			
0.40			
0.35			



### Case study Improving the efficiency of existing office buildings

In the refurbishment of its Sydney headquarters in Castlereagh Street, the Stockland Property Group demonstrated how much water can be saved in existing office buildings.

Before refurbishment began in 2005, the Stockland building used 1.91 kilolitres per square metre of water a year. This figure included water used by shops and food outlets in the building's retail areas.

During refurbishment, Stockland installed waterless urinals and WELS rated efficient taps. Cooling towers were replaced with more efficient models and more sub meters were installed

to help building managers keep track of water use. A water management plan was implemented and the new fire service test standard was introduced. Rigorous controls on equipment were documented. This enables building managers to cut the frequency of tests.

After refurbishment the Stockland building housed 650 staff on eight floors of office space. The benchmark for water use fell by more

than 22 per cent, saving 18,240 kilolitres of water a year (excluding the building's retail tenancies).

Stockland was one of the first large scale commercial property owners to get a NABERS rating for its entire portfolio.

Photograph 1 – Stocklands House at 175–183 Castlereagh Street Sydney is a good example of an existing office building that has significantly reduced its water consumption as a result of refurbishment.

#### References

Property Council of Australia (2006), Directory of Shopping Centres – New South Wales and Australian Capital Territory 2006.



## Chapter 4

# Water use benchmarks for shopping centres

Sydney Water has developed best practice water consumption benchmarks for shopping centres. These benchmarks were developed using information from 12 water efficiency audits conducted by the EDC Business Program.

An explanation of these three benchmarks is provided below.

### Median market practice with no leaks

Median market practice is the volume of water consumed by an average shopping centre with no leaks. If your water consumption is higher than this there is a good chance you have substantial leaks in your shopping centre. You should investigate this immediately.

### Economic best practice

Economic best practice is the performance you should be able to achieve using the criteria of a two year return on water efficiency investment. This benchmark should be your performance target for good business practice. Fixing leaks and

improving the efficiency of amenities are some of the most cost effective ways of reducing water consumption in your building.

### Very well managed shopping centre

A very well managed shopping centre has good design, strong management attention to water and use of longer term technical measures – some of which may not be financially viable on water savings alone.

### How to calculate your water consumption benchmark

To assess your water consumption against these benchmarks you need to know the gross lettable area of your shopping centre and its water consumption over 12 months.

### The gross lettable area of your shopping centre in square metres

This is the area used to determine the rental rates for your tenants. It should be assessed under the Property Council of Australia 997 Method of Measurement.

### The water consumption of your shopping centre over 12 months

This figure should include all water consumed for the shopping centre.

Table 4 – Benchmarks for water efficiency in Sydney shopping centres

Benchmark	Value
Median market practice with no leaks	1.70 kL/m <sup>2</sup> /year
Economic best practice (median of implementing 2 year paybacks)	1.68 kL/m <sup>2</sup> /year
Very well managed shopping centre	1.35 kL/m <sup>2</sup> /year

### About Sydney Water benchmarks for shopping centres

It is important to note that Sydney Water benchmarks are based on a very small sample of data from shopping centres. The benchmarks may not be truly representative of all shopping centres because shopping centres vary widely in design, size, pedestrian volume and the type of businesses they house.

It is also possible that some existing shopping centres are performing better than the benchmarks indicate.

The Sydney Water benchmarks provide a basic indication of the water consumption of shopping centres. The benchmarks will be revised as more detailed audit data becomes available. The Department of Environment and Climate Change NSW is also developing NABERS retail benchmarks.

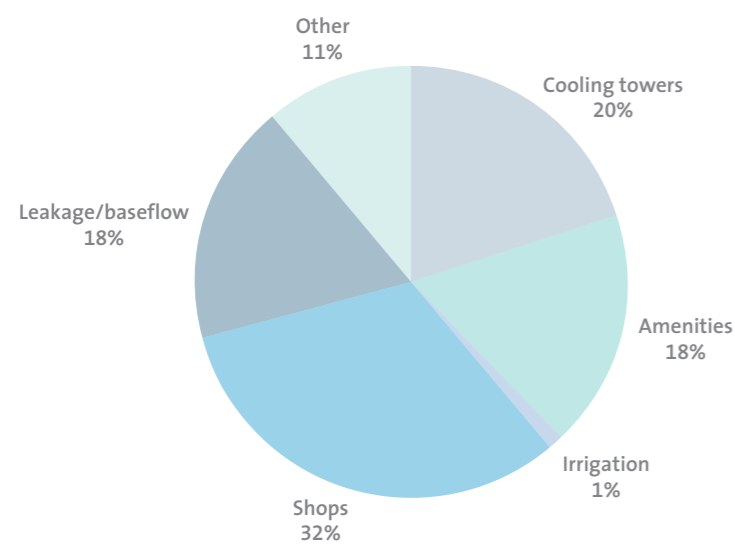


Figure 7 – Typical water distribution in a shopping centre, including leaks

## Chapter 5

# Benchmarking and building rating systems

Benchmark water consumption figures are a useful way to find out how water efficient your building is compared to others in the same industry. A benchmark helps you assess where there is room for improvement and if you can reduce your water use with cost effective measures. A benchmark can also confirm that your building is operating efficiently.

In addition to benchmark information developed by Sydney Water, there are several other environmental rating tools available for buildings. The three most common environmental rating tools used for commercial buildings in Australia are the National Australian Building Environmental Rating System (NABERS), Australian Building Greenhouse Rating (ABGR) and Greenstar.

### NABERS

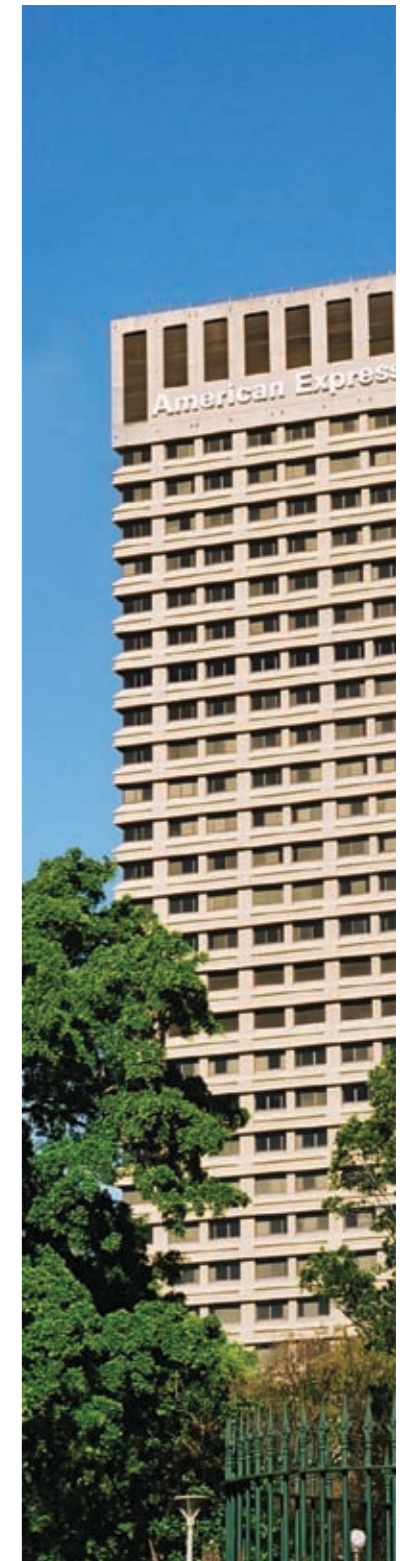
NABERS is a voluntary building performance rating tool. NABERS Office incorporates sustainability factors such as water consumption, energy consumption, solid waste generation and internal air quality. It also incorporates the ABGR system. NABERS Water assesses the water efficiency of buildings by allocating a star rating between 1 and 5 stars. 5 stars represents an aspirational target and 2.5 stars represents median performance. NABERS ratings are developed on the basis of a year's operational data.

For more information visit [www.nabers.com.au/office.aspx](http://www.nabers.com.au/office.aspx)

### ABGR

ABGR system rates the energy use and greenhouse gas emissions of commercial buildings on the basis of a year's operational data. ABGR is now incorporated into NABERS Office so that building owners can measure both water and energy efficiency.

For more information visit [www.abgr.com.au](http://www.abgr.com.au)



### Greenstar

Greenstar is a building environmental rating system run by the Green Building Council of Australia. Individual ratings offered by Greenstar include ‘office as designed’, ‘office as built’ and ‘office interiors’. The tool is designed to recognise good environmental performance across all aspects of building design and all aspects of environmental impact.

For more information visit [www.gbcaus.org](http://www.gbcaus.org)

When looking at environmental rating tools for buildings you might also find reference to BASIX, LEED and CIRIA.

### BASIX

The Building Sustainability Index (BASIX) is a regulatory tool that ensures improved water and energy efficiency when it is applied to new houses, home renovations and multi-unit dwellings in New South Wales. These buildings must achieve a certain level of efficiency before they can gain development approval. BASIX does not apply to commercial office buildings or shopping centres.

For more information visit [basix.nsw.gov.au](http://basix.nsw.gov.au)

### LEED

Leadership in Energy and Environmental Design (LEED) is a standard developed in the United States of America for the design, construction and operation of high performance green buildings. LEED covers five areas of environmental impact: sustainable site development, water consumption, energy use, materials selection and indoor environmental quality.

LEED style rating systems operate in Canada, Mexico and India.

### CIRIA Best Practice Indicators

CIRIA, a member-based research and information organisation dedicated to improvement in the construction industry, has developed best practice indicators for the water efficiency of offices and hotels in the United Kingdom. These indicators tend to be lower than Australian consumption benchmarks because of the lack of irrigation and cooling tower use in UK buildings. Adjusting for these uses, the CIRIA benchmarks are similar to Sydney Water benchmarks.

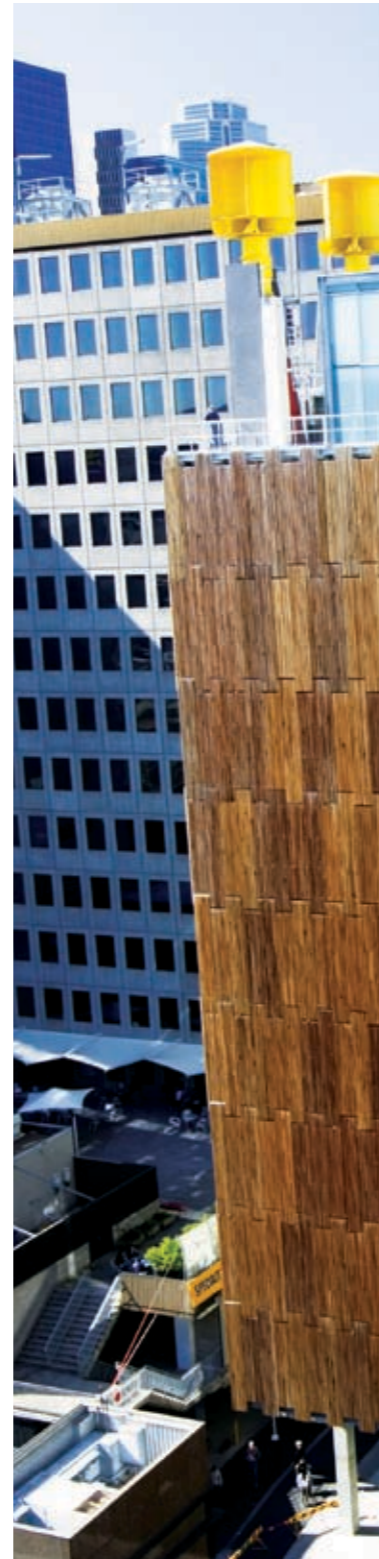


Table 5 – A comparison of ABGR star rating and energy consumption for a typical, Sydney office building

	Rating	MJ/m <sup>2</sup>	
		Electricity	Gas
Tenancy	1	659	73
	1.5	608	68
	2	556	62
	2.5	504	56
	3	452	50
	3.5	400	44
	4	349	39
	4.5	297	33
Base building	5	245	27
	1	801	89
	1.5	737	82
	2	672	75
	2.5	608	68
	3	544	60
	3.5	480	53
	4	416	46
Whole building	4.5	351	39
	5	287	32
	1	1456	162
	1.5	1340	149
	2	1225	136
	2.5	1109	123
	3	993	110
	3.5	878	98
	4	762	85
	4.5	647	72
	5	531	59

### Note

ABGR is a dynamic rating tool that takes variables into consideration such as building location, hours of operation and density of computers. The data presented in this example is only accurate where the following assumptions are true.

### Assumptions

Density of computers (m <sup>2</sup> /computer)	23
Hours of operation/week	50
Percentage of total building energy use that is electricity	90%
Percentage of total building energy use that is gas	10%
Building location	Sydney

### Definitions

Tenancy – Office space within a building covering tenant light and power only. This may include tenancy air-conditioning if this has been installed to service particular tenant loads, but does not include central services normally provided by the landlord.

Base building – Central services and common areas of a building.

Whole building – A combination of the above which should include all energy entering the building used for providing services to the occupants of the space.



## Chapter 6

# The true cost of water

### Water supply charges

Sydney Water charges business customers \$1.339 for every one thousand litres (or one kilolitre) of water used. These water prices are likely to rise in the future due to the pressure of long term changes to rainfall and climate change, increased pressure on the environment and rivers and the need to invest in new water supply systems.

The real cost of water to a business is much higher than metered charges. It includes the costs of wastewater, trade wastewater processing and hot water.

Water service	Cost per kL
Water	\$1.339
Wastewater	\$1.296
Trade waste process charge	\$0.574 (minimum)
Hot water	\$3.131 (energy costs)

These figures are based on Sydney Water charges for 2007–08. Check with your local supplier for charges if you are outside Sydney Water's reticulated network.

### Wastewater charges

Businesses that discharge more than 500 kilolitres of sewage a year, or 1.37 kilolitres a day, are charged \$1.296 per kilolitre to reflect the costs of treating and managing wastewater.

Sydney Water uses a Sewerage Usage Discharge Factor (SUDF) to calculate the amount of sewage that you dispose of. The SUDF is the ratio of water going out of your business through the sewerage system compared to water coming in from Sydney Water's mains.

The SUDF applied by Sydney Water will depend on your business type and the equipment you have installed.

A Sydney Water study found that the typical SUDF for a reasonably water efficient commercial office building is 74 per cent. The same study found that a water efficient commercial building has a lower SUDF than an inefficient building. As water efficiency increases and water losses are reduced, there is an increase in the proportion of water lost to the atmosphere in buildings with evaporative cooling systems.

Inefficient buildings use a higher proportion of water in leaks or inefficient fixtures and this water is usually sent to sewer.

You can easily assess the efficiency of a building by calculating water use per square metre of lettable area (benchmarked or normalised consumption). This relationship has been demonstrated in building rating tools such as NABERs (refer Table 3).

If you have improved the water efficiency of your building and think this may have altered your current SUDF, Sydney Water can reassess your SUDF. You need to present Sydney Water with evidence that discharges to sewer are lower than calculated in your current SUDF. Gathering evidence may require additional sub metering and Sydney Water customers must meet this cost.



**Calculating your sewerage charges**

To calculate your sewerage usage charges, use the steps in the following example:

An office that uses 100 kilolitres of water a day and has a calculated SUDF of 90 per cent will discharge a sewage volume of 90 kilolitres a day. Charges will be applied after the first 1.37 kilolitres.

**100 kL x 0.90 = 90 kL**

Subtract 1.37 kilolitres from 90 kilolitres to find out the volume that will have charges applied to it.

**90 – 1.37 = 88.63 kL**

Multiply the chargeable volume by Sydney Water’s sewerage charges.

**88.63 x \$1.296 = \$114.86**

Daily water charges for the same building will be \$133.90 (100 kilolitres x 1.339).

Daily water and sewer use charges will be \$248.77.

**Calculating your trade waste charges**

Businesses that discharge greasy or oily wastes are charged trade waste disposal fees by Sydney Water to cover the extra costs of treating this wastewater.

For example, a shopping centre using 100 kilolitres of water a day, with a calculated trade waste discharge factor of 75 per cent, will discharge a trade waste volume of 75 kilolitres a day.

**100 kL x 0.75 = 75 kL**

Multiply the chargeable volume by Sydney Water’s trade waste process charges.

**75 x \$0.574 = \$43.05**

Daily trade waste charges will be \$43.00.

**The true cost of water**

The true cost of water can far exceed charges for water and wastewater. Inefficient use of water can lead to excess charges for energy, chemicals, equipment and labour. Some companies have found that by taking these issues into account, the true cost of water can be up to four times its metered price.



Photograph 2 – Warragamba, the largest dam in the city’s supply system, shows signs of stress after reduced rainfall

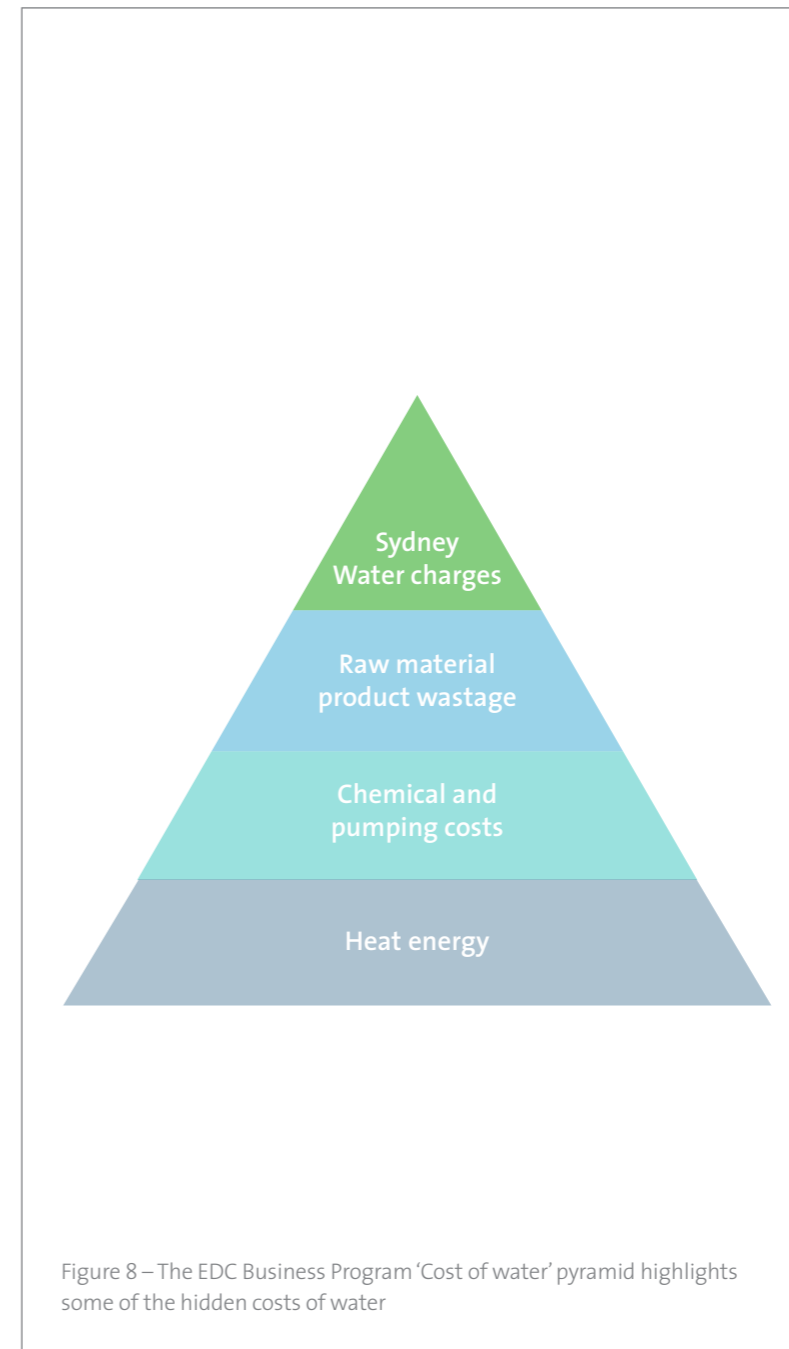


Figure 8 – The EDC Business Program ‘Cost of water’ pyramid highlights some of the hidden costs of water

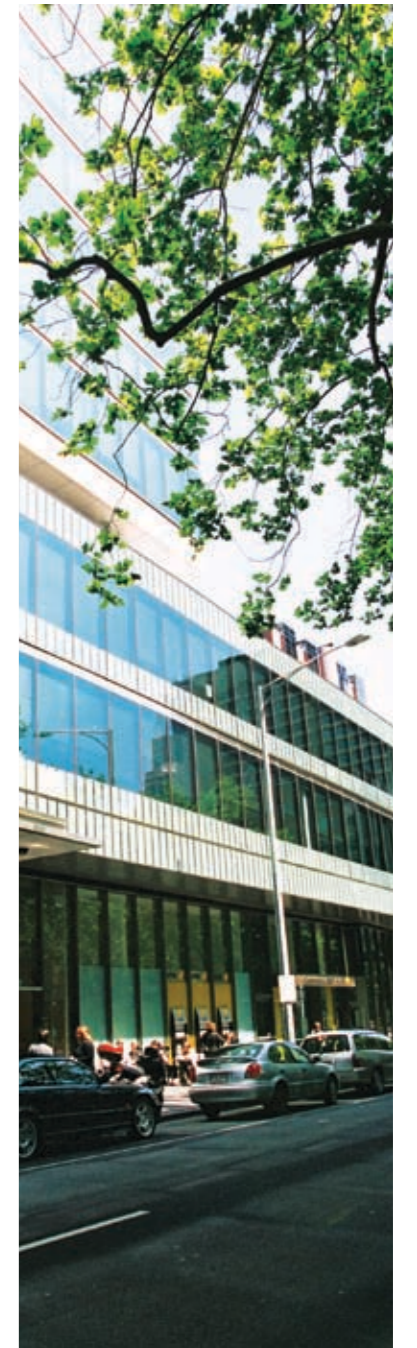


Table 6 – Review of common operating and capital costs

Facility	Causes of water loss and related resource wastage	Costs
Heating, ventilation and air conditioning (HVAC)	<b>Water leaks from cooling tower</b> <ul style="list-style-type: none"> <li>water leaks from incorrectly set ball float valve or poorly designed hydraulic balancing layout</li> <li>water loss from excessive drift, splash and bleed (poorly maintained anti-splash louvres)</li> <li>leaks from poorly maintained cooling towers.</li> </ul>	Water Sewage usage Energy Cooling tower chemical dosing
	<b>Poorly designed HVAC systems</b> <ul style="list-style-type: none"> <li>excessive water use in oversized cooling towers</li> <li>heat loss from uninsulated duct work</li> <li>lack of economy cycle – excessive operation of cooling tower</li> <li>use of building cavities to transport return air instead of sealed ductwork will draw hot outside air into the building envelope and add to heat loads.</li> <li>lack of variable frequency drives means no ability to tailor fan speeds to suit different cooling tower loads, and excessive operation of fans and chillers.</li> </ul>	Energy Water Capital costs – replacing oversized HVAC equipment and oversized fans
	<b>Poorly operated HVAC systems</b> <ul style="list-style-type: none"> <li>failure to use economy cycle or vent with outside air – excessive operation of cooling tower</li> <li>temperatures set too high/too low</li> <li>no automatic HVAC controls – no ability to program thermostats, set timers or use energy management systems</li> <li>dust and dirt on poorly maintained cooling coils will prevent efficient exchange of heat</li> <li>dust in poorly maintained air filters will restrict air flow and efficiency</li> <li>poorly located vents lead to hot and cool spots in building.</li> </ul>	Energy Water Capital costs – replacing oversized HVAC equipment
	<b>Excessive building heat loads</b> <ul style="list-style-type: none"> <li>additional evaporation from cooling tower to reduce high heat loads <ul style="list-style-type: none"> <li>poor building location, orientation, design will make indoor air temperature susceptible to changes in outdoor temperature</li> <li>poor building design will reduce ability to purge indoor heat – leading to excessive use of cooling tower</li> <li>waste heat from inefficient lighting</li> <li>waste heat from inefficient electrical equipment</li> <li>waste heat from unused electrical equipment on standby</li> </ul> </li> <li>waste heat from electrical equipment not turned off after office hours <ul style="list-style-type: none"> <li>cooking equipment in commercial kitchens, food courts, restaurants</li> <li>internal and external window shading</li> </ul> </li> <li>waste heat from product displays – lighting and electrical equipment</li> <li>poor building entrances and ventilation leads to loss of cooled air and entry of outside heat.</li> </ul>	Energy Water

Facility	Causes of water loss and related resource wastage	Costs
Water pumping and pressure jacking systems	<b>Poorly designed hydraulic systems</b> <ul style="list-style-type: none"> <li>pumping excessive water to upper storey storage tanks for gravity feeding fixtures and equipment</li> <li>higher pressure leads to higher water consumption, including hot water use</li> <li>damage to fixtures on lower floors from excessive water pressure</li> </ul>	Energy Water Sewage usage Labour Capital costs in early replacement of fixtures damaged by high pressures Capital costs to replace oversized pumps, storage tanks and valves. Higher ongoing maintenance
Amenities	<b>Poorly maintained amenities</b> <ul style="list-style-type: none"> <li>toilet leaks from perished cistern seals</li> <li>urinal leaks from malfunctioning sensors, poorly located sensors, broken solenoid valves</li> <li>excessive flow rates in basin taps lead to excess water use, and energy use for hot water</li> </ul>	Water Sewage usage Energy Excessive labour costs to maintain aging amenities
Hot water heating and kitchen equipment	<b>Excessive and inefficient hot water heating</b> <ul style="list-style-type: none"> <li>excessive energy required to heat water to higher-than-needed temperatures (reduce temperature to 60 °C for greater safety and efficiency)</li> <li>leaks from hot water system lead to excess water and energy use additional cold water is required to cool excessively heated water to useful temperature</li> <li>over-sink hot water boil units heat more water than is needed, adding to energy use and office heat load. If you use an auto-boil unit ensure it uses less than 50 Watts of standby power and is less than 2.5 litre capacity</li> <li>inefficient dishwashers and glass washers use more water, more hot water and more detergent per cycle</li> </ul>	Water Energy Chemical (detergent)
Fire service test water	<ul style="list-style-type: none"> <li>test water that's not reclaimed will end up as waste to stormwater whereas if could offset metered potable uses</li> </ul>	

**Responding to future water costs**

As water prices increase in Sydney and other cities, business costs will also increase. Businesses that are already water efficient will be rewarded and increased charges will create greater incentives for others to further improve their water efficiency.

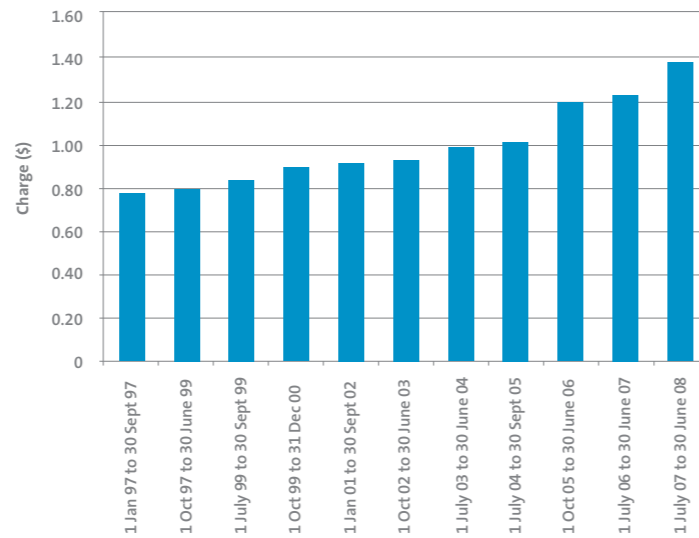


Figure 9 – Sydney Water's water use charges



Chapter 7

**Funding water saving projects**

Calculating the true cost of water in your commercial building can help build a strong business case for conserving water. By taking into account the total cost of water, many water saving projects are far more cost effective than first expected.

Many of the most effective water conservation projects will have simple paybacks – from several months to three years – making them excellent candidates for internal funding.

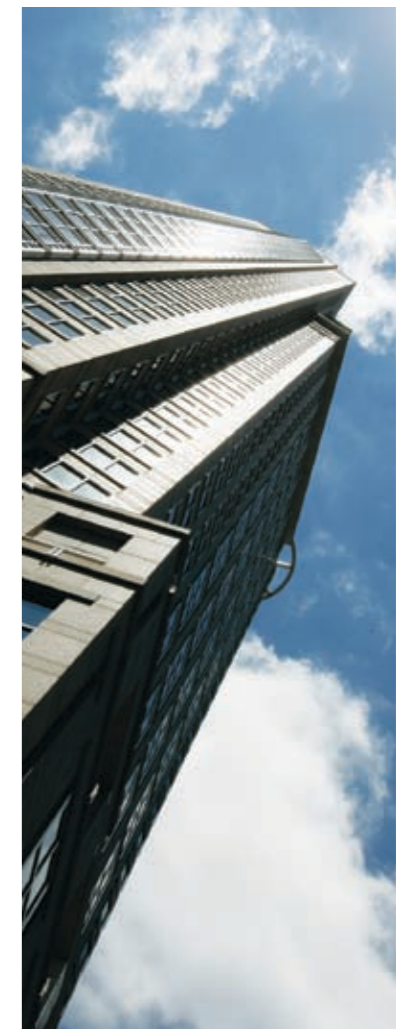
It can be difficult to internally fund an expensive or technically advanced water conservation project. If you need financial support for water conservation projects, some of the funding schemes listed below may help.

**NSW Climate Change Fund**

The NSW Government launched a five year \$340 million program to fund energy and water efficiency projects in July 2007. The NSW Climate Change Fund includes:

- \$30 million NSW Green Business Program for projects that will save water and energy in business operations in NSW within two streams – Market Transformation and Direct Measures
- \$100 million Residential Rebate Program for energy and water efficient appliance rebates including hot water systems, insulation and increasing the rainwater tank rebate up to a maximum of \$1500 and making it available across New South Wales
- \$100 million Recycling and Stormwater Harvesting Program to assist in implementing the Sydney Recycled Water Grid
- \$40 million Renewable Energy Development Fund for pilot and demonstration projects such as solar and geothermal power stations
- \$20 million School Energy Efficiency program to upgrade lighting and implement student based energy efficiency projects
- \$30 million competitive Public Facilities program for State and Local Government, educational and other community facilities to seek support for energy and water savings projects
- \$20 million Rainwater Tanks in Schools program.

For more information visit <http://www.environment.nsw.gov.au/grants/ccfund.htm>



### Low Flow Pre Rinse Spray Valve Program (Smart Rinse)

The Low Flow Pre Rinse Spray Valve Program, named Smart Rinse, will commence in 2007–08 and continue until 2009–10. During this time, Sydney Water will supply and install valves for commercial kitchens and restaurants, free of charge.

New models of low flow pre rinse valves have a flow rate of 6–7 litres a minute compared to a flow rate of 10–15 litres a minute in older models. The new models supplied have the same or better cleaning efficiency as older models and a 6 star WELS rating.

The Smart Rinse program is an effective way to cut water consumption and costs in commercial kitchens with no financial outlay.

### Waterless Wok Subsidy – saving water in Asian restaurants

Installing a waterless wok can save a busy Asian style restaurant about five kilolitres

of water a day. The Ethnic Communities Council (ECC) of New South Wales is offering subsidies and educational assistance to businesses in Sydney and the Central Coast if they install waterless woks.

If you would like a waterless wok for your restaurant or shopping centre food court, contact the ECC at [wok@eccnsw.org.au](mailto:wok@eccnsw.org.au)

### Australian Water Fund

Australian Government funding programs available through the Australian Water Fund are described below.

**Community Water Grants** help local community organisations, local government, schools, universities, childcare facility and health care organisations recycle or improve the health of their local water resources. Community Water Grants are not available for companies.

**Water Smart Australia Program** helps to accelerate development and uptake of smart technologies and

practices in water use across Australia and is targeted at large scale projects. A funding priority is to increase urban, regional and rural water use efficiency and trial innovative or new technologies and practices.

For more information visit <http://www.nwc.gov.au/agwf/index.cfm>.

## Chapter 8

# Managing water better

The EDC Business Program has shown that improved management of water is the key to achieving sustainable water savings. Without better water management, technical improvements will only deliver short term changes to water conservation.

### 7-point plan

The EDC Business Program's 7-point plan for water conservation provides a useful framework for businesses to structure water conservation programs.

#### 1. Seek commitment and leadership from senior management

Commitment and leadership from senior management is essential to ensure a successful water conservation program. To achieve real results, management must take the lead in water conservation and set an example for their employees. Managers need to encourage changes in processes and behaviour to achieve sustainable water savings.

#### 2. Appoint a water conservation manager

Organisations that appoint someone to manage water conservation achieve better results.

The person needs to have the dedicated responsibility for water conservation, although this does not need to be their sole task.

#### 3. Understand your systems to understand where your building is using water

Determine where, how and when water is used in your building. Audit water use, develop a balance between water entering and leaving the plant and identify the opportunities for saving water.

Identify and quantify the hidden costs of water. Water costs are not only associated with supply and subsequent discharge to sewer.

Saving water can lead to reductions in electricity, gas, labour and chemicals and identification of redundant water using equipment.



**4. Identify the opportunities to save water**

Some of the simplest ideas for saving water may be the most cost effective, so don't be afraid to think laterally. Water conservation is not just about large scale technical solutions. Small changes can make a big difference. Ensure all staff have the opportunity to consider water saving ideas.

**5. Set a realistic conservation goal**

It is important to have realistic conservation targets so that everyone can measure the gains. Businesses that conduct a water audit can typically identify annual savings targets of 20 per cent or more. Benchmark against key indicators such as kilolitres per square metre or litres per patron. Compare your benchmarks against those developed by Sydney Water and NABERS.

**6. Develop a conservation strategy**

A conservation strategy needs to use the following principles:

**Avoid**

Avoid using water where possible.

**Reduce**

Where water use cannot be avoided, reduce the amount of water used. Reducing leaks is the most cost efficient option to minimise water consumption. Identify leaks as part of your regular maintenance program.

**Reuse**

If you cannot reduce the amount of water being used in a process, try to use the water more than once.

**Recycle**

Seek an alternative water source such as treated wastewater from another process, or treated sewage effluent where health guidelines allow.

**7. Involve your employees**

Behavioural change will lead to sustainable water savings. Increase staff awareness of water conservation through signage, newsletters and posters. Tell staff why and how they can help both your business and the environment.

Hold a competition to generate water saving ideas and reward staff for doing the right thing. Lead by example.

The 7-point plan is integral to the EDC Business Program's work to help large water using customers save water, money and the environment.

**One-2-Five® Water – the power of the management diagnostic**

Improving water management is a key element of the EDC Business Program. To help companies achieve better long term water management, the EDC Business Program conducts regular water management diagnostics for its customers. The diagnostics are known as One-2-Five® Water.

The One-2-Five® Water process is effective in ensuring sustainable water conservation. The EDC Business Program has shown that companies that have performed best in this diagnostic process are able to sustain water savings over the long term.

**A management diagnostic**

A management diagnostic is a process that analyses qualitative or non technical measures that all businesses must address to achieve sound water management.

Qualitative approaches to water management include:

- leadership and demonstrated corporate commitment
- understanding water use performance and opportunities
- planning using water use targets and key performance indicators
- identifying people with water management responsibility and accountabilities
- improving operational and maintenance practices
- supply management and legal compliance
- incorporating water into financial management
- technology and innovation
- measurement, verification and reporting.

**One-2-Five® Water rating**

The One-2-Five® Water management diagnostic tool is an essential part of the EDC Business Program. It helps businesses measure improvements in their water management and compare their performance with other organisations.

The One-2-Five® Water diagnostic tool uses a five star rating system to measure a company's performance in water management. The star ratings are defined as follows:

- ☆ Understanding water and wastewater regulatory requirements
- ☆☆ Basic water management practiced
- ☆☆☆ Water management system established
- ☆☆☆☆ Water management integrated into business systems
- ☆☆☆☆☆ Best practice and continuous improvement.

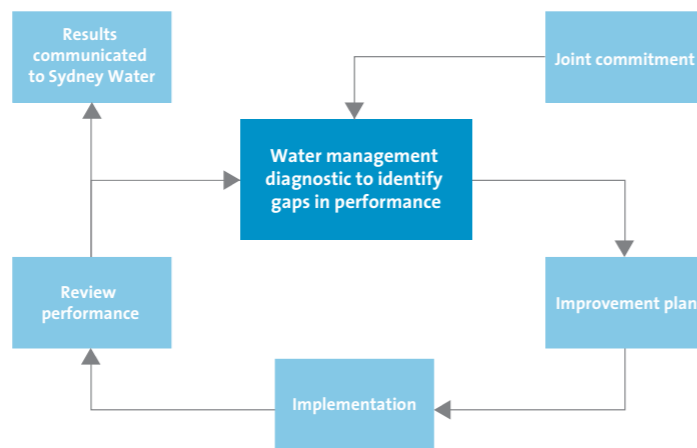


Figure 10 – The EDC Business Program process for helping customers save water, money and the environment

**How do management diagnostics work?**

One-2-Five® Water is a facilitated, self assessed workshop that helps a company assess its performance in essential aspects of water management. The company identifies management and operational measures that will improve water management.

For example, companies are asked to assess how well they comply with statements such as, “Water efficiency is addressed at facility management meetings and reports are given on the progress in achieving goals”.

A typical One-2-Five® Water session takes one to two hours to complete and requires a cross section of staff to attend, such as facility, finance, operations, engineering and maintenance managers. The One-2-Five® Water diagnostic will provide:

- an assessment of the business’s water management practices that can be used to benchmark performance against other similar organisations
- a targeted list of the barriers to improved water management
- an action plan that includes accountabilities and milestones.

**Typical barriers to better water management**

Tables 6 and 7 show critical actions identified in the initial One-2-Five® Water session and review sessions to address barriers to improved water management. Results from initial and review diagnostic sessions show that as businesses improve their water management, the focus on water management changes.

In initial One-2-Five® Water sessions, the focus is on gathering information, obtaining management commitment and developing management structures. In review sessions the focus changes to improving the quality of information and how the information is documented and communicated.

In tables 6 and 7, the elements and actions are listed in order of the frequency with which they occur.

The actions most commonly recommended in the EDC Business Program review diagnostics of 22 commercial property companies are shown in Table 10. The elements and actions are listed in order of the frequency with which they occur.

**Water management in your business**

Consider how your business has encountered or overcome some of the barriers to good water management described in Table 7.

Will undertaking the critical actions listed help you overcome these barriers? How else can you work within your existing business structures to overcome barriers to water management?

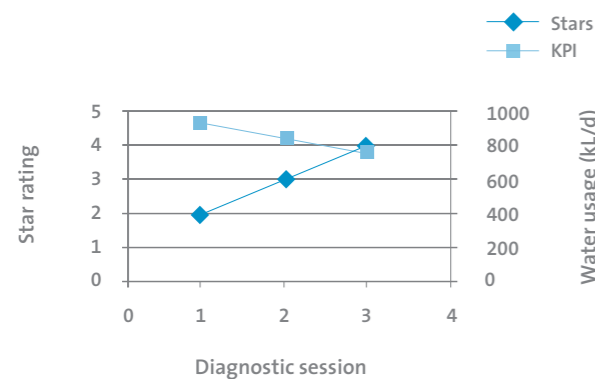


Figure 11 – A higher One-2-Five® Water star rating for Macquarie Real Estate Capital’s commercial Sydney buildings has influenced a reduction in its water consumption.

Table 7 – Elements and critical actions identified in initial One-2-Five® Water management diagnostics that have been completed in Sydney’s commercial property sector.

Element	Recommended critical actions
Understanding of performance and opportunities	Conduct a water and wastewater audit or baseline study to establish: <ul style="list-style-type: none"> <li>• assessment of trade waste legal compliance status</li> <li>• water and wastewater efficiency opportunities</li> <li>• leakage from reticulation system</li> <li>• total water use per production unit</li> </ul>
Targets, key performance indicators (KPIs) and motivation	Set overall cost and/or volume reduction targets that specifically incorporate water savings
Demonstrated corporate commitment	Develop a policy, eg environmental, with specific goals for improving water efficiency and have your Chief Executive Officer or Operations Director sign it
Reporting, feedback and control systems	Develop regular water efficiency reporting that highlights variances in water use compared to targets at cost centre levels
Metering and monitoring	Meter water usage for water intensive operations
Water supply, quality and reliability	Review your treatment and reticulation systems when refurbishing or installing new plant to ensure that supply volume, pressure and quality requirements can be met under maximum demand conditions.

Table 8 – Elements and critical actions identified in review One-2-Five® Water management diagnostics completed in Sydney’s commercial property sector.

Element	Recommended critical actions
Reporting, feedback and control systems	Develop regular water efficiency reporting that highlights variances in water usage versus target at cost centre levels
Understanding performance and opportunities	When assessing the benefits of water efficiency improvements, include the operating costs associated with water bores, pumps, pipelines, chemicals, treatment and heating, etc
Compliance with legal and other requirements	Integrate water management compliance issues in your risk management plans, including quality, environmental, occupational health and safety
Targets, key performance indicators (KPIs) and motivation	Develop a process for updating water efficiency targets when there are significant changes to your operations.
Water supply, quality and reliability	Capture natural site drainage and stormwater for reuse, where cost effective
Metering and monitoring	Display and track water performance indices by using existing process control systems.

## Case study

### The GPT and Jones Lang LaSalle journey to 5-star



The GPT Group and Jones Lang LaSalle (Asset Management Services) (JLL AMS) have achieved a 5 star rating in the One-2-Five® process. During 2005–2007, water use in their top five Sydney buildings was cut by more than a third. In their Citigroup Centre building which is half owned by Macquarie Office Trust, water use was cut by 51 per cent in the same period.

The GPT Group is one of Australia's largest diversified listed property companies with total assets of approximately \$12 billion and 800,000 square metres of lettable floor area. JLL AMS is property manager for The GPT Group's Office Portfolio.

GPT and JLL AMS are the second commercial property customer in the EDC Business Program to achieve a One-2-Five® Water management 5 star rating. As at November 2007, only three companies in the world had achieved this star rating.

GPT and JLL AMS have established key performance indicators and aggressive water reduction benchmarks and targets across their whole portfolio, including buildings in other states of Australia.

They have set a 2007 portfolio target of 1.17kL/m<sup>2</sup>/year which is 10 per cent less water used than in 2006.

The GPT and JLL AMS journey to 5 stars began in May 2005 when the companies signed a memorandum of understanding with the EDC Business Program. Resource efficiency had always been a priority for the two companies but they recognised they could improve more quickly by taking advantage of the assistance and resources of the EDC Business Program.

The first step in the journey to 5 stars was to conduct a water management diagnostic to determine the state of their water management systems and assess how they could be improved. The companies achieved an initial rating of 2 stars and five critical actions were identified:

1. Perform a detailed assessment of water savings available at each water intensive facility

2. Set water efficiency targets for facilities based on a savings assessment and benchmarking

3. Include legal compliance requirements in the induction program for all relevant staff and contractors

4. Develop regular water efficiency reporting that highlights variances in water usage versus target at cost centre levels

5. Meter water usage for water intensive operations.

The critical actions were completed quickly and a review diagnostic and audit were conducted by the Sydney Water contractor Energetics. The companies shot straight to 5 star.

The challenge for GPT and JLL AMS is to maintain this level of water management and continue to reduce benchmark water consumption.

The structured process of the EDC Business Program helped to promote cultural transformation of water management at GPT and JLL AMS, with emphasis on:

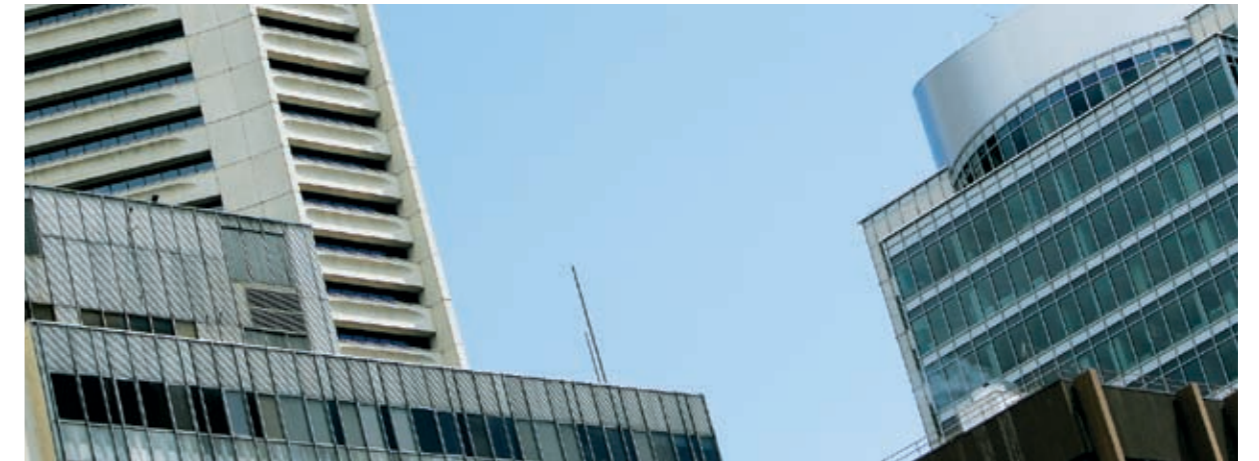
- understanding water use performance and discovering opportunities for conservation
- involving management and operations staff in water saving projects
- improving water use data, reporting and benchmarking
- completing and implementing NSW Government mandated Water Savings Action Plans
- continual improvement
- improvements in water management should be sustained for the future.

Photograph 3 – The Citigroup Centre Building at 2 Park Street Sydney, co-owned by Macquarie Office Trust and The GPT Group, has reduced its water use by 51 per cent since 2005.



## Chapter 9

# Monitoring water use



Regularly monitoring water use is the key to any successful maintenance schedule and any successful water saving program.

It is almost impossible to save water if you don't know how much you are using, where and when it is being used and where your best opportunities for water savings exist.

### Monitoring – the key to identifying water savings

Monitoring water use enables you to understand your water use patterns and discover leaks and inefficiencies.

Without monitoring, leaks can remain undetected because most wastewater goes directly to sewer. This means you pay unnecessary water and wastewater charges. If you have leaks in your hot water services you will pay unnecessary energy bills.

### Installing sub meters

To get the most out of your monitoring program you need to install sub meters throughout the building. The sub meters help you understand where and how water is being used.

The EDC Business Program suggests that you prioritise the sub metering of your commercial premises, as follows:

#### Priority 1 – cold water supply

Sub meter the supply lines that service the different areas of the commercial building. In some buildings, water is pumped to

a tank to supply water to the upper storeys. You can identify any overflows in the tank supply by comparing the tank's measured outflow to the main meter readings.

#### Priority 2 – hot water supply

Preventing hot water waste and leaks saves money, water and energy.

#### Priority 3 – amenities

Toilets and urinal systems can use large amounts of water and are often the source of leaks. Monitoring amenities can also provide





feedback on the success of leak reduction programs and improved maintenance and cleaning practices.

#### Priority 4 – cooling towers

Monitor the make-up water into a cooling tower. You can also install a sub meter on the bleed line. A meter on the bleed line will help establish a SUDF but you must make sure the meter is suitable for dirty water.

#### Priority 5 – food courts and restaurants

Water use in food courts and restaurants can be measured against the number of meals prepared to generate water use benchmarks and identify leaks and inefficiencies.

#### Priority 6 – outdoor areas and water features

Monitor the water supply to your irrigation system and water features because outside leaks can easily be missed.

#### Priority 7 – retail shops

Measuring the amount of water used by retail shops is essential in commercial buildings. Accurate sub

metering of each business allows you to pass water charges on to tenants according to their use. This gives them a direct incentive to save water.

#### Priority 8 – sewer discharge

Monitoring sewage discharge will help to identify the amount of sewage discharged from a building compared to the SUDF calculated by Sydney Water. If your sewage discharge is radically different from the SUDF calculated for a building of your type, you may have a leak. Sydney Water studies have shown that efficient buildings have a lower SUDF than inefficient buildings because more water is lost to evaporative cooling and less water is lost to leaks and disposed to sewer.

#### Manual monitoring

If you don't have an automatic monitoring system you can keep track of water use with manual readings. You should read the meter when the commercial building is closed at the end of the day's trading and again the following morning.

Ideally, meter readings should be very similar. If there is a large difference in readings and no activities occur at night, leaks need to be investigated and fixed. Overnight flow is often caused by leaking amenities or cooling towers.

#### Automatic monitoring systems

A continuous monitoring system is a more efficient way to monitor water use and keep track of multiple sub meters. Continuous monitoring systems save time, identify your water use patterns and make it easier to identify unusual water use. In most systems, water use is recorded at least every 15 minutes, giving an excellent picture of water use.

#### Data loggers

Simple continuous monitoring systems operate as data loggers. The information they gather must periodically be manually downloaded to a portable computer so that you can analyse the data. These systems are relatively inexpensive and give good information. The information is not instantaneous and you still have to download and analyse it.

#### Continuous online monitoring

Your business can choose to pay a fixed charge for data that is available through the internet. Your service provider will install a data logger on nominated sub meters and data will be sent to their computer servers via a mobile phone network. You should be able to access the water consumption information from any computer with internet access. The system can be programmed to alert you via email or SMS if there are dramatic changes in water use or increase in base flow.

If you want to establish an online monitoring system for your building you will have to pay an upfront cost to set up the system

and a smaller annual service charge. Costs will increase with the number of sub meters monitored and the complexity of your building.

There are great advantages in being able to access data from any computer and being able to identify problems as soon as they emerge. You can save money in equipment maintenance and upgrade costs.

#### Using your building management system

You can use your existing building management system (BMS) to continually monitor water use. Talk to the supplier of your current building.

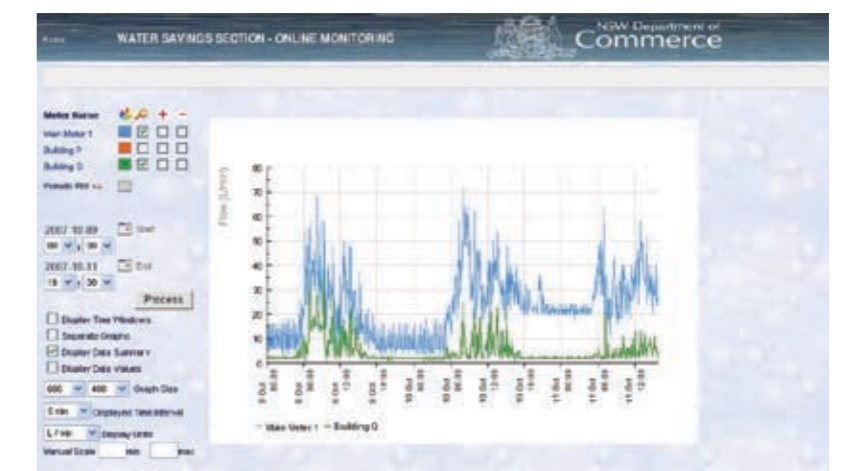


Figure 12 – A system such as the online water monitoring tool developed by NSW Department of Commerce is a valuable asset for good water management.

management system about whether they can connect water meters to your computerised BMS. The costs of running cable through an existing building will depend on the complexity of your hydraulics and building layout.

Using your BMS can enable you to consolidate the monitoring of all utilities (ie water, gas and electricity) into a single system. This gives you a snapshot of current use so you can compare it with your history of consumption. Having this information at your fingertips helps you efficiently manage utilities because you can:

- spot discrepancies in water use during or immediately after the event and respond appropriately
- track consumption and obtaining the data to justify water and energy conservation projects
- monitor energy and water key performance indicators (KPIs) in the building or sections of the building

- improve documentation so that you can back charge tenants for use of utilities, get an indication of previous utilities charges, or present evidence for legal disputes.

#### Graphing water use data

If you choose to graph your monitoring data you will have instant visual information about your water use. This makes it easy to identify patterns and changes. Graphs can be used as business performance indicators and are a good way to communicate water conservation messages to tenants and staff.

#### Water balance

A water balance is a key piece of information to include in a water efficiency audit. It helps you see where water is being used in your building and allows you to compare water intake with water discharged.

You can develop a water balance using information from regularly monitored sub meters. If you monitor water discharged

to sewer, you can develop a comprehensive water balance and accurately identify losses due to leaks.

To understand where water is used and how it is distributed, draw a diagram of the water system. The diagram should include water used by cooling towers and losses due to bleeding, evaporation and drift. If you use a pie chart (eg Figure 10) you can easily see how much water used in different parts of the building and how much is discharged to sewer.

Once you have calculated and graphed your water balance, it is far easier to determine your best opportunities for saving water.



Figure 13 – A typical hydraulic system for a commercial office building shows suggested locations for sub meters. Once installed, these sub meters will allow an accurate water balance to be developed



## Chapter 10

# Water efficiency audits

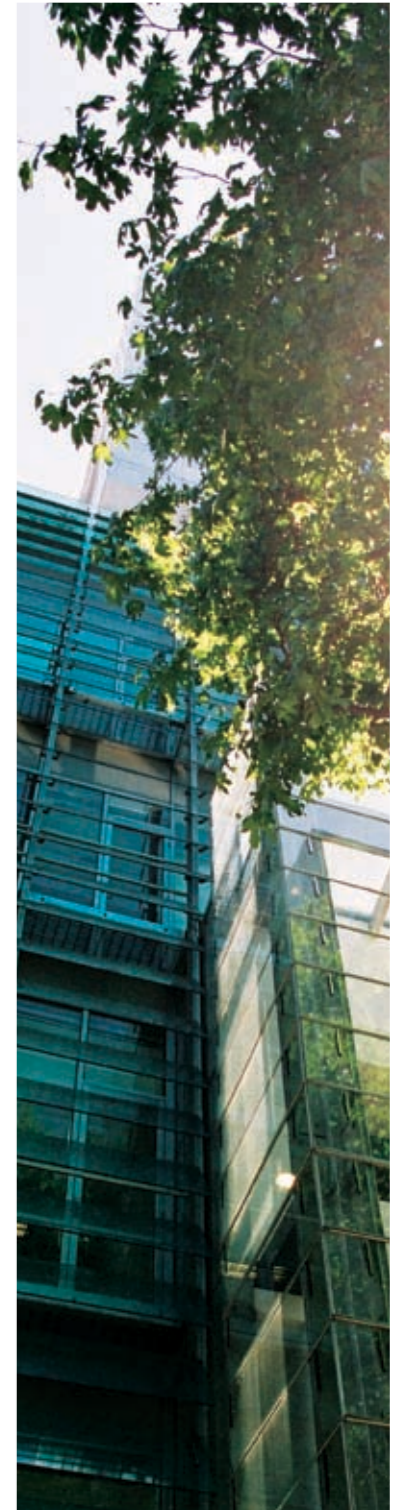
When you have an efficient water usage monitoring system, the next step in establishing a business case for water conservation is to carry out a water efficiency audit.

Key objectives of a water efficiency audit are to:

- identify water use patterns
- understand the water supply system
- identify deficiencies in the system, including leaks and wastage
- identify water and energy conservation opportunities, including water reuse
- benchmark water and energy use
- develop water and energy use targets.

To conduct a water audit you need to:

- locate up to date hydraulic plans that identify water, wastewater and stormwater reticulation pipe networks
- inspect access to the water pipe network, water services, existing meters and sub meters and tanks
- use flow tests to identify flow rates and inefficient water fixtures
- identify and recommend locations for new sub meters
- install logging equipment on meters and sub meters and begin logging
- monitor sub meters that use more than 10 kilolitres a day or 15 per cent of water used in the building
- calculate the net area of the building, the net lettable area (especially for commercial office buildings), the gross lettable area (especially for shopping centres), the number of levels and the size of the landscaped area
- calculate patronage and visitation and identify the building's hours of occupancy
- review cleaning practices in the building
- review and understand water use patterns
- understand operational and maintenance practices, including water use, reactive procedures, training, signage, etc



- identify base flows, leaks and inappropriate water use
- review main water meter sizing
- develop a water balance
- calculate water and sewage charges
- review water reuse or recycling and identify future projects
- identify your best water saving opportunities and prioritise these opportunities according to simple payback or internal rate of return calculations.

**KPIs and targets**

It is important to identify water use key performance indicators (KPIs) for your building and set reduction targets. The most common KPI for commercial office buildings and shopping centres is kL/m<sup>2</sup>/year. You may also want to measure litres per patron per day (L/patron/day).

Best practice water use for shopping centres and commercial office buildings is shown in Chapters 3 and 4 of these guidelines. You can use these benchmarks to set targets

for water conservation. You can also set targets by subtracting identified water savings from your current water use.

The following example of a calculated benchmark is from a shopping centre:

Baseline water consumed (averaged over five years)	519 kL/day
Gross lettable area	96,500 m <sup>2</sup>
Patrons a day (average from annual figures)	35,100
<b>KPI L/m<sup>2</sup>/year</b>	<b>1.96</b>
<b>KPI L/patron/day</b>	<b>14.78</b>

These figures indicate that the centre is performing below the median market value. After conducting a water efficiency audit, savings of 126 kL/day were identified.

Potential water savings identified	126 kL/d
Target water use	393 kL/d
<b>Target KPI L/m<sup>2</sup>/year</b>	<b>1.48</b>
<b>Target KPI L/patron/day</b>	<b>11.1</b>

By fixing leaks, adjusting and repairing cooling towers, improving cleaning practices and installing more water efficient amenities and kitchen equipment, the shopping centre could significantly improve its performance.

**Micro targets**

Water use targets can also be identified for each operation or piece of equipment identified in the audit and schematic. Examples of micro KPIs are shown below.

Fixture/Area	KPI
Amenities	L/patron/day
Cooling Towers	kL/day
(to avoid the impact different seasons have on cooling tower water consumption, you may need to measure kL/year)	
Hot Water	L/patron/day
Kitchens	L/patron/day or L/meal(cover)/day
Cafés	L/tables/day

Setting targets for each part of the building can help you and your tenants aim for relevant water conservation goals and measure progress. If you are sub metering and charging these businesses, KPIs help tenants understand their opportunities for water and cost savings.

**Action plans**

When you have identified where water is used and savings opportunities, it becomes easier to calculate the investment required for each opportunity

and the expected financial returns. This helps prioritise your water conservation investment.

Each business can decide its own priorities for water conservation. This decision will usually be made by considering:

- cost saving opportunities
- water savings and environmental benefits
- customer and tenant demand
- funding availability
- legal requirements
- tenant, customer and management support.

Once priorities are understood, a water saving plan with clear objectives and targets can be developed.

Formal processes for setting action plans are a key part of the EDC Business Program. Large water using businesses in the Sydney region are also required to complete a Water Savings Action Plan.

**Review your progress**

It is essential to review your water conservation progress so you can assess:

- how much water you have saved
- how your water savings have affected your KPIs

- the costs and benefits of your actions
- successes and failures of water saving projects.

A review will help you prioritise water savings and ensure that water conservation is an ongoing emphasis for your business, not an ad hoc process.

The process of continual improvement is a key element of the EDC Business Program.



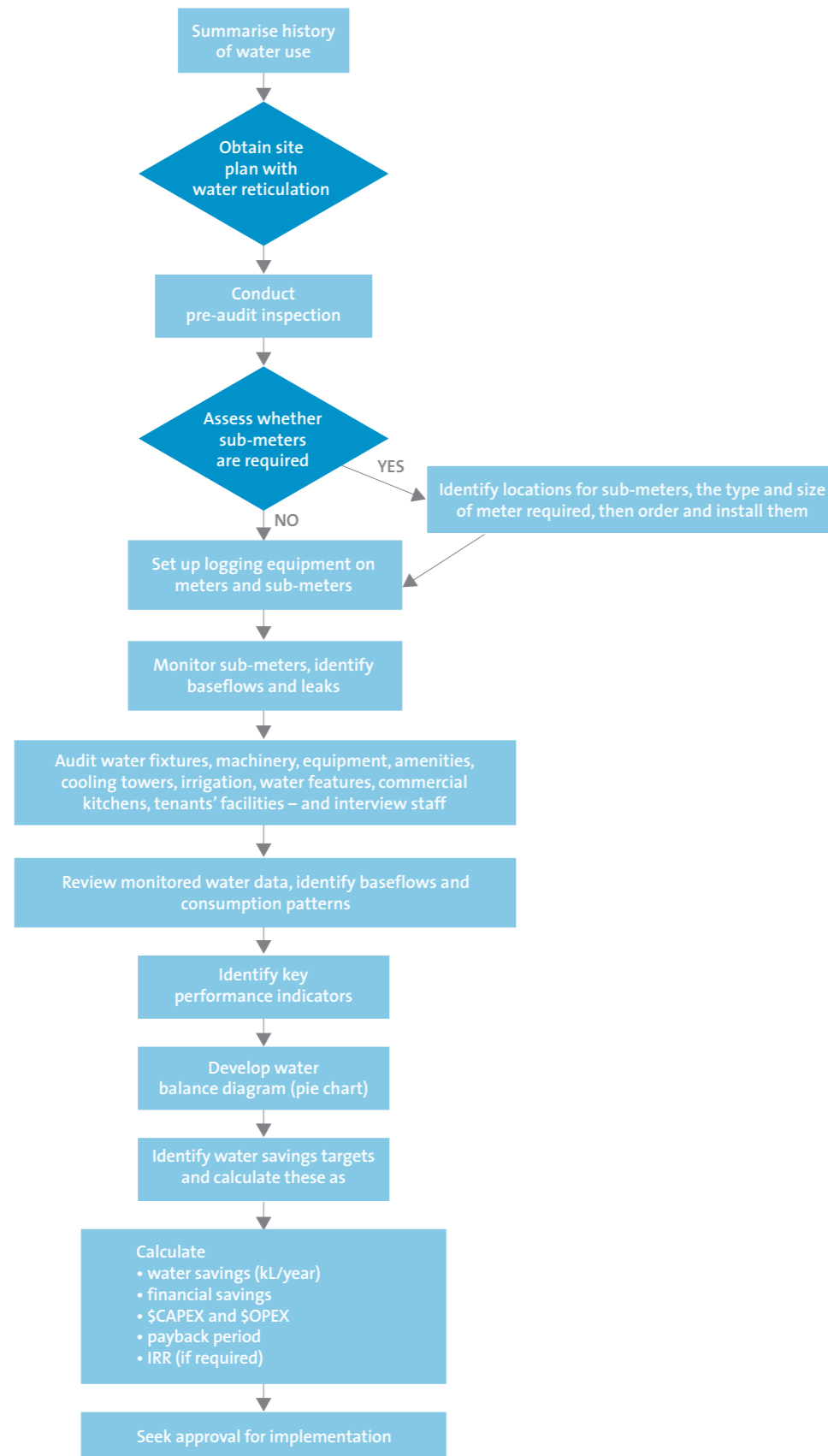


Figure 14 – The systematic approach that should be applied when conducting a water efficiency audit in a commercial building.

## Chapter 11

# Waterwise education

Education and good communication are vital elements of an effective water management system. Most people in New South Wales are aware of the importance of saving water (DECC, 2007) so it makes sense to let all your tenants, employees and visitors know what you are doing to save water and how they can help. This can boost staff morale and have a positive influence on the perceptions of building developers, owners and managing agents.

Many companies are also including water conservation in their environmental policies and will only lease office space if it meets minimum environmental standards.

Many government departments and large corporations have environmental policies that require them to reduce the environmental impact of their operations and choose environmentally high performing office space. Government tenants account for up to 30 per cent of the commercial office market in major cities such as Sydney. Without implementing measurable water efficiency measures in your portfolio, you will miss out on this important market segment.

Tools for including your tenants and workforce in water conservation campaigns include:

### Green leases

Green leases mean that the commercial relationship between owner and tenant is

based on sound environmental principles from the beginning.

The green lease is a precedent lease (one that all tenants sign). It sets out the mutual obligations of the building owner and the tenant to achieve environmental improvements. Tenants choose whether or not to agree to meet these obligations.

The benefits of a green lease for building owners include opportunities to attract tenants by reducing operational costs and generating more appealing buildings to work in.

Tenants have an incentive to participate in environmental programs because savings from improved efficiency are passed on. As of November 2007, Investa is the only company in the Australian property market to introduce a green lease arrangement.

### Public benchmarks

Setting and achieving water consumption targets is a good

way to demonstrate your corporate commitment to the environment. Publishing these water consumption targets and achievements will help environmentally aware tenants differentiate your building from others.

Companies such as Investa and Stockland agree that setting transparent targets is a key for maintaining market confidence and inspiring improvements in office performance. Investa has built a strong reputation for environmental management. It was the first Australian commercial property company to set and meet public water consumption benchmarks for its buildings.

### Keep tenants informed

Tenants and staff are generally keen to improve the environmental performance of their workplace, but often do not have access to information that enables them make a difference.

You should ensure that everyone in the building knows the basics

of how your water and energy conservation program works. They need to know who to call to report a leak or any other building performance problems, and where the light switches are so they can turn them off in the evening. Create ways for people to offer constructive suggestions for improved building management, such as a dedicated email address, webmail or even a suggestion box that is regularly read. Ensure that property supervisors promptly fix reported leaks and respond to reports and suggestions.

If your building has newer environmental design features, such as user operable louvres or adjustable air vents, make sure all tenants know how to use them properly. This information can be provided with new leases or by property managers at regular tenant and staff briefings. There can also be permanent signage throughout the building.

In new buildings, make tenant feedback a part of the long term commissioning process.

### Fix leaks quickly

Allowing leaks to go unfixed or failing to replace old, leaky equipment will quickly undermine your water conservation credentials. Conversely, a responsive maintenance team that makes sure water is not wasted will reinforce perceptions that building owners are environmentally responsible and care about water conservation.

### Sub meter and charge for consumption

Sub metering each tenancy in your building means that owners and tenants can see the impacts of their water consumption habits. It gives tenants a financial incentive to become more efficient, develop benchmarks and monitor water consumption against business production or turnover.

Charging tenants according to their consumption also prevents unfair cross subsidies that occur when water and energy bills are split proportionally amongst tenants, regardless of whether they are water savers or water guzzlers.

If you intend to charge tenants for water consumption, you should state this in the lease. You need to explain how outgoings will be measured and how charges will be calculated and recovered from the tenant.

### Provide information feedback

It's easier for people to modify their behaviour if they receive relevant information and feedback. Some companies install screens in their office that display latest information about the building's energy and water consumption and its progress against environmental targets. Other companies make sure that graphs of energy and water use are regularly emailed to staff. This information allows staff to evaluate and modify their behaviour, as individuals and as a team.

If you want to run awareness programs and are an EDC Business Program customer, the following resources are available:

#### Save it sticker

Fill in the phone number of your plumbing maintenance staff and place this sticker in bathrooms so that staff or visitors can report leaks before they become big problems.

#### Save it sticker – Chinese

This sticker allows you to communicate water conservation messages to Chinese speaking visitors and tenants.

#### Shower hangers

Remind staff that a one minute shorter shower today saves nine litres of water for tomorrow. Co-branded shower hangers can be developed for EDC Business Program customers.

#### Posters

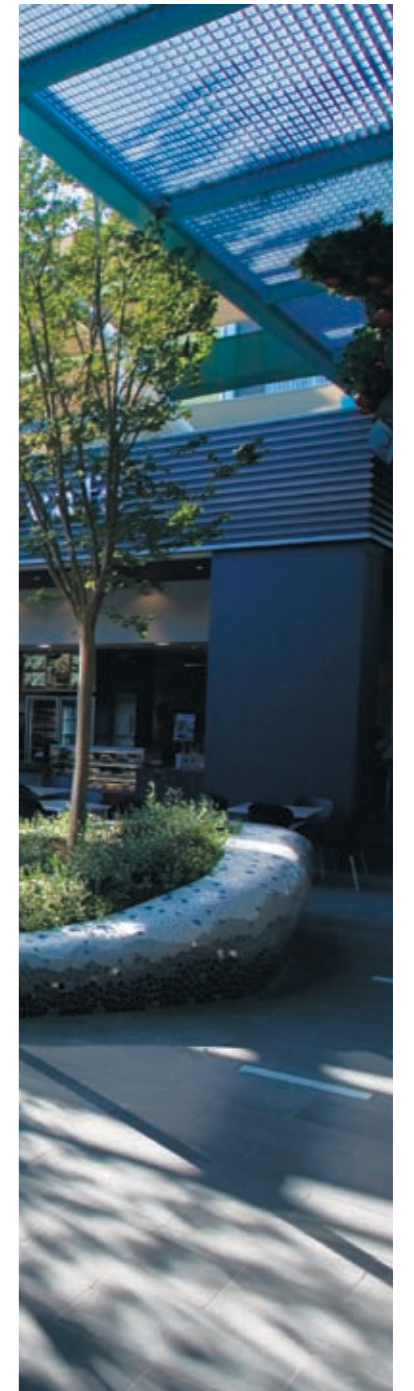
EDC Business Program customers can receive a range of co-branded water conservation posters. The posters can be displayed in amenities and staff rooms and near other water using equipment.

#### WaterFix and DIY Retrofit

Sydney Water offers residential customers the chance to participate in WaterFix where a licensed plumber installs an efficient showerhead and flow restrictors in your house. Residential customers can also participate in DIY Retrofit where they can install a free

packet of flow restrictors on their existing showerhead and household taps.

Sydney Water has a rolling program to distribute DIY kits and promote WaterFix in shopping centres. You can promote these programs to staff, in partnership with Sydney Water.





### Case study

#### Mandarin Centre – water efficient tenants

The Mandarin Centre in the Sydney suburb of Chatswood has been monitoring on-site tenant communication and financial incentives to help tenants reduce water consumption.

The Mandarin Centre installed a customised monitoring system in 2006 and now directly monitors the water consumption of individual shops in the centre and charges tenants for their water use. New tenants must submit a list of proposed equipment to Centre Management and only water efficient units are approved. For example, if a new

restaurant is to be opened and a wok stove is on the proposed list of equipment, it will be rejected unless the wok stove is a waterless wok.

Several times a day, the Mandarin Centre conducts random inspections on the largest water users in the centre. These inspections ensure that all staff observe water efficiency practices and understand that Centre

Management takes water conservation seriously.

Photograph 4 – The Mandarin Centre in Sydney's north shore suburb of Chatswood, managed by the Paragon Group, requires water efficient equipment as part of all new tenancy fit outs.

### References

*Who Cares About the Environment 2007*, Department of Environment and Climate Change NSW.

*Green Lease Guide for Commercial Office Tenants 2006*, Investa Property Group, Department of Environment and Climate Change NSW, City of Sydney Council, City of Melbourne Council and the Institute for Sustainable Futures.

