Smart Living Handbook

Making sustainable living a reality in Cape Town homes
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# Contents

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“We all have a responsibility to learn how to live and develop sustainably in a world of finite resources.”
– Archbishop Emeritus Desmond Tutu, 2009
Introduction

Cape Town – eKapa – Kaapstad – is South Africa’s Mother City. It is the oldest city in the country, the legislative capital of South Africa, and an important centre of trade and tourism. Within hours after his release from prison, Nelson Mandela made his first public speech from the balcony of the Cape Town City Hall – heralding the beginning of a new era for South Africa. The city is probably best known for its natural beauty – Table Mountain, the Cape of Good Hope and the Cape Flats, where a unique plant life exists. Fynbos (Afrikaans for ‘fine bush’) is shrubby, evergreen vegetation that is well known for its characteristic proteas. It occurs nowhere else but along the Cape coastal belt, its adjacent mountains and some isolated inland mountaintops.

The Cape Floral Kingdom has over 9,000 different plant species, of which 190 are endemic. That means that they are found nowhere else in the world. Although Cape Town is renowned for its beauty and biodiversity, it faces many grave environmental resource challenges. Local development and pollution have destroyed natural habitats, placing many unique plants and the rare animals living among them under threat. Climate change caused by vehicle emissions and coal-based power generation will have a severe impact on all life in our city. Water resources are increasingly scarce, and landfill space is rapidly filling up. Cape Town is also characterised by huge wealth differences. Some Capetonians use more water, electricity and petrol, and generate more waste than the average American, while others live in households with a single tap, and still use unsafe fuels for their cooking.

Background to the handbook’s creation

The City of Cape Town has a partnership with the City of Aachen in Germany that specifically promotes sustainable development in a practical way. One of the partnership’s projects implemented in Cape Town was the 21 Households project with families from Khayelitsha, Manenberg and Wynberg. Over a period of a year, households met monthly to learn about sustainable living through practical, interactive workshops and outings. Eco-audits were done in their homes at the start and end of the project to determine the main focus areas that had to be addressed and the eventual impact of the training.

The project was a great success in the local communities. It was repeated in different areas, and everywhere, households felt that they had been empowered to make better decisions that would improve their lives and benefit the environment. The participating households believed that it was important to get the message across to the broader community, and suggested that the workshop notes be printed in a handbook format.

Subsequently, the Smart Living Handbook was developed on behalf of the City of Cape Town by AMATHEMBA Environmental Management Consulting and Sustainable Energy Africa. It was based on the Home Environmental Management Guide Book by AMATHEMBA and The Energy Book by Sarah Ward, and was first published in 2007. Minor updates and reprints were done in 2008 and 2009. In 2010, Steadfast Greening and Icologie undertook an extensive update and review of the handbook, and compiled the complementary Smart Events and Smart Office handbooks.

Making a difference: Energy, water, waste and our diverse environment

Every time you switch on a light, drive your car, run a bath or put out your rubbish you’re making a decision that affects the environment. Natural resources – water, coal, oil, land, fresh air – will run out if we use them at a faster
rate than they can replenish themselves. There are many indications that this is already happening. Households have a significant cumulative impact. To make sure that there are enough resources to go around – enough for current and future generations – we need to manage our resources well, using what we have efficiently and fairly. Many of us are aware that we should be doing this, but are often unsure about what to do and how to do it. This handbook aims to provide you with information and practical actions to implement – to protect the environment, save money, and make your home a safer place to live in. We can make a difference.

**Saving the earth and saving money**

The wonderful thing about saving water and electricity and reducing waste is that it will save you and the City of Cape Town much needed money. The actions recommended in this book are easy and relatively cheap. Where an item may be a bit more costly, we offer information on the long-term savings. Also worth considering is that when you buy an appliance, you pay more than just the selling price – you commit yourself to paying the cost of running the appliance for as long as you own it. These energy and water costs add up quickly. Therefore remember, when you buy a new appliance, rather switch to one that will be energy and water-efficient. These usually cost no more than their less efficient counterparts, but will save you money over the years.

**How to use this handbook**

We would all like to make good choices when it comes to managing our homes – good choices for our health, safety and pocket, but also for the environment. This handbook has some useful information and handy tips to help you make the best choices to reduce your energy and water consumption and waste output. It also provides information on how to keep our natural world as strong and diverse as possible. The handbook is divided into four main sections: Waste, Energy, Water and Biodiversity.

The handbook contains a lot of information, and we recommend that you give yourself sufficient time to work through it – attempting to read all chapters together and trying out all the new actions all at once, could be difficult. Perhaps start with reading the summary of each chapter; decide which chapter interests you the most, or will give you what you need to make smart decisions in your home, and begin.

Different types of households are faced with different environmental issues. For example, high-income households may find that they are high consumers of electricity and need to explore ways to reduce their consumption. Informal households, on the other hand, may find that their greatest problem is the health and safety of householders because of the unsafe use of energy. We hope this handbook will be of relevance and use to all homes in Cape Town. Where a section does not seem to relate to your issues, simply move on to the next one, or explore and consider the issues facing your neighbours.

Each section provides the following information:

- The key challenges related to the resource
- What the City of Cape Town is doing to manage the resource / issue
- What you can do in your home
- Practical resources and steps for implementation.

Activities and pictures are provided for interaction with the issues, as well as easy reference. Safety and health issues are also addressed in each of the sections. Community organisation and activity are vital for good governance. Therefore, the handbook also contains information on some interesting initiatives in Cape Town’s civil society.

Water and energy-saving products are available from most hardware stores and suppliers of plumbing or lighting devices in Cape Town. There are many waste recycling initiatives at schools and in communities, so consult your community newspaper for more details. Many ‘green’ products are available locally – visit Cape Town Green Map (www.capetowngreenmap.co.za) for more information. Our local nurseries are well stocked with indigenous plants, and will be able to guide you on what is best suited to your local area, or you can contact Kirstenbosch for more information.
Some useful resources and references are listed at the end of each chapter, but a full reference on environmental resources in the city can be found in the City’s digital Environmental Resource Directory, which can be downloaded from the Environmental Resource Management Department’s website. Visit www.capetown.gov.za/environment; click on “Publications”, and then choose “Environmental education resources”.

Acknowledgements

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Water is a natural resource on which all living matter depends. While freely available in many natural environments, in human settlements potable (drinkable) water is less accessible. Demand often exceeds supply, and there are significant costs in getting water from the natural environment to the tap in an acceptable form.
Summary

Fresh water is a scarce and critical resource. Less than 1% of water on earth is easily accessible and fresh. Most of our water is sea water, with some fresh water found underground and frozen in icecaps. Worldwide, the lack of access to fresh drinking water and sanitation is a growing problem. Available drinking water is a basic need that we cannot survive without for longer than seven days. Plenty of fresh water is also required to produce the food, goods and services we use and manufacture daily. With the threat of climate change likely to increase water scarcity even further, it is very important for us to understand our role in protecting natural water systems, and to conserve our precious water supplies.

Why is water conservation important?

The main water issues facing us are as follows:

• The world’s supply of available fresh water is decreasing due to rapid urbanisation.
• South Africa is a naturally dry and water-stressed country with below average rainfall.
• We can expect increasing water shortages with more severe drought and flooding due to climate change.
• Supplying fresh drinking water to our growing population is complex and costly.
• Our rivers, wetlands and estuaries are threatened by development, pollution and alien vegetation.

What can we do?

Here is a list of practical guidelines to conserve water, reduce water wastage, and protect our supplies:

• Read your water meter and know how much water you use monthly.
• Conduct a water audit at home to determine where you use the most water.
• Check for and fix all leaks or dripping taps.
• Fit water-efficient showerheads and tap fixtures in your home.
• Install water-efficient or dual-flush toilet systems.
• Avoid watering your garden between 10:00 and 16:00.
• Attach an automatic shut-off spray fitting to your garden hosepipe.
• Install a drip irrigation system instead of using a sprinkler to water your garden.
• Use the economy cycle on your dishwasher and washing machine.
• Do not use automatic top-up systems for your swimming pool.
• Use a pool cover to prevent evaporation (ensure necessary precautions to avoid drownings).
• Recycle greywater from the bathroom for watering your garden and plants.
• Install a greywater recycling system in your home.
• Avoid hosing down hard surfaces or paved areas with potable water.
• Wash your car on a grassed area, not in your driveway or in the road.
• Divert swimming pool backwash into the sewer only, not into the stormwater drain.
• Do not throw solid objects down the toilet or into the stormwater drain.
• Do not pour toxic paint, solvents, chemicals, poisons or pesticides into stormwater or sewer drains.
• Lay permeable paving around your home to encourage natural rainwater filtering and drainage.
• Install rainwater harvesting tanks to store water for use in your garden and house.
• Design a roof garden to capture rainwater and manage stormwater or sewer runoff naturally.
• Plant indigenous water-wise gardens, i.e. gardens that need less water.
• Identify and remove invasive alien vegetation from your garden and local wetland.
• Protect and keep your local freshwater ecosystems pollution-free.
Introduction to water

What is water?

Water is a liquid, but can have a solid state (ice) and a gaseous state (water vapour or steam) as well. Water covers much of the earth’s surface, and is found mostly in the form of oceans. Only 3% of the world’s water is fresh, with less than 1% easily accessible fresh surface water. The rest is groundwater and ice. In the earth’s atmosphere, tiny water droplets and ice crystals that are suspended in the air form water vapour or clouds. Together, the oceans, polar ice and clouds make our entire planet look blue and white from outer space. This is why the earth is known as ‘the Blue Planet’.

The water cycle

The earth’s water supply is constantly being recycled. It evaporates from the oceans due to the sun’s heat, and is given off by trees and plants through the process of evapotranspiration (i.e. the sum of water evaporation from the soil surface and water transpiration through plant leaves). In the air, water vapour cools and condenses into clouds, which results in rainfall onto the land. Surface water runs off into lakes and rivers, usually ending up in the oceans … and the cycle starts all over again.

Fresh water is intercepted from catchment areas and rivers, and stored in dams before undergoing treatment to provide fresh drinking water to homes. Wastewater from households must also be treated before being released back into the water cycle. Rainwater is channelled from buildings and roads into stormwater drains, which flow directly into lakes, rivers and, eventually, the sea.
Water is a basic need

Water is important to almost everything on earth, from influencing our climate and weather patterns to shaping the continents and the healthy living of organisms. Two thirds of the human body is made up of water, and although we can live up to a month without food, we cannot survive without drinking water for longer than five to seven days.

Water is a basic need and a key building block of all communities. Huge amounts of fresh water are used to irrigate farmland for food production. It is essential for manufacturing, particularly in heavy industries like electricity generation plants and iron and steel production, which need large amounts of water for cooling or as a power source. A reliable supply of fresh water is critical for all households too.

Knowing exactly how much water is used in our daily lives helps us understand how important it is to use it wisely. Generally, we think about the water needed for drinking and cleaning only. However, we should also think about the water required to produce the goods we buy and the food we eat. The ‘water footprint’ is a measure of the total amount of fresh water that is used to produce goods and services.

To make ONE KILOGRAM of certain foods, vast amounts of water are needed.

<table>
<thead>
<tr>
<th>Item</th>
<th>Water Needed</th>
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<tbody>
<tr>
<td>beef</td>
<td>50 000 to 100 000 litres</td>
<td>apple</td>
<td>70 litres</td>
</tr>
<tr>
<td>chicken</td>
<td>3 500 litres</td>
<td>glass of beer</td>
<td>170 litres</td>
</tr>
<tr>
<td>soy beans</td>
<td>1 650 to 2 200 litres</td>
<td>glass of milk</td>
<td>200 litres</td>
</tr>
<tr>
<td>rice</td>
<td>1 900 litres</td>
<td>hamburger</td>
<td>2 500 litres</td>
</tr>
<tr>
<td>potatoes</td>
<td>500 litres</td>
<td>pair of jeans</td>
<td>11 000 litres</td>
</tr>
<tr>
<td>maize</td>
<td>450 to 630 litres</td>
<td>small car</td>
<td>450 000 litres</td>
</tr>
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**Water and good health**

Here are ten good reasons why drinking plenty of fresh water every day can help you stay healthy:

- Drinking fresh water reduces your risk of a heart attack.
- Water removes toxins from your body, lessening the burden on your kidneys and liver.
- Water can prevent kidney stones and reduce your chances of bladder, kidney and urinary tract infections.
- Dehydration (a lack of water) can cause loss of concentration, headaches, irritability and tiredness.
- Perspiration (sweating) is your body’s natural way of cooling itself, and to sweat, you need lots of water.
- Water makes up a large part of the fluid that lubricates and cushions your joints and muscles.
- Water helps relieve constipation by adding fluid to the colon and bulk to your stools.
- Water helps us recover from illness, controlling fever by replacing lost fluids, and thinning out mucus.
- Drinking water moisturises your skin from the inside out and helps skin maintain its elasticity and suppleness.
- Water keeps your body metabolism and digestion working properly, giving you the energy needed to exercise.

**World water crisis**

The United Nations World Health Organisation recognises access to water as a basic human right, and places the responsibility on governments to provide all people with sustainable access to safe drinking water and sanitation.

Demand for clean, fresh water is steadily increasing due to the growth in populations and cities. Already, demand is exceeding supply in many parts of the world. Water shortages are also caused by periodic drought, pollution, poor infrastructure and inefficient water use. In sub-Saharan Africa, a third of all people have no access to safe drinking water or sanitation. It is estimated that by 2025, more than 60% of the world’s population will be living in water-stressed areas that are vulnerable to water shortages.

The United Nations has prioritised water access among its Millennium Development Goals, because a lack of access to safe water contributes to widespread suffering, including increased poverty, high infant mortality (child death rates), low levels of education, and political instability. Due to contaminated water, an average of 4 500 children die each day from waterborne diseases like diarrhoea.
Water and climate change

Climate change is likely to increase our demand for water even further, particularly in already water-scarce regions like Africa. In Southern Africa, scientists are predicting changes in the intensity and seasonality of drought and rainfall. This means that the dry areas of our country (such as the western half) will get drier, with longer periods of drought, while the much wetter eastern half of South Africa is expected to receive heavier rainfall over shorter periods, with a higher risk of flooding.

Climate change is likely to have a significant impact on water and food security. It could threaten access to sustainable, fresh drinking water and sanitation, especially for vulnerable people. Natural vegetation and animal migration patterns could also alter as climate change intensifies.

Increasing drought and floods will probably worsen many existing environmental problems, including the following:

- Soil erosion
- Shortage of animal grazing
- Loss of nutrient-rich topsoil
- Crop and livestock losses
- Low farm yields
- Reduced food supplies
- Increased cost of food and water
- Sediment build-up in dams
- Lower dam water levels
- Spread of wildfires

Many rural areas still do not have access to potable (drinking) water on tap.

Climate change will result in rising sea-levels and increased storm surges.
Water quality in our freshwater ecosystems is also likely to be affected by the higher temperatures brought about by climate change. Rising sea levels predicted due to melting polar ice could cause an increase in the salinity (salt content) of river estuaries, resulting in changes to aquatic (water-based) ecosystems. Bacterial diseases, such as cholera and diarrhoea, are more likely to spread in warmer river water. We can also expect higher water evaporation rates, which will reduce our water storage capacity.

**Water availability in South Africa**

The sustainable management of our freshwater resources is critical for the economic development of South Africa. We live in a naturally dry country with an average annual rainfall of 464 mm – well below the world average of 860 mm. More than 50% of our water comes from only 14% of our rivers, which are situated mainly along the eastern escarpment. In terms of water availability per person, South Africa is classified as a water-stressed country, with 98% of our water supplies already being used. Based on our current water use and population growth, the Department of Water Affairs estimates a 1.7% water shortage by 2025.

In the past, South Africa invested in building dams and treatment plants to maintain our supply of fresh water. Today, we have few viable sites left to build new storage dams, and we face serious and costly development challenges as our population and cities continue to grow.
There is generally little awareness of South Africa’s uncertain water situation. We often use water inefficiently, and water wastage is common. All of us will be negatively affected by water shortages and increasing water costs. Greater awareness, protection of freshwater resources, and effective water-saving practices are needed for us to conserve South Africa’s limited water resources.

**Protecting our freshwater ecosystems**

Not only do we live in a water-stressed country, but 80% of South Africa’s rivers are also classified as threatened by urban development. Human activity, such as industry, settlements and recreation, is popular along ecologically sensitive ‘green corridors’, like floodplains and wetlands, and should be carefully managed. Vleis and rivers are often used for illegal dumping and flushing of factory and farm wastewater, chemicals and pesticides. Runoff from informal settlements and polluted stormwater from our houses, buildings and roads are also frequently allowed to enter our rivers and wetlands untreated. Many of our urban water bodies contain dangerously high levels of bacteria, and are unhealthy for people and animals to swim in. The health of our river systems is vital to maintain our water quality and to ensure we have a sustainable supply of fresh drinking water.

Water bodies, wetlands in particular, play a very important role by controlling the flow of water, filtering impurities, and replenishing groundwater. Wetlands also naturally absorb greenhouse gases (gases trapped in the earth’s atmosphere), such as carbon dioxide. Natural vegetation in these areas should be protected and not removed, as it maintains biodiversity, and reduces surface runoff, soil erosion and the risk of flooding. Alien vegetation, however, should be removed, as it presents a significant problem (see Biodiversity section for more information).

**Threat of invasive species**

**What is the problem?**

Invasive alien species cost South Africa’s economy billions of rands every year. Invasive alien species are plants, animals and microbes that are brought in from other countries, and then outcompete the indigenous species for habitat and food.
Invasive alien plants directly threaten our water security, ecosystems and the productive use of our land. They intensify the impact of fires and floods, increase soil erosion, and absorb enormous amounts of water. Invasive aquatic plants, (such as the water hyacinth, parrot’s feather, water lettuce and water weed) affect agriculture, fisheries, transport, recreation and water supply.

Examples of common alien plants that absorb lots of water and should be removed include the silver wattle, cat’s claw creeper, oleander, Port Jackson willow, watercress, kikuyu grass, weeping willow and silky oak.

**Who is fighting the problem?**

The Working for Water (WfW) programme was launched in 1995 to fight the problem. It is run by the Department of Water Affairs in partnership with local communities and government departments, research foundations, non-governmental organisations and private companies.

Since it began, the programme has cleared more than 1 000 000 ha of invasive alien plants, providing jobs and training to approximately 20 000 people from poor communities. WfW currently runs more than 300 projects in all nine of South Africa’s provinces. Scientists and field workers use a combination of the following methods to control invasive alien plants:

- Felling, removing or burning invasive alien plants
- Environmentally safe herbicides
- Species-specific insects and diseases from the alien plant’s country of origin

WfW is internationally recognised as one of the most outstanding environmental conservation initiatives in Africa. It enjoys political support for its job creation efforts and the fight against poverty. An essential part of the programme is the investment in community skills-training for women, youth and the disabled wherever possible. For more information, visit www.dwaf.gov.za/wfw/.

**World Water Day**

World Water Day is held annually on 22 March to focus attention on the importance of fresh water, and to promote the sustainable management of freshwater resources. The City of Cape Town celebrates Water Week annually with a programme of activities throughout the city to highlight the need for water security and conservation. It also gives recognition to people and projects that have improved access to drinking water for our citizens.

*Removal of alien vegetation helps save water.*
Our water rights

In South Africa, the Water Services Act provides that all water service authorities, such as the City of Cape Town, must provide water and sanitation services that are efficient, affordable, economical and sustainable. This means that the poorest of the poor must be able to afford the water they need. At the same time though, the City’s Water and Sanitation Department must generate enough money to cover the cost of treating and distributing the water.

The City does not profit from the provision of water supply and wastewater removal services. The charges for these services are to cover the cost of operating, maintaining and upgrading/expanding the water and wastewater systems.

The Water Services Act determines the following basic water requirements for all households:

- Every person is entitled to receive a minimum of 25 ℓ per day.
- Every household (average eight people) is entitled to receive 6 kℓ, or 6 000 ℓ, per month.
- These 6 kℓ of water must be provided free of charge to all homes in South Africa.
- Water must be supplied at a minimum flow rate of 10 ℓ per minute.
- If there are no taps in the home, the City will install a tap within 200 m of that household.
Consumers may not be without water supply for more than seven full days in any year.

The City’s Water and Sanitation Department must ensure that provision is made for future water supply as well.

Where does our water come from?

Most of the bulk untreated water supplied to Cape Town comes from dams that store water running off Western Cape mountains during our winter rainfall season. The main dams that supply Cape Town are Wemmershoek, Steenbras Upper, Steenbras Lower (City-owned dams), Voelvlei, the Berg Water Project and Theewaterskloof (Department of Water Affairs dams). The Berg River Dam, which begun in 2002 and was completed in 2008, was implemented to increase the raw water supply to Cape Town.

How sustainable is our water supply?

Even with our latest water supply schemes, the increasing water demand and threat of climate change mean the future of our water supply in Cape Town is not secure. There are few viable sites left for building new dams in the Western Cape, and the Department of Water Affairs and the City of Cape Town have been considering alternative options, such as tapping into groundwater through the Table Mountain Aquifer, and desalinating (removing salt from) seawater. Desalination plants, like the one used on Robben Island, are very expensive and can take years to plan and implement on a large scale and are energy intensive.

A more sustainable option for providing fresh drinking water is to adopt a water conservation approach. The City aims to reduce water use and water wastage by 20% by 2020. Therefore, the municipality encourages all people to understand water scarcity, protect water resources, and practise responsible water use.

Reclaim Camissa project

Cape Town was first established in 1652 as a replenishment station to supply passing ships with fresh vegetables and water. A freshwater spring located on the slopes of Table Mountain in the area known today as Oranjezicht is where much of central Cape Town’s water and cultural history from the time of Jan van Riebeeck originated. The Oranjezicht Springs were the city’s original formal water supply in 1682. A chamber was built over it in 1813 to protect the main spring. Over time, all the springs were canalised, and although they still exist today, they are mostly underground in a series of pipes and stormwater drains, which drain unnoticeably into Table Bay.

The Reclaim Camissa project is working to re-introduce this natural waterway and restore the historical connection between the mountain and the sea. It aims to develop heritage and tourist sites throughout the central business district linked to the springs and rivers on the slopes of the mountain, and connect people to this original waterway with beautiful parks and pedestrian walkways. Since the Oranjezicht spring water is not fit for drinking, the irrigation of the urban park surrounding the new Cape Town Stadium at Green Point is a first initiative to make use of water from the springs, rather than using the City’s fresh drinking water supply. For more information, visit www.capetownpartnership.co.za/reclaim-camissa/.
How is our drinking water treated?

Producing an uninterrupted supply of fresh drinking water is a critical non-stop operation. From storage dams, raw (untreated) water is conveyed through pipelines and tunnels to the City’s water treatment works, where it is made potable (fit for drinking). It is put through various processes to remove substances and kill any harmful micro-organisms, ensuring it complies with the South African National Standard for Drinking Water (SANS 241). These standards, in turn, comply with those of the World Health Organisation.

At the water treatment plant, the water first passes into a stilling chamber to reduce water pressure and control water flow. From here, it enters the particle separation and settling process, which entails adding lime for pH (acidity/alkalinity) adjustment, and either ferric or aluminium sulphate to help small particles join together to form larger masses. If required, powdered activated carbon is added to reduce any taste and odour problems in the raw water that might have been caused by algae in the storage dams. Once these chemicals are added and mixed, the water is directed to larger settling tanks at even slower flows to allow the clusters of particles in the water to settle and be drawn to the bottom as sludge (sediment).

The clear water at the top flows through slots in the tank, and is chlorinated before it passes through the sand filter beds. The filtered water is stabilised by adding further lime and carbon dioxide to ensure that the water is not corrosive (containing harmful chemicals) and does not form scales. A final dose of chlorine is added for disinfection as the water leaves the water treatment plant for the bulk storage reservoir, before being discharged to households, industry, business and agriculture.

The entire process of water catchment, treatment, storage, distribution and management is subjected annually to the Department of Water Affairs’s Blue Drop certification process for drinking water. This is a strict set of standards that ensures that we receive high-quality drinking water.

**Characteristics of final water after treatment (2006 averages)**

- **pH**: 8.5 – 9.2
- **colour**: less than 5
- **oxygen absorbed from permanganate**: 0.8 parts per million
- **alkalinity (as CaCO₃)**: 28 – 32 parts per million
- **chlorides (as Cl)**: 25 parts per million
- **aluminium (as Al)**: 0.2 parts per million
- **iron (as Fe)**: 0.04 parts per million
- **total hardness (as CaCO₃)**: 57 parts per million
- **fluorides (as F)**: less than 0.1 parts per million

*Source: City of Cape Town, Scientific Services Department, Athlone*
FREQUENTLY ASKED QUESTIONS

How good is drinking water quality in Cape Town?
The quality of drinking water in Cape Town is of a very high standard, as most of our water comes from largely unpolluted mountain catchments. In addition, the City has excellent water treatment facilities.

How and when does our water get tested?
The City’s Scientific Services Division performs more than 320 000 chemical and biological tests, using sophisticated water testing instrumentation. Weekly monitoring on raw water entering the treatment plants, and on treated water leaving the plants into the distribution network, is done throughout the year.

Why is chlorine added and present in the water?
Chlorine is a disinfectant that kills bacteria in water. It has prevented and wiped out waterborne diseases, such as typhoid, cholera and dysentery, in many parts of the world.

Is it better to drink bottled water than tap water?
There is no reason why people should not drink tap water in Cape Town. Bottled water is expensive and contributes to waste. Rather get your own reusable water bottle and refill it with tap water.

Why does the water sometimes appear white when the tap is first opened?
The presence of air bubbles from high pressure in the pipes can make water appear white. This is harmless. Simply allow the water to stand in a glass for a while, and the air bubbles will escape.

Why does water sometimes smell and/or taste funny?
Chlorine in our water can cause a ‘swimming pool’ smell. The smell should disappear in open air once water leaves the tap. Also, a harmless substance called Geosmin can cause an ‘earthy’ smell or taste. Geosmin is produced by small water plants, called algae, which may be present in rivers and dams, especially during summer. However, the water remains safe and fit for human consumption.

Does Cape Town use recycled water?
Recycled water is not used for drinking purposes, but the City does use recycled wastewater for industrial and irrigation purposes, which do not require potable water.
Where does our wastewater go?

Wastewater produced by households and industry is removed from properties through a sewerage system. This is a network of pipelines and pump stations conveying wastewater to the City’s wastewater treatment works, where the water is put through mostly mechanical and biological processes to break down and remove substances that could be harmful to human beings and the environment.

The treated effluent is then released into the natural environment via rivers and streams, which eventually flow into the ocean. Like raw water treatment, treated wastewater must also comply with regulations. The entire sewerage treatment process is annually subjected to the Department of Water Affairs’ stringent Green Drop certification process for wastewater.
Protecting city water resources

The National Water Act seeks to ensure that the nation’s water resources are protected, used, controlled and managed in ways that reduce and prevent water pollution. To this end, everyone must carefully plan and participate in co-ordinated efforts to manage water resources effectively.

One of the major issues affecting our urban water resources is excessive levels of sediment and nutrients entering our waterways. Sediment (such as eroded topsoil, sand and litter) disrupts and reduces the natural water flow, while too many nutrients (from untreated sewage, chemicals, fertilisers and pesticides) can alter the aquatic ecology (system of life) of rivers. Poor waterway management threatens the availability of our freshwater supplies, and rehabilitating these areas is costly.

Currently, the City has two bylaws that regulate the protection of our sewerage and stormwater systems: the Wastewater and Industrial Effluent Bylaw and the Stormwater Management Bylaw. Both bylaws outline the responsibilities of the owner/occupier of premises and the City’s responsibility to protect the environment.

The Wastewater and Industrial Effluent Bylaw includes the following provisions:

- No foreign material or objects, fat, oil, grease and building rubble should be allowed to enter the sewer.
- Property owners are responsible to clear blocked sewers on their property.
- If property owners fail to clear blocked sewers on their properties, the City will be forced to do so to prevent any health risk. In such a case, the cost of unblocking the sewer will be for the property owner’s account.
- Owners must ensure that no groundwater or stormwater enters the sewerage system.

The Stormwater Management Bylaw intends to ensure that only rainwater, and no polluted water, enters the stormwater system. It also allows for swimming pool overflows into the stormwater system, but prohibits backwashes, which should be discharged into the sewerage system.

Report all incidents relating to water pollution to the Water Technical Operations Centre. Phone 086 010 3089, e-mail waterTOC@capetown.gov.za, or SMS a maximum of 160 characters to 31373.

Water restrictions

As part of the City’s water demand management plan, water bylaws have been introduced to reduce water wastage. Here are some of the restrictions contained in the bylaws:

- No watering of gardens (or any grassed area) with potable water between 10:00 and 16:00.
- No hosing down of a hard surface or paved area with potable water.
- Water-saving devices, such as water-efficient showerheads, tap fittings and fixtures, and efficient toilet flush systems, must be included in all new buildings and developments.
- No toilet cistern may exceed 9.5 ℓ in capacity.
• Automatic top-up systems using a float valve that is fed from a potable water source in order to supply swimming pools and garden ponds are prohibited.

• Major water users, using over 3 650 kℓ of water per year (such as business and industry), must undertake an annual water audit and reduce their consumption.

For more information on the water bylaws and full responsibilities of both the City and consumers, please visit the City’s Water Services website on www.capetown.gov.za/water/.

Water tariffs

Since 2001, the City of Cape Town’s water and sanitation billing system has used a rising-step tariff for customers in the domestic category. Step 1 represents the free basic water allocation, providing all customers with the first 6 000 ℓ (6 kℓ) of water free of charge. Step 2–4 remain relatively affordable and rise gradually. Step 5 (consumption 35–50 kℓ) and Step 6 (50 kℓ and more) represent high monthly water users, who pay the most for water. Over and above the 6 kℓ of water supplied free of charge each month, the City also allocates a R38,00 indigent grant to poor or needy people, whose properties are valued at R300 000,00 or less. Consumers who qualify for an indigent grant and use less than 10,5 kℓ of water per month are exempt from paying water and sanitation charges to the City.

Water accounts and meters

City of Cape Town Water Services staff read your water meter approximately every 30 days. You are charged according to the aforementioned rising-step tariff. It is important to verify that you do in fact receive your free basic water. Although all residents receive 6 kℓ of free water each month, it is often not reflected as exactly 6 kℓ on your account. This is because your meter is not read on the same day each month. Therefore, the reading period may be shorter or longer than 30 or 31 days. If you are unable to pay your water bill, you will be charged interest on outstanding amounts. It is best to pay your account, or alternatively make an arrangement with the City for a repayment plan. If you fail to pay or make an arrangement, the City could restrict your water supply. In addition, if a water meter has been tampered with, the City has the right to cut off the supply.

Make sure that you know where your water meter is located and that you can read it. Your water meter should be accessible to City officials at all times. The City is busy with a programme to move meters outside of premises to allow easier access for reading. Should your water meter be located behind locked gates, or if dogs prevent the meter readers from taking a reading, you may take your own reading and phone it through to the Water Services Department. Where water meters are not read, consumption is estimated and charged according to historical monthly use.

The City of Cape Town makes use of two main types of water meters for domestic applications, namely inferential and volumetric meters. A water management device (WMD), is being introduced and can be programmed to make available only a fixed amount of water depending on what the household can afford. The WMD is set in consultation with you, the property owner, to suit your budget and help you save water and money. It is being installed in mainly low-income households to begin with, but anyone can apply for one to be installed.

For City of Cape Town water account queries, call 086 010 3089.

For information on water meters, or to phone in a water reading, call 086 010 3090.
The City is striving to conserve water to ensure that access to drinking water remains sustainable. Successful reductions of 10–20% are often achieved during drought restriction periods, and the latest objective is to make water-saving behaviour a way of life in the long term. The City cannot do this without your help and support. Households use as much as 60% of all the water in our city, and any actions we take to use water more efficiently will make a big difference to the sustainability of our water resources.

Conduct a mini-audit

To save water, you must first know how much water you are using, where you are using it, and where you could use it more efficiently. Use the following exercise to conduct a mini-audit and determine your water consumption. Then you will be able to decide where to make water-efficiency improvements in your home. Generally, 40–60% of household water is used for non-essential purposes, such as watering gardens and filling swimming pools. The table overleaf also shows typical water use patterns in low and middle-to-high income households in Cape Town. You need to fill in how often an activity is undertaken and the number of people in the household. Then calculate water used per day and total consumption.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Average litres of water used per activity</th>
<th>Number of times activity done each day</th>
<th>Total water used by a person each day (litres)</th>
<th>Number of people in the household</th>
<th>Total household water consumption/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Wash hands and face</td>
<td>1,5 litres</td>
<td>3 times a day</td>
<td>1,5 litres x 3 times = 4,5</td>
<td>4 people</td>
<td>4,5 litres x 4 people = 18 litres</td>
</tr>
<tr>
<td>Wash hands and face</td>
<td>1-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bath</td>
<td>80-150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-minute shower</td>
<td>80-100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teeth cleaning (tap running very slowly – rather use a mug)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet flushes</td>
<td>6-21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking (cup)</td>
<td>0,25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing dishes (hand)</td>
<td>18 single basin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dishwasher</td>
<td>17-45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing machine (one 3 kg load)</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand washing (1 tub load)</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaking/dripping tap (1 drop/second each day)</td>
<td>30-60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food garden (per m² per day)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking (meal for five people)</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using the garden hose for an hour</td>
<td>600</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total consumption per day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Once you have conducted a basic water audit, you should have a better understanding of your water use patterns and the average daily and monthly water consumption in your home. Compare your audit calculations to your water bill. Check the reading on your water meter to make sure it is correct. If there is any difference, it will be worth investigating, as there may be a problem.

Here are some practical steps to improve water efficiency in your household:

**Finding drips and leaks**

A dripping tap can waste 30–60 ℓ of water every day. Taps, showerheads, toilets and hot-water cylinder overflow pipes often leak. An unnaturally green patch in the garden or damp patches in walls and hardened surfaces may also indicate a leaking water pipe. Drips and leaks can be a major source of water loss, and in terms of the new City of Cape Town Water Bylaw, it is illegal not to attend to obvious leaking pipes or water fittings. You can fix many leaks yourself, without calling a plumber or handyman.

Before repairing a leak, close the water mains (the main isolating valve or stopcock) in the service pipe to your house, or the isolating valve linked to where the leak is present. Once the leak is fixed, open the isolating valve again slowly to control the water pressure and prevent damage to pipes.
What is the main isolating valve?

The main isolating valve is the main tap to your whole house, and it is important to know where it is. It can be in the form of a stopcock or a ball valve located in the service pipe on your property between the meter and the house. Since the service pipe is usually laid underground, it can develop underground leaks.

A stopcock is designed to allow a gradual closing of the supply. Remember, if this stopcock is closed suddenly, you may hear a slamming or banging noise in your water pipes. This is called ‘water hammer’, and is caused by a sudden change in water flow. With time, this can loosen brackets holding the pipes, and increase the likelihood of leaks. Closing a stopcock should be done with care and only when essential to repair toilet cisterns and hot-water cylinders. Whenever you do close the stopcock, keep a check on your water consumption for a possible underground leak.

Who is responsible for repairing leaks?

Where the water meter is located outside the property, the municipality will repair the underground pipe up to the boundary of your property. The owner or occupier is liable for repairs on the inside of property boundaries. Where the meter is located on the property, the municipality will repair the pipe up to the inlet side of the meter. Please ensure that the municipality has access to this pipe and the water meter.

How do I check for underground leaks?

All household members should stop using water before you can conduct this hour-long test. Wait for 30 minutes after water use has stopped before you start the test.

- Locate your water meter, and record the reading.
- Check your water meter to see whether water continues to flow through it even though all water use has stopped.

If you have an inferential water meter, check whether the star wheel is turning. If the wheel is turning, you may have a leak in your piping system. If your meter is volumetric, check the red digit on the extreme right. This digit is very sensitive to water flow through the meter. If it rolls over to the next digit, it could indicate that there is a leak. Some municipalities lock new water meters – you can ask them for a key. Certain models of the volumetric meter only have three red digits instead of four. These meters are not as sensitive to water flow as a meter with a fourth red digit.

- To confirm that there is a leak, take a second meter reading one hour after your first reading.
- Subtract the first reading from the second reading.
- This will tell you how much water is leaking every hour.

If you find an underground leak, call a qualified plumber to repair it. If pipes need to be replaced, ensure that only materials approved by the South African Bureau of Standards/the Joint Acceptance Scheme for Water Service Installation Components (JASWIC) are used. JASWIC publishes a list of approved plumbing materials.

Visit the website www.jaswic.co.za or contact your local water department for this information. For a list of accredited plumbers in your area, visit www.capetown.gov.za/water and click on “Policies, laws and bylaws”.
Toilet leaks
A leaking toilet can waste up to 100,000 ℓ of water in one year. These leaks increase your water consumption, push you into a higher water-tariff bracket or step, and can be extremely costly.

Testing for toilet leaks
Here are three simple tests to help you find out if your toilet is leaking. Wait 20 minutes after you have flushed the toilet before you do these tests.

• Listen for water trickling into the toilet bowl.
• Press a piece of toilet paper against the inside back surface of the bowl. If it gets wet, you probably have a leak.
• Put 15 drops of food colouring into the toilet cistern. If, after 15 minutes, the water in the toilet bowl colours, there is a leak.

Finding the leak
Remove the cistern cover and look at the water level inside.

• If the water is at the same level as the flush valve overflow pipe, the water level is set too high or the float valve is leaking.
• If the water is flowing into the overflow pipe, the float valve is set too high or is leaking.
• If the water level is below both overflow pipes, the flush valve is leaking.

Setting correct water levels
Overflow pipes prevent flooding if the water level in your toilet cistern is set too high. If water is flowing out of your overflow pipe, it means that your water level is set too high. This may be fixed by lowering the float valve setting: Simply bend the float arm slightly downwards. Close the isolating valve and remove the fitting from the cistern. To prevent damage to fittings, hold the arm with one hand, while bending it with the other hand. If the valve is fitted with a screw-type adjuster, turn the screw to lower the float slightly. The water should rise to a level below the overflow, and the float valve should close off. If this does not happen, and the water level continues to rise and the cistern starts to overflow again, the float valve washer needs replacing.
Replacing a float valve washer

**Step 1:** Close the isolating valve to shut off the water supply to the toilet.

**Step 2:** Remove the split pin and the float arm.

**Step 3:** Unscrew the cap.

**Step 4:** Remove the plunger by using water pressure to push it out. (Open the isolating valve slightly.)

**Step 5:** Unscrew the brass plunger to remove the washer held inside it.

**Step 6:** Fit a new washer. Reassemble the parts – step 4 to step 1.

**Step 7:** Open the isolating valve slowly and check that the float valve closes when the cistern is full.

Replacing a flush valve washer

**Step 1:** Close the isolating valve.

**Step 2:** Disconnect the lifting wire from the lever arm.

**Step 3:** Remove the split pin and the side float.

**Step 4:** Remove the spindle assembly.

**Step 5:** Unscrew the bottom flange and remove the washer.

**Note:** Remember which side this washer faced to fit the new washer.

**Step 6:** Install a new washer with the sloping side facing upwards.

**Step 7:** Reassemble the parts – step 5 to step 1.

**Step 8:** Open the isolating valve slowly, and test that there are no more leaks.
### Hot-water cylinder leaks

As with toilet cisterns, hot-water cylinders or geysers also have an overflow pipe to prevent flooding. A gravity-fed (non-pressurised) cylinder has a float valve similar to that in a toilet cistern to control water flow. This can be adjusted to correct the water level and reduce water overflow.

An enclosed, high-pressure geyser is thermostat-controlled, and fitted with a pressure-reducing valve. It is normal for water to drip from the overflow, which is connected to an expansion relief valve. Water expands when heated, and a small amount is released through this valve to relieve the pressure inside the cylinder and prevent it from bursting. The drip could continue for an hour or more, losing up to 2 ℓ a day. However, this should stop when the temperature stabilises. Instead of wasting this water, the overflow can be directed to the garden, or collected from the pipe to water plants.

Should the overflow drip continue or exceed 2 ℓ a day, there could be a leak. Geysers are complex and very dangerous, and it is best to call a qualified plumber to fix any problem.

### Toilet cisterns

Toilets use large amounts of fresh drinking water. However, with good maintenance and simple water-saving initiatives, toilet water consumption can be significantly reduced. Older toilet cisterns with a siphon flushing system hold 9–12 ℓ of water. Modern toilet cisterns hold about 6 ℓ of water. Converting your toilet to a multi-flush system, which flushes for as long as the handle is held down, or a dual-flush system, which offers long and short flush options, can cut your water bill by up to 20%. Alternatively, try reducing your cistern volume by placing a bottle or bag in your cistern. In terms of the City’s new Water Bylaw, a toilet cistern may not exceed 9.5 ℓ in capacity.

**Dual-flush:** A dual-flush toilet costs approximately R2 500. Dual-flush systems require higher levels of maintenance than the multi-flush system.

**Multi-flush (interruptible flush):** This is a simple system that lets you control the flush volume. As soon as you let go of the toilet handle, it will stop flushing. This will save you more than 50% in flushing volume. An existing toilet can be retrofitted with a multi-flush system, which costs around R500.

**Plastic bottle or ‘hippo bag’:** Placing a plastic bottle or ‘hippo bag’ into your cistern will reduce the amount of water per flush at little to no cost. A hippo bag costs approximately R25. The container, or bag, should ideally be placed under the float (ball) of the valve, which controls the flow of water into the cistern. If using a plastic bottle container to reduce the water flow, you will need to make a drainage hole on either side of the container, mid-way up, so that the water stored in the container (that takes up space) does not become stagnant. The bottle will need to be weighted down to keep it from floating.

Make sure that the arm of the float valve or the float itself is not snagged by anything placed inside the cistern, as this will cause the cistern to overflow, resulting in water wastage. Do not use a brick or stone instead of a plastic bottle, as corroded particles could block the water pipes.

No foreign or solid objects, such as ear buds, golf balls and medicine containers, should ever be thrown down the toilet. These items block and seriously damage sewer pipes, which are costly to repair. Actually, it is best to treat a modern toilet and sewer in much the same way as a traditional septic tank, where organic waste breaks down naturally.
Baths and showers

Most people think they are saving water by showering instead of bathing. The average shower uses about 20 ℓ of water each minute, while an average bath holds 150–200 ℓ. Therefore, if you shower for longer than five minutes without a water-efficient showerhead, you are not saving water. Showering only saves water if you reduce the water flow rate and take shorter showers. A shower exceeding five minutes will use as much water as an average bath.

In terms of the City’s new Water Bylaw, the maximum flow rate from any showerhead may not exceed 10 ℓ per minute.

Water-efficient showerheads

Water-efficient showerheads deliver around 6–10 ℓ of water per minute. They reduce the amount of water that flows out of a showerhead, without affecting the quality of the showering experience. This is done by adding air to the flow of water, increasing the size of water droplets much like a high pressure hose. A water-efficient showerhead saves up to 50% of water, and also reduces water-heating electricity consumption. Various models and brands are available, though they generally work best with a high pressure geyser or water pressure upwards of 200 kPa or 2 bar. Water-efficient showerheads are available from around R300.

Taps and basins

Tap aerators and flow-restrictors can be fitted onto bathroom and kitchen taps, reducing normal tap flow from 20–30 ℓ per minute, much of which is wasted, to a more sensible 6–10 ℓ. These water-efficient devices channel water through a small screen that is screwed onto tap openings. This can reduce the water flow from your tap by 50–75%, while the water pressure remains the same. Tap aerators should screw on easily, and cost approximately R35. However, only threaded taps can be fitted with aerators. If your taps are not threaded, you can purchase a thread adapter. Always remember to check the required water pressure (kPa) for the products to work effectively.

Dishwashers and washing machines

Making smart choices when buying a new household appliance can have a significant impact on your water and energy use. Look for water and energy-efficient products. Dishwashers use an average of 40–75 ℓ of water per wash, although very efficient machines can use as little as 13 ℓ. More efficient machines will also use less electricity (refer to the Energy section in this handbook). Machines with economy or half-load washing cycles will reduce water consumption by 37% and energy use by 29%. Large washing machines use an average of 150 ℓ per wash – as much water as a bath. High-efficiency washing machines use about 30% less water and 40–50% less electricity. Look for machines that consume 37–45 ℓ of water per wash. Water-efficient machines generally need a higher concentration of detergent. It is best to use environmentally friendly washing powders and liquids, which biodegrade naturally and are good for greywater recycling.
How to fix a leaking tap

A dripping tap usually means that its washer needs replacing. Here is how to do it:

**Step 1:** Close the water mains or stopcock, and then open the tap fully.

**Step 2:** Unscrew the cover. When unscrewing the tap, wrap a cloth around it to prevent it from being scratched.

**Step 3:** Unscrew the spindle.

**Step 4:** Unscrew the washer-retaining nut and remove the washer.

**Step 5:** Fit a new washer and replace the nut. Make sure that you have the correct washer size for the tap.

**Step 6:** Reinstall the spindle and screw down the cover.

**Step 7:** Close the tap, open the water supply slowly and check for leaks again. Do not overtighten the tap, as the new washer is softer and is easily damaged.

Also remember always to use strainers in kitchen sinks and basins to prevent cooking oils, grease and food scraps from entering the drains. These substances can damage the system and cause blockages and overflows, both inside and outside your home. As all drains in the kitchen and bathroom lead to the wastewater system, such items should be disposed of properly. Appropriately dispose of kitchen waste, or use food scraps for compost. Strainers can also be used in bathrooms to keep out hair and other objects, which can also block the sewer.
Gardens

Watering

Gardens can consume as much as 40–60% of all the water used in the home. This is treated, drinkable water, and we should therefore think carefully about using it in the garden. We can be more efficient by watering our gardens in the cooler parts of the day, or by using a drip irrigation system, which loses less water through evaporation than a sprinkler, for instance. Drip irrigation is also more effective, as it feeds the roots of the plants. Composting regularly and adding mulch to our gardens also reduce surface moisture loss. Some indigenous endemics (i.e. plants suited to growing in Cape Town, such as agapanthus) do not require watering at all, except during establishment. Also see the Biodiversity section for more information on indigenous gardening.

In terms of the City’s Water Bylaw, gardens may not be watered with potable water between 10:00 and 16:00. If you use a hosepipe to water your garden from a potable-water source, attach a controlling device, such as a spray gun with automatic shut-off, to the hose end. Also try switching to a water-efficient sprinkler.

Water-wise lawns and plants

Large grassed areas and lawns require plenty of water. If having a lawn is important to you, avoid kikuyu grass, and replace it with indigenous drought-resistant buffalo grass (*Stenotaphrum secundatum*) or couch grass (‘fynkweek’). These grasses require half the amount of water, and are low in maintenance. The lawns at the Kirstenbosch Botanical Garden consist of indigenous grass species and are only watered once a week at night during the three summer months of the year, surviving well on natural rainfall for the rest. Limit the use of lawn fertilisers as far as possible, and be sure to use phosphorus-free lawn fertilisers only. Most lawns already have sufficient phosphorus, and when more is added, it runs through the watercourse, where the excessive nutrients cause algae growth in surrounding rivers, wetlands and lakes.

The more water-wise you make your garden from the start, the easier and cheaper it will be to maintain. Please refer to the Biodiversity section for detailed information on indigenous gardening and plants.

Swimming pools

Filling and evaporation

It takes 32.5 billion litres of water to fill the estimated 650 000 swimming pools in South Africa. The Western
Cape accounts for about 91 000 of these swimming pools. During hot weather, pool levels naturally drop by 0,5–1 cm a day. Pool covers reduce evaporation by up to 90%, saving the water you would use to top up your pool. The plastic for pool covers costs approximately R40–R50 a square metre. Sophisticated automatic roll-up stations and related accessories could cost more than R2 000. The more you need to top up your pool, the higher your water bill will be. Pool covers should be fitted with the necessary precautions to prevent drownings.

Pool leaks

Leaking pools result in unnecessary water loss. Look for cracks inside the pool, or an area of abnormally green grass. Better still, record how often you need to top up your pool. Of course, this will happen more regularly in summer. If the level of your pool drops by more than 5–6 cm a week, you probably have a leak. The City’s new Water Bylaw prohibits automatic top-up systems using a float valve fed from a potable water source to supply swimming pools and garden ponds, and backwash must be directed to the sewerage system only.

Natural swimming pools

Natural swimming pools, also known as organic swimming pools or reed-bed pools, recreate ponds and mountain pools found in nature. The water is kept clean by circulating it through indigenous water plants surrounding the natural pool instead of using chemicals. The roots of the plants absorb waste material, leaving no nutrients that could lead to algae and bacteria growth. As the plants grow, impurities are continuously removed, leaving the water clear and fresh. The pool does not need any harmful chemicals, like chlorine, additives or salt.

Once established, natural swimming pools are low-maintenance and take care of themselves as a balanced aquatic ecosystem. The only work required is to cut away dead plant material, and occasionally empty the leaf collector. Organic pools are not just for swimming: They are natural landscaping features as well, which encourage and support biodiversity.

Boreholes and well-points

Boreholes and well-points draw underground water for irrigation purposes. A well-point is normally an installation with a pump mounted at ground level that draws up water via a suction pipe from a maximum depth of 8–10 m. Boreholes, in turn, can be shallow at a depth of about 30 m, or deeper at 100 m or more. Installing well-points and boreholes is expensive and should be fully researched beforehand. Also, all groundwater is not necessarily ideal for irrigating plants.

Although they are generally not considered a sustainable solution to water conservation, boreholes can help reduce our dependence on fresh drinking water for garden maintenance. Groundwater plays an important role in the environment. During dry periods, groundwater replenishes low-flowing rivers. During wet periods, the opposite occurs: The rivers and surface drainage replenish the groundwater. To ensure that borehole water is not polluted or overexploited, the amount of groundwater that is extracted needs to be monitored, and all boreholes must be registered with the municipality.
Greywater

Recycled water from baths, showers and basins is called greywater, and can be used once cooled off to water gardens. This can result in a substantial saving on your water bill. Laundry water with phosphate detergents is also nutritious and can encourage plant growth. However, soaps, cleaning products and washing-up liquids also contain harmful chemicals, which are bad for your garden. Greywater, especially from the kitchen, may not always be safe as it contains increased bacteria, and should be used with caution to water the garden. If you want to recycle your greywater, safely monitor what is entering the water, and manage the system properly. For health reasons, do not use greywater to water any crops meant for eating, such as your vegetables, herbs or fruit.

When using greywater in your garden, it is important that the water droplets are large and that the spray is low, so that the greywater does not travel to other areas. Avoid spraying or sprinkling this water on your lawn on windy days. Rather consider reusing this water through a drip system, which drops the water directly onto plant roots. An even better greywater drip system uses underground piping. Also take care not to allow greywater onto surfaces that drain into the street, as this will pollute the stormwater system, which runs into our rivers and streams.

Professionally installed greywater systems are available in Cape Town, but are complex to install and can be costly. Research the process thoroughly, and make sure you use a reputable company. The long-term benefits are great.

Rainwater harvesting

Rainwater harvesting is a relatively easy and environmentally friendly way to reduce potable water demand, especially for watering gardens or cleaning. Systems are easy to install and operate, and are cost-effective. Although it is illegal to connect a rainwater tank to your drinking supply, rainwater harvesting still makes sense:

- It provides a source of water in case of emergencies.
- It reduces storm drainage load and flooding in city streets.
- It teaches us about water conservation.
- It leads to food security by encouraging vegetable gardening.
- It can be used to flush the toilet, for bathing, washing up and cooking.

How is rainwater harvested and stored?

There are various ways, but the most frequently used method is diverting water off the roof through gutters, and storing it in plastic tanks. Rainwater tanks hold different amounts of water, from 200 ℓ to 10 000 ℓ. As these tanks are relatively big, you will need a large area and solid base to install one. To save space, choose a vertical rather than a horizontal tank. Placing the rainwater tank in the shade will help to keep the water as cool as possible. A 1 000 ℓ tank appears to be the most economical and popular, and costs in the region of R1 000 for the typical green plastic version. A small 250 ℓ tank costs about R600.

Is rainwater clean and safe?

Since tanks are made of plastic, algae will grow in the water if exposed to sunlight. The simplest and most effective method to ensure that rainwater is safe for use is to boil it.
Rainwater drawn from roofs and gutters may be contaminated by bird or rodent droppings. Therefore, ensure that your gutters are kept clean. You could also control water quality to some extent by diverting the first flush.

**How much water can be harvested off the roof?**

Determine the average annual rainfall for your area. To allow for drier-than-usual years, calculate for only two thirds of the average annual rainfall, and then assume another 10% is lost to evaporation, overflow and first-flush diversion.

Now use this formula to calculate the total litres harvested: roof area (m²) x 0.66 x 0.9 x average annual rainfall (mm).

A 5 000 ℓ tank used primarily for flushing the toilet in winter rainfall areas could save up to 15% annually. This is using runoff from an 80 m² roof, and assumes an average or above-average rainfall pattern.

Remember, it is illegal to connect or divert stormwater to the sewer drain, as this causes overflows and blockages.

**Permeable block paving**

Permeable paving allows rainfall to pass through a paved surface. It is an important part of sustainable urban design, and prevents excessive runoff, flooding and nutrients from entering the stormwater system directly. By filtering and absorbing water more naturally into the watercourse rather than diverting it straight to the stormwater drain, our rivers and wetlands are better protected from pollution, excessive nutrients and sediment.

According to the City Water Bylaw, we should not hose down paved areas, like driveways and concrete surfaces, since harmful acids and chemicals collect on these surfaces, and are washed into the watercourse. When designing or renovating your house, avoid large areas of solid concrete, and rather select permeable paving.

**Car washing and cleaning**

Believe it or not: How you wash your car affects your household’s water consumption. Also, if the detergent you use contains toxic chemicals, those chemicals can run off into your yard, down the stormwater drain, and straight into our rivers, lakes or the sea. It is better rather to wash your car on the lawn instead of the driveway, as water that lands on an impermeable surface, such as the driveway or pavement, ends up contaminating the nearest water body.

If you spend just ten minutes spraying down your car with a typical garden hose, you can easily use as much as 300 ℓ of water – as much as you would use running two full baths or washing seven loads in a dishwasher.

**Simple steps to water-efficient car washing at home**

- Spray your car once (fast).
- Use a bucket and biodegradable soap to wash the car.
- Rinse fast, as continuous spraying with a hosepipe wastes water.

**Take your car to a car wash**

Another option is to locate an eco-friendly car wash in your neighbourhood. Not all areas have them, but they are becoming increasingly popular. Look for a car wash that uses non-toxic soaps and phosphate-free, biodegradable detergents and cleaners, and recycles its wash water. Car-wash companies often use high-pressure hoses and are required to recycle at least 50% of the water they use.

**Go waterless**

There are waterless car-wash detergents available. Although washing with these products takes longer, this might be worth your while considering you will be saving water. Moreover, these cleaners are typically earth-friendly – read the fine print to make sure.
Contacts and resources

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<th>COMPANY/ORGANISATION</th>
<th>CONTACT NUMBER</th>
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<tr>
<td>Local Government Departments</td>
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<tr>
<td>City of Cape Town Water account queries</td>
<td>086 010 3089</td>
<td><a href="mailto:accounts@capetown.gov.za">accounts@capetown.gov.za</a></td>
<td><a href="http://www.capetown.gov.za">www.capetown.gov.za</a></td>
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<tr>
<td>(corporate call centre)</td>
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<tr>
<td>City of Cape Town Water and Sanitation Technical Operations Centre</td>
<td>086 010 3089</td>
<td><a href="mailto:WaterTOC@capetown.gov.za">WaterTOC@capetown.gov.za</a></td>
<td><a href="http://www.capetown.gov.za/water">www.capetown.gov.za/water</a></td>
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<tr>
<td>or SMS 31373</td>
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<tr>
<td>National Government Departments</td>
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<tr>
<td>Department of Water Affairs (DWA), Cape Town</td>
<td>021 941 6000</td>
<td></td>
<td><a href="http://www.dwa.gov.za">www.dwa.gov.za</a></td>
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<tr>
<td>021 941 6100 (fax)</td>
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<td>0800 200 200</td>
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<tr>
<td>Working For Water Programme</td>
<td>021 441 2700</td>
<td><a href="mailto:wfw@dwa.gov.za">wfw@dwa.gov.za</a></td>
<td><a href="http://www.dwa.gov.za/wfw">www.dwa.gov.za/wfw</a></td>
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<tr>
<td>021 441 2751 (fax)</td>
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<tr>
<td>Tertiary Education Institutions</td>
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<tr>
<td>University of Cape Town – Environmental and Geographical Science Department (EGS)</td>
<td>021 650 2873/4 021 650 3791 (fax)</td>
<td><a href="mailto:postgrad@enviro.uct.ac.za">postgrad@enviro.uct.ac.za</a></td>
<td><a href="http://www.egs.uct.ac.za">www.egs.uct.ac.za</a></td>
</tr>
<tr>
<td>University of Cape Town – Environmental Evaluation Unit (EEU)</td>
<td>021 650 2866 021 650 3791 (fax)</td>
<td><a href="mailto:eeu@science.uct.ac.za">eeu@science.uct.ac.za</a></td>
<td><a href="http://www.egs.uct.ac.za/eeu">www.egs.uct.ac.za/eeu</a></td>
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<tr>
<td>University of Cape Town – Freshwater Research Unit (for research on rivers and wetlands)</td>
<td>021 650 3636 021 650 3301 (fax)</td>
<td></td>
<td><a href="http://www.zoology.uct.ac.za/docs/fresh.html">www.zoology.uct.ac.za/docs/fresh.html</a></td>
</tr>
<tr>
<td>University of the Western Cape – Earth Sciences Department</td>
<td>021 959 2223 021 959 2438 (fax)</td>
<td><a href="mailto:bhonigwachs@uwc.ac.za">bhonigwachs@uwc.ac.za</a></td>
<td><a href="http://www.science.uwc.ac.za/earthscience">www.science.uwc.ac.za/earthscience</a></td>
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Organisations

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<tbody>
<tr>
<td>Climate Action Partnership (CAP)</td>
<td>021 799 8834 021 761 5462 (fax)</td>
<td><a href="mailto:s.marais@conservation.org">s.marais@conservation.org</a></td>
<td><a href="http://www.cap.org.za">www.cap.org.za</a></td>
</tr>
<tr>
<td>Environmental Monitoring Group (EMG)</td>
<td>021 448 2881</td>
<td></td>
<td><a href="http://www.emg.org.za">www.emg.org.za</a></td>
</tr>
<tr>
<td>Institute for Plumbing SA (Western Cape)</td>
<td>021 712 0700 021 712 0700 (fax)</td>
<td><a href="mailto:iopsawc@telkomsa.net">iopsawc@telkomsa.net</a></td>
<td><a href="http://www.iopsa.org.za">www.iopsa.org.za</a></td>
</tr>
<tr>
<td>Water Research Commission</td>
<td>012 330 0340 012 331 2565 (fax)</td>
<td><a href="mailto:info@wrc.org.za">info@wrc.org.za</a></td>
<td><a href="http://www.wrc.org.za">www.wrc.org.za</a></td>
</tr>
<tr>
<td>Wildlife and Environment Society of South Africa (WESSA) (Western Cape)</td>
<td>021 701 1397</td>
<td></td>
<td><a href="http://www.wessa.org.za">www.wessa.org.za</a></td>
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<tr>
<td>Working For Wetlands</td>
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<td><a href="http://www.wetlands.sanbi.org/wfwet">www.wetlands.sanbi.org/wfwet</a></td>
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### Other relevant websites

- [www.randwater.co.za](http://www.randwater.co.za)
- [www.savewater.co.za](http://www.savewater.co.za)
- [www.umgeni.co.za](http://www.umgeni.co.za)
- [www.storyofbottledwater.com](http://www.storyofbottledwater.com)
- [www.thameswateruk.co.uk](http://www.thameswateruk.co.uk)

### Additional phone numbers and contacts
Reading this book will help you:

- Understand critical environmental and resource issues facing us all.
- Save money through good home management.
- Improve safety in the home.
- Understand City tariffs.
- Know where to go for help or advice about City services.
- Explore alternative technologies, such as solar water heaters.
- Expand your knowledge and enjoyment of our biodiversity.
- Learn how to fix a leak, wire a plug, fit a ceiling, turn your waste into compost and many other simple actions for Smart Living (environmentally sound, financially efficient and safe).

This cartoon is intended to stimulate debate and encourage forward thinking with regard to Cape Town’s future as an environmentally sustainable and smart living city, and does not necessarily depict the City of Cape Town’s plans.