

www.toowoombawater.com.au



What is needed,
along with fresh water,
is fresh thinking.
We need to learn
how to value water.

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Kofi Annan, UN Secretary-General

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A message from the Mayor

Residents of Toowoomba and the surrounding region,

Water gives life to all things, which makes it our most precious resource. Water also brings people enjoyment, offering inspiration and wonder, and is an outlet for recreational activities.

The reality of climate change is unreliable rainfall, yet our demand for water continues to increase and traditional water sources such as dams and bores are unable to meet those needs. At this critical time for Toowoomba, we not only need to secure a new water source, we have an individual and collective responsibility to find better ways to manage the water we have. We can no longer afford to use water only once. Through this Water Book Council offers you a thorough summary of the Water Futures – Toowoomba project. This project is about incorporating our knowledge of the water cycle into our everyday lives. Toowoomba's future will be secured by an understanding of our water sources and being informed about what is possible. I am confident that this project is safe and the very best option in terms of addressing the water shortage issues we face.

Our role in the water cycle is often forgotten. We tend not to think about the source of our tap water, how it is treated or how it returns to the environment. I strongly encourage all to read the Water Book and to find out as much as you can about Water Futures – Toowoomba. The intention of this Water Book is to ensure you receive all the facts, clearly and without bias, so you can reach your own decision about this innovative project. The task before Toowoomba is to embrace a whole of water cycle management strategy with a new understanding of this valuable resource. We are aware of recent proposals to interconnect water supply systems and to develop new water sources for South East Queensland. The long-term solution offered through the Water Futures - Toowoomba project will complement these initiatives and will ensure the continued prosperity and growth of our region.

It is time to take responsibility for restoring the water balance and, in the absence of realistic alternatives, we must break new ground in water cycle management.

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Mayor Dianne Thorley Toowoomba City Council

66 The long-term solution offered through the Water Futures – Toowoomba project will ensure the continued prosperity and growth of our region. ??

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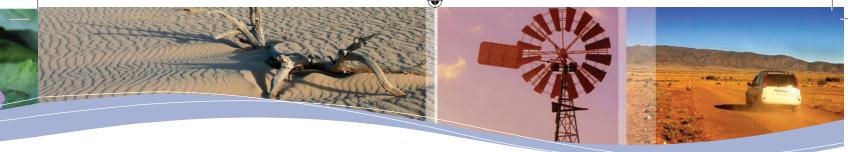
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Living in a dry country

Australia is the driest inhabited continent on the planet, yet it has taken us until fairly recently to realise how urgent the need is to be water wise.

Although Australia is the sixth-largest country in the world, about the same size as the 48 mainland states of the USA and roughly 50 percent larger than Europe, we have the lowest population density, with a comparatively small population of around 20 million. This is largely due to the fact that our climate is highly variable and unpredictable, characterised by droughts and floods.

Our growth will continue despite our dry surrounds. We need to realise, however, that only 6.6% of Australia is arable – land considered fit for cultivation. This places additional burden on the water resources of expanding towns and cities, given the creation of new settlements is unlikely. We must also consider the environmental impacts on this fragile land of such things as soil erosion from overgrazing, poor farming practices, rising soil salinity and desertification.

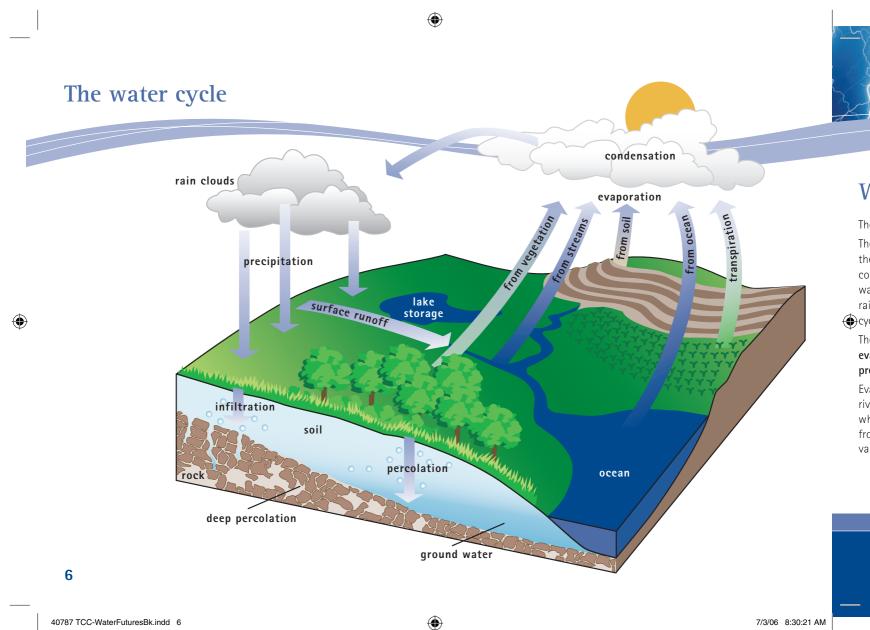
Despite these limitations, Australia is still the "lucky country" and a land of hope, but there will only be enough water for present and future generations if we value it appropriately and use it wisely.

So what is Toowoomba's water future?

Safe, reliable water supplies helped Toowoomba become the prosperous city it is today. But the sources and methods that served our community so well in the past – dams, bores and strong demand management – are now overtaxed. It is time to complement our current resources and practices with new, more sustainable solutions. No single alternative will meet all of our water supply needs. Toowoomba must look for creative ways to expand supply by working with the natural water cycle, being mindful to maintain the ecological balance of our surrounds. It will require careful management and innovative development of future supplies.

Water demand exceeds supply for 40% of the world's population

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What is the water cycle?

There is no "new" water on earth.

The same limited amount of water has been doing the rounds for about three billion years – and will continue to do so. Nature is constantly recycling water; moving it from oceans to clouds, via the rain back to earth and around again (see water cycle diagram).

The water cycle consists of four main processes: evaporation (and transpiration), condensation, precipitation and collection.

Evaporation occurs when the sun heats water in rivers, lakes and oceans and turns it into vapour, which rises into the air. Plants transpire water from their leaves, stems and fruits as water vapour which also enters the atmosphere. When the water vapour cools it changes back into droplets and forms in clouds. This is known as condensation.

Precipitation occurs when clouds get so heavy with condensation that the water falls back to the earth in the form of rain, hail, sleet or snow.

As water returns to earth, it may fall over oceans, lakes or rivers or it may end up on land. When it settles on land, it will either soak into the earth (becoming part of the "groundwater" that plant roots tap into) or it may run over the soil and collect in bodies of water where the cycle starts all over again.

The human contribution

It is appropriate and necessary for humans and animals to "interrupt" the water cycle for survival. People interrupt water pathways through withdrawals and discharges.

We take water out of the system to irrigate crops, provide us with drinking water and to carry out our industrial, commercial and leisure activities.

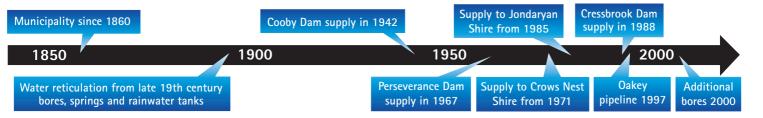
Whether intentionally or not, we add substances to the water. In rural areas these additions may include pesticides, herbicides and fertilisers. In urban areas we add mostly organic matter (human faeces), salts and traces of metals, drugs and other chemicals.

Toowoomba currently interrupts the water cycle by withdrawing groundwater from bores and taking surface water from dams in the Moreton Catchment. We discharge our used water down Gowrie Creek, which flows into the Condamine Balonne Basin, a completely different catchment.

The Water Futures – Toowoomba project will simply mimic Nature, by speeding up the water cycle process.



Toowoomba's water supply history



Getting water to Toowoomba isn't easy

There is a finite supply of fresh water and it's not always in the right place.

The majority of Toowoomba's water comes from the Moreton Basin to the east of the escarpment. We have to pump that water a great distance, and uphill, and the cost of electricity to do so is very high.

Most cities source their water from higher catchments. Due to our geographical location at the top of a mountain range, no higher catchment is available to us. The lift to Toowoomba is one of the highest in the country and the cost of pumping represented 50% of delivery cost to residents' taps in 2004/05. Cressbrook Dam is 40km from Toowoomba and requires a 457-metre lift.



Cressbrook Dam in June 2005 when dam was at 30% usable storage

Did you know?

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In 1966, when Lake Perseverance was being constructed, a flash flood swept through the area, drowning dozers and other machinery in its wake.

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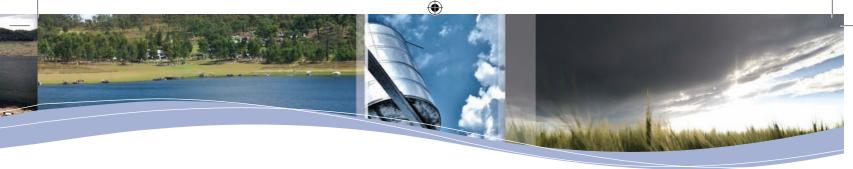
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What are our current water supply sources?

Bores

We have eight bore "stations", where bore water is softened (if necessary) and chlorinated, before being introduced into the reticulation system.

Bores have always provided at least part of Toowoomba's water supply. Before Cooby Dam was built they were our main water source.

Bore contribution to our water supply is usually 10-15%. In recent times daily bore contribution has reached as much as 23.3%.

Bore water, however, is a finite resource and needs to be managed carefully for future generations.

Dams

Toowoomba has three dams: Cressbrook, Cooby and Perseverance.

Dam levels have declined steadily since 2001 and, at the time of print, have fallen to a low of 25.2% of their available storage. Toowoomba has used between 12,300 and 16,200 million litres (ML) each year over the last eight years.

The Queensland Department of Natural Resources, Mines and Water (DNRM&W) uses climate and rainfall information to work out how much water we can safely take from our dams and bores. In their 2004 review, they told us we should be using not more than 13,600ML per year. Our dams have had to shoulder the burden of our unwitting overuse of water.

Rainwater

There are approximately 5000 households in Toowoomba that already have rainwater tanks.

Rainwater tanks can help decrease household demand for water, although a typical 10,000-litre (L) tank can only reliably supply about 70L per day (/d). This means that in most cases, rainwater tanks can work as a supplement only, given that average household water consumption is about 490L/d.

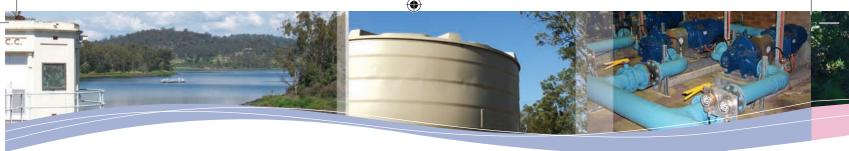
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Did you know?

Cressbrook Dam has spilled over only once in the last 15 years, when it overflowed continuously for 16 days.

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What is the future of these sources?

It is the responsibility of the Department of Natural Resources, Mines and Water (DNRM&W) to tell Toowoomba how much water we can safely take from our dams and bores each year without running dry. Before December 2004 that figure was 19,000 megalitres (which is 19,000 million litres or equivalent to 19,000 Olympic size swimming pools).

In late 2004 DNRM&W revised those figures, this time taking into consideration a wider range of historical climate data that included the recent years of drought. The new figures told us we had been exceeding our safe yield since 1998 and reduced the amount we could take from our dams by 28%. This reassessment has made the need for a new water source for Toowoomba very clear and urgent.

Bores

Bore water will continue to prop up supply. Council has plans to drill additional bores but new bores cannot meet the current water shortfall. More significantly, aquifer levels are falling steadily due to a combination of low rainfall and limited groundwater recharge.

Groundwater resources should not be taken for granted. Recharge can take years and all over Australia groundwater withdrawal exceeds recharge rates. We will need to manage our future use of underground water carefully.

Dams

Existing dams are unable to provide for our future water needs and it is unlikely another can be built

because it would reduce the amount of water available to other areas of South East Queensland. Dam levels are dropping and the result is declining water quality. At the end of 2005 Toowoomba's surface water storages were at historically low levels.

Rainwater

Council recognises the value of rainwater as a supplementary water source and has amended the Toowoomba Planning Scheme to require all new buildings from October 1 2005, whether residential, commercial or industrial, to be fitted with rainwater tanks.

At the time of printing this book, rebates are available to residents who put in their own water tanks on existing properties, subject to some conditions. Contact WaterWise on **4688 6253** for more information. lt pu sti ye lin ou

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Did you know?

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Groundwater may have taken millions of years to get to where it is, so its protection and conservation are very important.

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How do we better appreciate water?

It has taken a long time for population growth to put adequate pressure on our water resources to stimulate changed practices. However, in recent years governments have been forced to put limitations on water use in an effort to slow our usage and encourage a water valuing culture in Australia.

Education, water restrictions, rainwater tanks, WaterWise plumbing regulations, water management plans and rebates are all forms of demand management.

Demand management

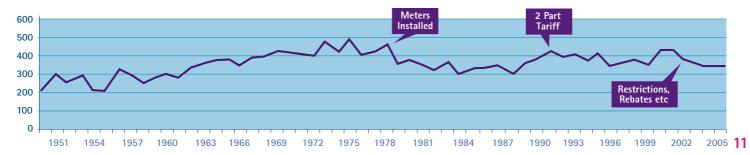
Toowoomba is a leader in water demand management. Our domestic water usage averaged 219 litres per person per day (L/p/d) in 2004/05. By comparison the South East Queensland Regional Plan water consumption reduction target is 230L/p/d by 2020.

Demand management is effective – consumption dropped 8% in 2002/03 (after Level 2 water restrictions were introduced) and a further 6% in 2003/04 (after Level 3 water restrictions were introduced). Toowoomba has been on Level 4 water restrictions since August 2005. Details on our current restrictions follow on page 12.

Every time measures to reduce water use have been introduced, our consumption has gone down. The graph below shows how demand management has influenced water use in this region. It indicates our total water use – supplied to neighbouring shires, industry and commercial as well as domestic.

Unfortunately, although demand management is a useful tool, it is not a total solution to secure future water needs.

Historical water consumption (litres/person/day)



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water restrictions

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
Useable storage trigger point to introduce restrictions	100% to 55%	55% to 40%	40% to 30%	30% to 20%	less than 20%
Useable storage trigger point to lift restrictions		65%	50%	40%	30%
Lawns Hand-held hose	Permitted	Specified days, specified times	Not permitted	Not permitted	Not permitted
Un-approved watering systems	Specified days, specified times	Not permitted	Not permitted	Not permitted	Not permitted
New turf	Subject to approval	Subject to approval	Landscape alterations not permitted when dam storage below 35%	Not permitted	Not permitted
Private gardens Hand-held hosing/ bucket watering	Permitted	Permitted	Specified days, specified times	Hosing not permitted Bucket watering specified days and specified times	Not permitted
Un-approved watering systems	Specified days, specified times	Not permitted	Not permitted	Not permitted	Not permitted
TCC approved drip irrigation systems	Specified days	Specified days, specified times	Specified days, specified times	Specified days, specified times	Not permitted
Sports Fields	Maximum 12 hours a week with sprinklers in accordance with TCC guidelines	Maximum 6 hours a week with sprinklers in accordance with TCC guidelines	Maximum 3 hours a week with sprinklers in accordance with TCC guidelines	Maximum 1 hour a week with sprinklers in accordance with TCC guidelines	Not permitted
Schools	Maximum 24 hours a week with sprinklers in accordance with TCC guidelines	Maximum 12 hours a week with sprinklers in accordance with TCC guidelines	Maximum 6 hours a week with sprinklers in accordance with TCC guidelines	Maximum 2 hours a week with sprinklers in accordance with TCC guidelines	Not permitted

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	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
Paved areas	Permitted	Not without TCC approval on grounds of accident or emergency or construction work	Not without TCC approval in special circumstances, alternative water source in case of construction work	Not without TCC approval in special circumstances, alternative water source in case of construction work	Not Permitted
Pools and external spas	Permitted	Not without TCC approval May be topped up with reticulated water Owners encouraged to cover pools	Not without TCC approval May be topped up with reticulated water Owners encouraged to cover pools	Can only be filled from alternative water source Can only be topped up with alternative water source	Not Permitted
Pond and fountains	Permitted	Permitted	Ponds must not be filled and fountains that do not recycle water must not be operated	Ponds and fountains must not be filled unless by alternative water source	Not Permitted
Tanks	Permitted	Permitted	Must not be filled or topped up unless water is entirely for domestic purposes	Must not be filled or topped up unless water is entirely for domestic purposes	Not Permitted
Washing of motor vehicles, caravans and boats	Permitted	Permitted	Bucket filled directly from tap Rinsed with hose fitted with trigger nozzle Flushing of inboard motors to prevent corrosion permitted	No cleaning of vehicles except to clean windscreens windows and mirrors	Not Permitted
Washing of private dwellings	Permitted	Permitted	No washing except by bucket filled directly from tap, rinsed with hose fitted with trigger nozzle Washing of roofs prohibited excluding guttering	No washing unless from alternative water source	Not Permitted
Pets and Livestock	Permitted	Permitted	Water must only be used for drinking, cleaning animals or cleaning pens	Water must only be used for drinking, cleaning animals or cleaning pens	Water must only be used for drinking, cleaning animals or cleaning pens 13

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WaterWise rewards and rebates

Toowoomba City Council recognises residents who lead the way for change towards water conservation. There are several rewards on offer to water wise people at the beginning of 2006.

There are financial rewards through Toowoomba City Council rebates and reductions to your water bill and there is the reward of doing something good for the environment through water conservation.

Installing water-efficient washing machines

Water-efficient washing machines (AAAA or AAAAA) can save you up to 180L per wash if you are changing over from an unrated machine.

Council provides a \$50 rebate towards the purchase of a new front loading AAAA or AAAAA washing machine, providing the rebate application form is filled out at the time of purchase. Some conditions apply.

More information is available on the Water Futures -

Toowoomba website at http://www.toowoombawater. com.au/rebates.html or enquiries can be made through the WaterWise office on 4688 6253.

Rainwater tanks

Rainwater tanks can make a great contribution to reducing your water consumption, especially if you use the water for gardening and have it connected to suitable fixtures such as your toilet. People who use their tank water (or own bore water) for such things as watering and vehicle washing are exempt from Council's water restrictions.

Toowoomba residents are eligible for a rebate of \$500 for the installation of rainwater tanks on existing properties. The tanks must have a capacity of at least 5000L and be connected to at least one toilet cistern.

There are some forms to fill in and a plumbing inspection will be required.

There are only a limited number of rebates for tanks.

Contact the WaterWise office on **4688 6253** or visit the Water Futures – Toowoomba website at **http://www.toowoombawater.com.au/rebates.html** for more information.

Drip irrigation systems

Watering the garden can be expensive. Almost half of residential water consumption is used in the garden or on the lawn. This can be greatly reduced through efficient watering.

By installing a Council-approved drip irrigation system you can save lots of money and look after your plants at the same time. The reward is that approved irrigation systems are not subject to the same levels of restrictions as sprinklers.

You can pick up the application form from a hardware or local irrigation specialist or download it at http://www.toowoombawater.com.au/documents-and-forms/cat_view.html

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Warwick McDonald, CSIRO's Acting Director of the Water for a Healthy Country Flagship

We must use water wisely because there is no more water. There is an urgent need to innovate. Water Futures – 14 Toowoomba will create a renewable water source. Closing the loop in the water cycle is the next big step in Australia.

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Call our plumbing inspectors on **4688 6882** to arrange an inspection. You will be charged for this service but the cost is refundable if your system meets Council requirements.

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AAA shower rose replacement – new-for-old

A traditional shower rose uses anywhere from 12 to 25L per minute, whereas AAA-rated shower heads use just 9L per minute.

AAA-rated shower roses can help you save by reducing the amount of water and power you use in the shower. That is a saving of up to 80L in a fiveminute shower (about 8 buckets) and with a modern quality product, you won't even notice that less water is coming out of the showerhead.

Over 3000 Toowoomba residents have already taken up the offer of our free new-for-old exchange program. The offer will continue until all shower roses are gone.

For further information contact the WaterWise

office on 4688 6253 or visit the website at http:// www.toowoombawater.com.au/rebates.html

Dual flush toilet replacements

By replacing your old single flush toilet with a AAA-rated (3L/6L) dual flush toilet you will save between five and eight litres of water each time you flush, or 120L per household per day.

Since March 2005, all new houses built in Toowoomba are now required to install dual flush toilets. A reduced water bill and a committment to "slowing the flow" will encourage owners of older homes to replace their inefficient toilets.

WaterWise makeover

Engaging the services of an accredited plumber to achieve a WaterWise house offers great promise of water savings.

The money saved on water and energy for heating has the potential to be \$125 to \$150 per year, depending on the number of occupants, meaning

the total investment can pay for itself quickly. Giving your house a WaterWise makeover is another way for you to take individual responsibility for Toowoomba's water future.

Let's Slow the Flow! We can all make a difference!





Taking responsibility

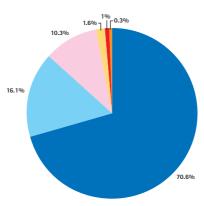
We can no longer guarantee surface water from dams as a reliable supply and we must not overuse groundwater (bores or underground aquifers) to solve a short-term problem that may result in us depleting groundwater as a supply for future generations.

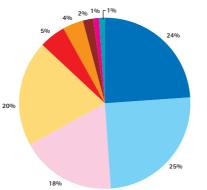
Water is not ours to take, dirty and dispose of without consequence. We simply borrow it for a while as a part of the water cycle. To do this responsibly, we need to be aware of how much water we use and for what.

How much do we use?

Of the 10,582 megalitres of metered water delivered to Toowoomba customers in 2004/05, domestic water use accounted for about 70%. A large part of that usage is for watering – we are after all the "garden city". This water makes its way back into the water cycle sooner than the water we use for ourselves.

Bathroom usage is also a large portion of overall usage - this is why we must all learn to take shorter showers. Toilet flushing costs us about 18% of our supply and laundries use 20% (see pie chart). By contrast, the quantity of water we use for drinking and cooking is only about 2% of total household usage (based on estimates of 5L/p/d).





Consumption by customer type Residential - 70.6% Commercial - 16.1% Public/Institutional - 10.3%

Tourist - 1.6%

Industrial - 1% Other - 0.3%

Residential water use





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What happens to our wastewater?

Toowoomba is Australia's second largest inland city and a major population centre at the head of the Murray-Darling basin. The Wetalla Water Reclamation Plant discharges more than 60,000 megalitres of treated wastewater into Gowrie Creek every year. This has the potential to have a major impact on the health of Australia's greatest inland river system and its water users downstream.

Elevated levels of nitrogen and phosphorus, or nutrients, in the Darling River during the early 1990s resulted in extensive blue-green algae blooms, making the water virtually unusable for stock, irrigation or town water supplies. Urban wastewater was identified as a significant source of this nitrogen and phosphorous, and a national program of treatment plant upgrades was undertaken to prevent a recurrence.

Wetalla Stage 4, Toowoomba's first Biological Nutrient Removal (BNR) plant, was commissioned in 1996, and treats about 60% of our wastewater. The remaining 40% currently receives conventional treatment, but with the planned commissioning of a further \$37million BNR upgrade in late 2006, all of Toowoomba's wastewater will receive treatment to remove nitrogen and phosphorus.

Salt in treated wastewater also poses a threat to the Murray-Darling. Toowoomba currently discharges about 10,000 tonnes of dissolved salts into the river system every year. In 2005, Toowoomba City Council launched a Wastewater Salinity Reduction Program, which will reduce the amount of dissolved salts in our wastewater through a combination of trade waste management and industry and public education.

Wastewater or sewage is not a topic people commonly discuss but one with which we should become more familiar. There are benefits in heightening community awareness of the sewerage system and the ways to look after it, including what should and should not be put in the sewer.

For more information about wastewater see www.toowoombawater.com.au/waste-water.html or phone 4688 6252. For information regarding trade waste contact the Trade Waste Section on 4688 6799 or email at tradewaste@toowoomba. qld.gov.au

But what if we kept some?

The fact is that we can no longer afford to use our water only once. All over the world people are looking for opportunities to better utilise the water they have.

Sewage is more than 99% water and methods exist to remove or kill the contaminants it contains.

In order to understand the changes water goes through after human use, a Water Quality Star Rating System was devised to measure water purity.

Did you know?

The Wetalla Water Reclamation Plant treated and disposed of 8918ML in 2004/05.

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What is the Water Quality Star Rating System?

NO STARS: Wastewater

Domestic sewage and trade waste

Uses

 No discharge or use without treatment

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1 STAR: Effluent

• Treated to remove large particles Uses

- No discharge or use without treatment
- **

2 STAR: Effluent

- Most biodegradable organic material has been removed
- Usually has been disinfected

Uses

- Discharge into some waterways
- Apply to land in controlled conditions

3 STAR: Effluent

- Nearly all biodegradable organic material has been removed
- Nutrient content has been reduced
- Usually has been disinfected

Uses (with approval)

• Discharge to land or waterway in which people swim

4 STAR: Fit-for-purpose

• Further treated, typically to provide quality suitable for particular purposes

Uses

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- Industrial purposes
- Irrigation of public areas
- Crops for consumption

5 STAR: Drinking (potable) water

- Treated sufficiently for direct human consumption
- Conforms to Australian Drinking Water Guidelines
- Monitoring must conform to specified quality assurance proceedures

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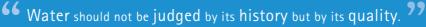
6 STAR: Purer than drinking water

- Treated to a very pure quality
- Lacks nutrients and minerals

Uses

- Kidney dialysis
- Industrial processes such as pharmaceutical manufacturing
- Supplement raw water supply such as a dam or underground aquifer

Dr Lucas van Vuuren, National Institute of Research, South Africa



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Introducing Water Futures – Toowoomba

Water Futures – Toowoomba is a total water management program

In developing this program Council examined our use of dams, bores and rainwater, and looked at ways to better use the water we have through demand management. Council also considered the role water restrictions can play and explored a number of alternative supply options to determine the best sustainable solution to satisfy all economic, environmental and social issues. You will find more details on these as you read on.

In the eyes of the public the most significant aspect of the Water Futures – Toowoomba project is the proposal to recycle our water for indirect potable reuse. Potable quality water is fit for human consumption and a definition of indirect potable reuse can be found in our Frequent questions section (on page 35).

Indirect potable reuse

As part of the Water Futures – Toowoomba project, 5000ML/y of reclaimed water from the Wetalla Water Reclamation Plant will be treated to 6 star standard using an Advanced Water Treatment Plant incorporating ultrafiltration, reverse osmosis and ultraviolet disinfection and advanced oxidation. The purified water will be piped to Cooby Dam, where it will be mixed with dam water, before being pumped to the Mt Kynoch Water Treatment Plant, where it will receive further treatment, along with water from Cressbrook and Perseverance Dams. Waste salt from the reverse osmosis process will be blended with 4 star water and used for coal washing.

The total capital cost, including the Advanced Water Treatment Plant, pipelines and pump stations, is estimated at \$68million.

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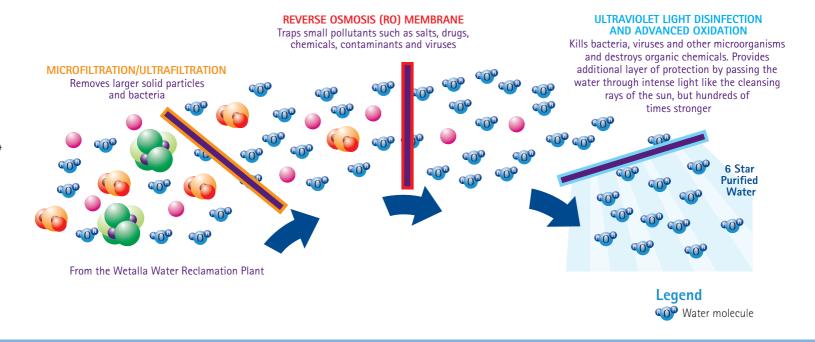
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Queensland Premier Peter Beattie

Water is liquid gold, and our government is committed to ensuring its future supply for the development of our state.

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Multi-barrier process treats water to higher than current drinking water standards



Associate Professor Greg Leslie - School of Chemical Engineering and Industrial Chemistry, University of New South Wales

Wastewater that is purified through ultrafiltration, reverse osmosis, and ultraviolet disinfection is very safe to drink. The same processes are used by the leading bottled water companies.

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The recycling process

Treated wastewater from the Wetalla Water Reclamation Plant will be purified through the use of a multi-barrier treatment process incorporating:

- Ultrafiltration
- Reverse osmosis
- Ultraviolet disinfection and advanced oxidation
- Surface water mixing with Cooby Dam water
- Conventional water treatment at Mt Kynoch Water Treatment Plant
- HACCP risk management and quality assurance system for the whole water cycle (HACCP is recognised and used all over the world as a system for ensuring the quality and safety of food products. Toowoomba City Council already has an independently certified and audited HACCP system to ensure drinking water quality.)

Multiple barriers

A multi-barrier process works on the principle of providing more than one means of removing any particular contaminant. It means we do not rely on just one treatment process to do the job and a failure of one component will not compromise water quality.

Experts agree that a multiple barrier system employing appropriate treatment technologies is capable of reducing the concentrations of contaminants to such a low level that the risk becomes negligible. This approach is supported by highly credible agencies such as the US Environmental Protection Authority and World Health Organization in their guideline documents.

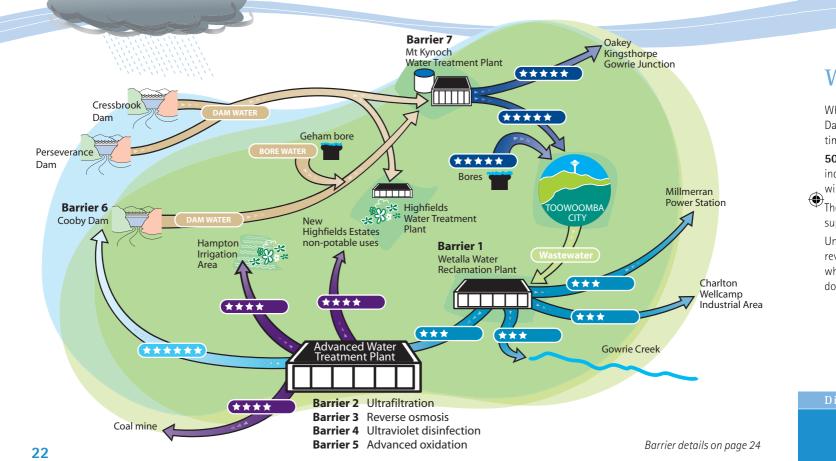
Did you know?

Ancient Egyptians treated their water by siphoning it out of the top of huge jars after allowing the muddy water from the Nile River to settle.

21



A new water cycle for Toowoomba



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What can we do with all that extra water?

When dam levels drop the quality of water also declines. In recent years Cooby Dam's contribution to Toowoomba's water supply has been minimal and at times non-existent for this reason.

5000ML/y of ***** water will be returned to Cooby Dam for indirect potable reuse through the Water Futures – Toowoomba project. This will make up about 25% of our total water supply needs in 2025.

The purified water will improve the overall dam water quality for drinking supplies and is expected to promote a healthier dam ecosystem.

Under the proposal, **2000ML/y of ****** water, blended with the reverse osmosis waste stream, will be supplied to a mine for coal washing, which will allow Toowoomba to dispose of salts that would otherwise flow down Gowrie Creek.

A further **1000ML/y of ****** water can be substituted for potable bore water to supply the Hampton Irrigation Area and **500ML/y of ****** water can be used for non-potable urban domestic use at Highfields.

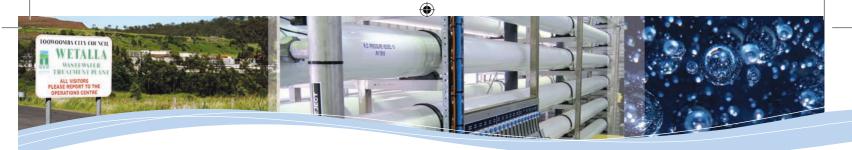
1000ML/y of *** treated water will be allocated to Millmerran Power Station and **500ML/y of ***** water will be available for potential non-potable use at the Charlton Wellcamp Industrial Area.

Toowoomba will still flush about **1000ML/y of** \bigstar water down Gowrie Creek to supplement its natural flow, although this discharge will be treated to a higher standard than it is currently.

Did you know?

Although a person can live without food for more than a month, a person can only live without water for approximately one week.

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The seven barriers of Water Futures – Toowoomba:

Barrier 1 – Wetalla Water Reclamation Plant

The first process the wastewater goes through is at the Wetalla Water Reclamation Plant, which combines several different processes to purify water. The physical process of screening removes large particles and material that will not dissolve. A biological process follows, where a population of small organisms such as protozoa and bacteria feed on the dissolved organic material in the water. Oxygen is supplied at controlled rates to create zones ranging from high oxygen to none at all, to encourage specific types of organisms to grow.

The water then flows through large settling tanks where the organisms and their feed (organic materials) are separated out and returned to water at the beginning of this process to do their job all over again. The solid by-product, called biosolids, has excellent nutrient value and is used as a soil additive in agriculture. To ensure that there are no dangerous bacteria or viruses remaining, the water to be discharged down Gowrie Creek is disinfected to 3 star standard using chlorine or UV light. The water to be purified for potable reuse then continues to the next barrier.

Barrier 2 – Ultrafiltration

The next stop for the water is at the Advanced Water Treatment Plant where it will undergo ultrafiltration, or microfiltration. Ultrafiltration involves the use of polymer or ceramic membrane filters, with a pore size of 0.01 micron, to remove very fine colloidal (very small suspended) particles from water.

At this stage in the process parasites such as Giardia, Cryptosporidium and bacteria such as E coli (Escherichia coli) and microbes that might have been present in the water are removed.

Barrier 3 – Reverse osmosis

Barrier three is known as reverse osmosis (RO). During the RO process, pressure is applied to squeeze the water across an extremely fine membrane filter. The pore size of the RO membrane is so small (0.0001 micron) that bacteria, viruses and most chemicals cannot pass through.

The membrane traps small pollutants such as salts, drugs (e.g. chemotherapy drugs, anti-inflamatories, antibiotics and other pharmaceuticals), chemicals (e.g. personal care products), hormones, and importantly, viruses, while allowing the water molecules to pass right through.

Very small amounts of some organic chemicals may pass through an RO membrane, but these are safely destroyed at the next advanced oxidation stage (or barrier 5) in the Water Futures – Toowoomba project.

It is important to note that not many hormones enter our water system to begin with. Hormones are large organic molecules (more than ten times the size of water molecules), making them relatively easy to remove using membrane systems. Current Australian research shows that more than 90% of the hormones in raw sewage will be destroyed in the water reclamation plant (Barrier 1). wł

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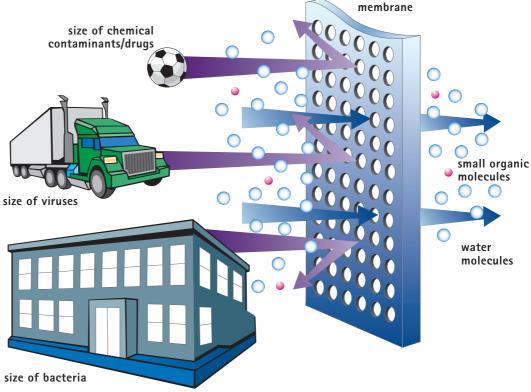
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How does reverse osmosis work?

Most contaminants are large when compared to a water molecule. Low molecular weight compounds may pass through the RO membrane, but the combination of UV light and advanced oxidation (through the use of a chemical such as hydrogen peroxide) generates hydroxyl radicals that can oxidise the organic molecules that pass through. The advanced oxidation process does not lead to any additional chemicals being left in the water.

UV light also kills pathogens by damaging the DNA to prevent replication.



reverse osmosis

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Barriers 4 and 5 – Ultraviolet light disinfection and advanced oxidation

By this stage the water is already more than pure enough to drink. UV light disinfection and advanced oxidation provide additional layers of protection by passing the water through intense light, like the cleansing rays of the sun but hundreds of times stronger. UV disinfection irradiates drinking water to kill pathogens such as bacteria and viruses, and inactivates Cryptosporidium and Giardia. Advanced UV oxidation will break down and destroy any remaining organic chemicals or contaminants.

Barrier 6 – Cooby Dam

The recycled water is then blended with Lake Cooby's surface water.

The water from Cooby Dam is naturally hard and contains dissolved organic matter. In the days before Toowoomba found other water supplies hardness was a major water quality issue for Toowoomba. Hardness destroys soap and leaves a calcium carbonate buildup around tap fittings. Bore water and dam water both pick up minerals through the ground but water that has been processed through RO is soft. The water that will come through the Advanced Water Treatment Plant will improve the quality of Cooby Dam's water.

Barrier 7 – Mount Kynoch Water Treatment Plant

At the Mt Kynoch Water Treatment Plant, where our current drinking water is already processed, Toowoomba's water is treated to meet the health and aesthetic requirements of the National Health and Medical Research Council's Australian Drinking Water Guidelines. This process does not change with the advent of Water Futures – Toowoomba, it is something we have always done.

Most "dirt" (organic material, micro organisms, minerals) present in the dam water is measured as "turbidity" and turbidity is settled out of the water in a large settling tank. Multi-media filters (crushed coal, sand and gravel) remove the remainder of the turbidity. To settle and filter small particles, a specialised treatment chemical (coagulant) is added that makes the particles larger (flocculation). The larger particles (flocs) containing the dirt settle and become sludge that is removed. The smaller flocs are trapped in the filters. Under conditions where the raw dam water is relatively clean, the settling stage is not needed and the plant can be operated in what is called "contact filtration" mode.

Nuisance minerals such as iron and manganese are removed through adding chlorine prior to filtration. Chlorine oxidises these metals, bringing the metals from solution into suspension so that they may then be filtered out. Adding chlorine to the treated water also destroys microorganisms not trapped by the filters. A sufficient quantity of chlorine is added to ensure some is present at the consumer's tap to prevent bacteriological re-growth in the pipes.

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A greener cleaner city and other big benefits:

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Having a safe and sustainable water supply will give us a happy and healthy community that can continue to grow and prosper.

Toowoomba will maintain its reputation as an enviable city with the lifestyle benefits of a stable water supply and the knowledge its future is secured.

Toowoomba's most famous festival, the Carnival of Flowers, will continue to bring vibrant colours into our gardens and many visitors to our beautiful city.

Drought protection

Water recycling will reduce the demand on our fresh water supply and make use of a precious resource that currently goes to waste.

Business

The project assists with job creation and export growth through the availability of recycled water for increased coal production and to Charlton Wellcamp Industrial Area, energy producers and horticulturalists.

Toowoomba businesses will be able to plan for the future with the knowledge that they will have a reliable water supply.

Economic

Water Futures – Toowoomba will generate regional development and economic growth through its sustainable supply of recycled water to mining, industrial and horticultural pursuits.

Recycled water has a comparatively low unit cost and it is also sustainable, unlike other suggested solutions.

Environmental

By taking responsibility for our wastewater we will enhance the ecosystem of the Murray Darling Basin by eliminating a considerable amount of salts, trace elements and nutrients from its waters.

Electricity is needed to pump water from our dams up to Toowoomba. By reducing this need for electricity, we are actively reducing the release of greenhouse gases into the environment.

Esteem

Water Futures – Toowoomba will be the first introduction to Australia of indirect potable reuse for urban water supply. We will lead Australia in adopting this proven and innovative technology, which has been done in various other countries (see page 33), and pave the way for similar projects throughout the country.

Did you know?

Toowoomba has had Water Restrictions since 1991.



What about the other options?

A number of suggestions have been made about other potential water supply options for Toowoomba. More detailed information can be found on the Water Futures – Toowoomba website, at www.toowoombawater.com.au

Water from coal seam gas production

Queensland Gas Company (QGC) has a potential 3000-5000ML/y of water available as a by-product of coal seam gas production at Chinchilla. Water quality and quantity will vary during the life of the production wells and, as the water has a salt content of 3000-5000mg/l, desalination will be required to achieve acceptable quality. Polyaromatic hydrocarbons and radionuclides are often associated with coal and may need to be removed from the water. Polyaromatic hydrocarbons may have an effect on the desalination process.

The capital cost to pipe 5000ML/y to Toowoomba,

including desalination, pump stations and 180km of pipeline, is estimated at \$150m. The total annual cost, including operation and the cost of capital, is estimated at \$3500/ML.

QGC have advised that they are concentrating on supplying water to communities close to their production area and have made no offer to supply Toowoomba.

Summary: More costly than Water Futures – Toowoomba and no offer has yet been made.

Oakey Creek Groundwater Management Area (OCGMA)

This option proposes swapping 5000ML/y from bore licence holders in the OCGMA for water from the Advanced Water Treatment Plant for a period of five years. The five-year period has been suggested to allow people time to accept the Water Futures – Toowoomba indirect potable reuse concept. At the end of five years, the purified water would begin to flow to Cooby Dam and irrigators will then receive less highly treated water from Wetalla at a cost of \$300/ML.

The salinity of OCGMA water ranges from 1100-2600mg/l, meaning this water requires desalination. Pipelines and pumping stations to and from the bore field would also need to be constructed for a total estimated capital cost of \$86m.

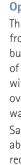
There will be insufficient water available from Wetalla to provide purified water to Cooby Dam and supply additional water to irrigators. This means that the pipelines and pump stations would be abandoned after the first five years and the cost passed on to Toowoomba ratepayers. Groundwater levels in the OCGMA are declining

and Council's need to pump 24 hours per day, rather than seasonal pumping for irrigation, will put extra demands on the already stressed aquifer.

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Did you know?

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If all the water on earth were represented as a bucket, the fresh water would be represented as but a small glassful. Of this, the water available for us to use would be equal to a single drop.



Summary: There is insufficient wastewater available to supply Cooby Dam and irrigators, and the ground water source is not sustainable. The cost is additional to Water Futures - Toowoomba, and pumps and pipelines built to carry water to the irrigators would be abandoned after five years.

Condamine Groundwater Management Area (CGMA)

Option 1

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This option is as for the OCGMA, but takes water from the CGMA. The CGMA contains five sub areas, but the best source, Area 3, has 123 licenced bores, of which 21 are allocated between 500 and 1247ML/y with an average of 680ML/y. The supply is already over allocated and Council will require a continuous water supply, rather than on a seasonal basis. Salinity ranges from 585 to 1040mg/I, which is above the Australian Drinking Water Guidelines requirement of 500mg/I. Collection and distribution systems, storages, two pipelines for treated and bore water, a reverse osmosis plant and evaporation basins are all needed. The estimated capital cost is \$131m. As for the OCGMA proposal, there will be insufficient water available from Wetalla to provide purified water to Cooby Dam and supply additional water to irrigators, meaning that the pipelines and pump stations would be abandoned after the first five years and the cost passed on to Toowoomba ratepayers.

Summary: There is insufficient wastewater available to supply Cooby Dam and irrigators, and the ground water source is not sustainable. The cost is additional to Water Futures - Toowoomba, and pumps and pipelines built to carry water to the irrigators would be abandoned after five years.

Option 2

Similar to Option 1, but irrigators surrender allocations in return for Wetalla effluent. This will

require EPA approval. Collection and distribution systems, storages, two pipelines for treated and bore water, a reverse osmosis plant and evaporation basins are all needed. The estimated capital cost is \$96m. It is doubtful this option will meet National Water Initiative objectives for funding and additional cost will come back to ratepayers.

Summary: Salt disposal will create environmental issues, and the water source is not sustainable. The cost is higher than Water Futures – Toowoomba and additional costs will come back to ratepayers.

Option 3

This is a NuWater proposal to swap Pittsworth, Millmerran and Jondaryan shire irrigators' allocations for treated effluent. Toowoomba's needs will be met by CGMA groundwater and we will surrender existing dams to South East Queensland. As for Options 1 and 2, there are issues with salts and water hardness from the CGMA source, and the water source is

Did you know?

Irrigation was developed in 5000 BC.



stressed. The capital costs for treatment, pumping and delivery are estimated at \$300m.

The outcome of this proposal is dependent on the success of the NuWater bid for a pipeline to carry wastewater from Brisbane. The proposal is unlikely to succeed, as Brisbane's wastewater has been allocated for other purposes.

Summary: This option is very expensive and the NuWater project is unlikely to progress.

Coolmunda Dam

It has been suggested that Toowoomba could gain an allocation from Coolmunda Dam. The dam has a capacity of 75,000ML, but is fully allocated for irrigation and other purposes in the Inglewood district. It is unlikely an allocation will be granted by SunWater and there is no DNRM&W and Queensland Government support.

A pipeline from Coolmunda to Toowoomba, a distance of 155km, will be needed, at an estimated cost of \$75m for 5000ML/y. There will be additional costs of treatment and purchase of existing water allocations.

It is doubtful the option will meet the National Water Initiative objectives for funding resulting in additional cost to ratepayers.

Summary: It is unlikely that a water allocation could be obtained, and additional costs will come back to ratepayers.

Rainwater tanks for all Toowoomba residences

The cost for installation of 35,000 tanks of 10,000litre storage capacity, with the inclusion of a pressure pump, slab and plumbing, is estimated at \$175m. This does not include the cost associated with alterations to roofs and landscaping. Some homes are not suitable for installation of a tank. Summary: Costs are very high and not all homes

can be economically fitted with a rainwater tank. Council will, however, continue to encourage homeowners to install tanks by increasing community awareness and through its rainwater tank rebate.

Use recycled water for industrial purposes only

Toowoomba does not have sufficient industrial water demand for the replacement of potable water with recycled water to achieve significant savings.

Non-domestic users make up 30% of Toowoomba's water demand, but these users are mainly commercial, educational, government and hospitals. Industrial users make up only a relatively small proportion of the non-domestic demand.

Many industries in Toowoomba already use bore or tank water supplies for some or all of their needs, or have implemented or are considering internal recycling programs.

Summary: Unlike other cities, Toowoomba lacks suitable industrial demand for this option to return a significant reduction in demand for potable water.

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Did you know?

Rainwater tanks should be checked for sludge every two to three years.

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Use recycled water for horticultural use only

Hampton Irrigators is one example, already included as a possibility in the Water Futures – Toowoomba proposal, of replacing potable or potentially potable water with reclaimed water for horticultural use. There are no other significant opportunities for Toowoomba to replace horticultural water use with recycled water as Toowoomba's dams are used for town water supply only. Supply of recycled water to new horticultural users will not increase the amount of water available to Toowoomba for potable supply.

Summary: Irrigators do not use our potable supplies so this option does not offer significant benefits.

Dual reticulation

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Dual reticulation (also known as third-pipe or purple-pipe) is often proposed as an alternative. Under these schemes, reclaimed water is treated to at least 4 star standard, and delivered to homes and businesses through a separate reticulation system for external uses such as garden watering and car washing, or low risk internal uses such as toilet flushing.

Because of the need to treat the recycled water to 4 star standard, capital and operating costs for treatment are not much less than for 6 star water. Dual reticulation is not suitable for established sites such as Toowoomba, as it would be necessary to dig up every street and road to install a new, separate reticulation system, and install separate connections and plumbing to every property, at a cost of hundreds of millions of dollars.

Summary: Dual reticulation is not a suitable option for an established city such as Toowoomba.

Pipeline from Wivenhoe

It has been suggested that we source 11,000ML/y

from Wivenhoe Dam. This option will require an allocation from South East Queensland Water in the context of the SEQ Regional Water Supply Strategy Study. The Queensland Government has indicated that allocation is highly unlikely to be approved.

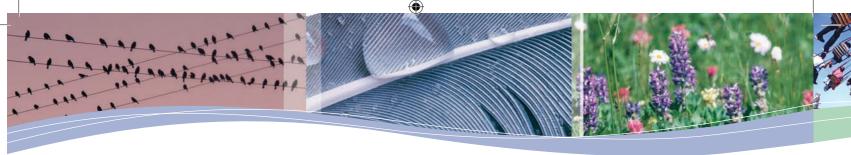
There will be a high operation and maintenance cost, with an additional lift of 240m from Wivenhoe to Perseverance required. The project cannot be progressively brought on line so it will require large capital expenditure before water becomes available. The estimated capital cost is \$90m, and the required upgrade of reservoirs, gravity mains and treatment would cost in the vicinity of \$25m.

Summary: The total cost, estimated at \$115m is a greater outlay than for Water Futures – Toowoomba, ongoing costs will be higher, and an allocation of water is highly unlikely.

Did you know?

Toowoomba has almost 700 kilometres of sewers!

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Increase extraction from bores in Toowoomba **Basalts** aguifer

Increased extraction from bores in the Toowoomba Basalts aguifer is included in Water Futures -Toowoomba and is our cheapest option. Our current extraction is 1800ML/y of our allocated 3800ML/y. An increase of up to 2000ML/y is possible and can be progressively brought on line. The estimated cost is \$4m.

Summary: This option is already part of the Water Futures - Toowoomba plan and is cost effective however, increased bore extraction alone will not meet all our water needs. Underground aquifers are also a finite resource and our use of them should be carefully managed.

New bores to extract from the Artesian Basin

New bores drilled into the Clarence-Moreton Artesian Basin can possibly supply 3000-5000ML/y. Our final allocation will be determined by the

DNRM&W. The estimated cost of new bores is \$8-10m and they can be progressively brought on line. This is part of the Water Futures - Toowoomba plan. Summary: This option is already part of the Water Futures – Toowoomba plan and is cost effective however, increased bore extraction alone will not meet all our water needs. Underground aguifers are also a finite resource and our use of them should be carefully managed.

Emu Creek Dam

Construction of a Dam at Emu Creek has been considered as an option, offering a possible storage volume of 130,000ML, with a possible safe yield of 9000-12,000ML/y.

An allocation would have to be made in the context of the SEQ Regional Water Supply Strategy Study and it is estimated it would take 12-15 years to obtain government approval. The Queensland Government has advised that it is highly unlikely

that approval would be granted, as the dam site is located in the headwaters of the Moreton catchment. and would reduce the yield of Wivenhoe Dam. The estimated cost of building the dam is \$145m. There is a high operation and maintenance cost associated with this option and an additional lift of 150m from Emu Creek to Pechey Reservoirs is necessary. An upgrade of reservoirs, gravity mains, and treatment is required at an estimated cost of \$25m.

The project cannot be progressively brought online and will require a large capital expenditure before water becomes available.

Summary: The dam site is located in headwaters of Wivenhoe catchment and will affect yield of Wivenhoe Dam. The Queensland Government has advised that this is not an option. It is not cost effective and involves long timeframes.

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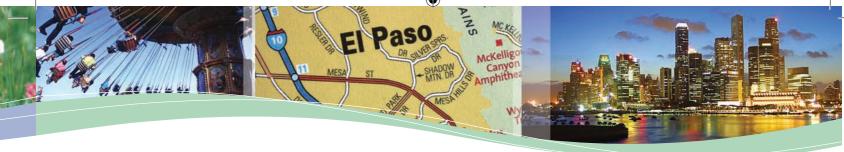
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Did you know?

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Groundwater can take a human lifetime just to travel half a kilometre.



Frequent questions

Do other countries recycle water?

Communities around the world have implemented projects to use purified recycled water to supplement drinking water supplies:

Orange County (OC) in California, USA has been injecting recycled water into depleted groundwater basins since 1976. OC is upgrading this system to use microfiltration, reverse osmosis and ultraviolet light technologies to purify water, which is injected into underground aquifers. Orange County draws water from these aquifers and treats it before supplying it to its customers. The water OC supplies to Disneyland comes from this aquifer.

The Upper Occoquan region of northern Virginia, USA has recycled its water for drinking purposes since 1978. Highly treated waste water goes into the Upper Occoquan Reservoir and the water is then withdrawn, treated again and supplied to the residents of Fairfax County. Up to 90% of the water in the reservoir that supplies 1.2m people is recycled during dry spells.

The Singapore Water Reclamation Study (NEWater Study) was initiated in 1998. NEWater, which now supplements Singapore's drinking supply, is treated used water that has undergone stringent purification and treatment processes using advanced dualmembrane (microfiltration and reverse osmosis) and ultraviolet technologies. Indirect potable reuse supplies Singapore only 1% of its water, however this will increase to 2.5% by 2012. The bulk of NEWater is supplied directly to industy, which finds it more attractive than townwater, due to its purity.

Windhoek, Namibia has been accessing direct potable reuse water on an intermittent basis since 1968.

In Clayton County, Georgia, USA their wastewater

receives secondary treatment, then land treatment. There is then a subsurface flow into a stream used as a potable water source. It has been in use for 20 years and is currently being updated to include wetlands treatment and water treatment plant enhancements.

The reclamation of water for reuse in **Southern California** began in 1948 when the Sanitation Department of Los Angeles looked to develop a truly "local" water supply. Their investigation culminated in the Montebello Forebay Groundwater Replenishment Project, in use since 1962. Reclaimed water is blended with imported river water and local stormwater runoff and used for aquifer replenishment.

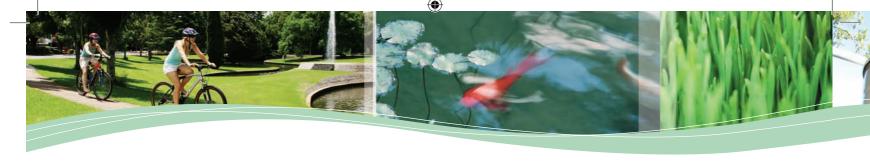
The Fred Harvey Water Reclamation Plant in **El Paso**, **Texas** has been recharging their aquifers to augment groundwater supplies and prevent salt intrusions from Rio Grande Alluvium since 1985.

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The US Army used reverse osmosis water purification units to provide clean water during a cholera epidemic in Rwanda and to aid flood victims in North Dakota.

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What is Water Futures - Toowoomba?

Water Futures – Toowoomba is a project to ensure a safe and sustainable water supply for Toowoomba and the surrounding areas. Water Futures – Toowoomba has a number of parts, all of which are critical to its success:

- Demand management, which is about minimising use of our water.
- Maximising use of rainwater, by requiring rainwater tanks to be installed on all new buildings.
- Increasing our use of bore water, but recognising that this is a finite resource and we cannot rely on it for a long-term solution.
- Supplementing the water in Cooby Dam with purified reclaimed water.

Why do we need Water Futures – Toowoomba?

Changing climate patterns and increased development have put great strain on our existing dams and they are not able to supply our water needs into the future. The Queensland Government has told us that it is very unlikely that a dam at Emu Creek would be approved because it would reduce the water available for Wivenhoe Dam. Other water supply options are more costly and less environmentally friendly.

Will the purified water be safe to drink?

Yes. The technology involved in the Water Futures -Toowoomba project is not new and has been well tested. There are many places throughout the world, particularly in the USA, where recycling effluent for planned indirect potable reuse already takes place. There has been no evidence of negative health effects related to drinking this water in more than 20 years. Toowoomba will not be putting any of the purified water into our water supply system until independent testing and assessment by the Queensland Government and CSIRO shows that it is safe to drink. Preliminary testing is likely to last three to five years, or for as long as it takes to ensure water safety. Thereafter testing will be ongoing.

How can we ensure the water stays safe?

Apart from intensive and continuing testing of the purified water quality, the treatment system will include numerous fail-safes, each of which will shut the system down at the first sign of a problem with any of the processes. The entire procedure will be operated under an independently certified and audited HACCP risk management and quality assurance system. HACCP is an internationally recognised and recommended approach to food safety.

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Did you know?

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In Altona, Germany in 1892, the water from the Elbe River was filtered before drinking. At the time, hundreds of people from nearby Hamburg (which did not filter their water) died from cholera. The citizens of Altona were untouched by this waterborne disease.

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How will the water be purified?

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The seven-barrier process involves treated water from the Wetalla Water Reclamation Plant being purified by ultrafiltration, reverse osmosis, and ultraviolet disinfection and advanced oxidation. This water will be mixed with Cooby Dam water and then further treated at our existing Mt Kynoch Water Treatment Plant before entering the city's water supply. Eventually, it will make up about 25% of our total supply.

What about the chemicals and pathogens in wastewater – endocrine disrupting chemicals, hormones, trihalomethanes, bacteria and viruses?

The results of testing of thousands of samples over a number of years from systems such as the Singapore NEWater and the Orange County schemes show that the processes Toowoomba will be using safely and effectively remove these chemicals and organisms from reclaimed water, resulting in a product which goes far beyond the purity requirements of the World Health Organisation and the United States Environmental Protection Agency.

What is the Water Quality Star Rating System?

The Australian Water Association's Water Quality Star Rating system is designed to assist the community to understand the differences in the quality of recycled water. It ranges from no stars (domestic and industrial sewage) to 6 star quality water (suitable for kidney dialysis machines and pharmaceutical manufacturing). Drinking water is 5 star quality.

What is the difference between direct and indirect potable reuse?

Direct potable reuse occurs when wastewater is treated to a very high standard and the purified water is added directly to the treated drinking water supply. This is not planned for Toowoomba.

Indirect potable reuse is when the highly purified wastewater is introduced to a water body, such as a dam or underground aquifer and mixed with the native water. The mixed water is then extracted and further treated before being used for drinking water. Water Futures - Toowoomba includes indirect potable reuse by adding purified water to Cooby Dam.

Did you know?

Viral infections are usually transmitted through person-to-person contact, rather than by water.

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What is the difference between planned and unplanned indirect potable reuse?

Unplanned indirect potable reuse occurs in many places all over the world, the most obvious example is London. Many dozens of towns discharge their treated sewage into the Thames only for the towns downstream to pull it back out again and treat it for potable use.

Planned indirect potable reuse means that we are aware of and open about the intention to treat to a very high standard the water for reuse and will have strict procedures and ongoing checks to maintain water quality and to reassure our public.

Could we avoid the need for recycled water if every house had a rainwater tank?

No. Rainwater tanks can make a great contribution to reducing your water consumption, especially if you use the water for gardening and have it plumbed into suitable fixtures such as your toilet.

Even if the installation of rainwater tanks to all households were practical and affordable, they would still be unable to keep up with current water demand. Figures from the Water and Wastewater Strategy Study for Toowoomba and the Surrounding Areas suggest a 10,000L rainwater tank can only reliably supply 70L per day. Toowoomba's average per household consumption is 490L per day.

Why can't we recycle water for industrial or horticultural use only?

Supply of non-potable water for industry or nonhousehold use – such as for horticulture – is dependent on there being a need and being able to get the water to those users. It is necessary to provide completely new delivery infrastructure for the non-potable water, and in the case of industry this makes the exercise uneconomic unless the industry is located close to the water reclamation plant (for example New Wave Leathers, which is already using recycled water), or a number of potential industrial users are clustered together (such as Charlton-Wellcamp, which is already included in the Water Futures – Toowoomba proposal).

Toowoomba lacks the opportunities to replace industrial or horticultural use of potable water with recycled water.

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The Mt Kynoch Water Treatment Plant produced 14,894ML in 2004/05 to supply Toowoomba and surrounding shires.

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Why can't we supply recycled effluent just for gardens and laundry use?

Provision of recycled effluent for laundry and outside use would require the installation of dual reticulation. Water for dual reticulation needs to be treated to at least Class A+ (equivalent to 4 star) standard, due to possible cross contamination and the high probability of human contact with the water. The estimated cost of an appropriate treatment plant is \$10m.

This would also require the digging up of every road to lay new pipes, at an estimated cost of \$175m, and a further \$175m to lay parallel plumbing to each property because we cannot allow interconnection with the potable water supply. The total cost of \$360m can only be seen as conservative because it does not take into account additional costs associated with working around or relocating existing services such as gas, electricity and telephone lines, nor the restoration of roads.

What is greywater and can we use it?

Greywater includes shower, bath, hand basin, kitchen sink, dishwasher, washing machine and laundry tub water. Greywater may contain large numbers of pathogenic (disease causing) organisms such as bacteria and viruses, fats, greases, salts and other chemicals. As such, it poses a health and environmental risk if used in an uncontrolled way.

The Queensland Plumbing and Drainage Act 2002 controls the ways in which greywater can be used. The Act describes where it can be used, the types of treatment and irrigation systems that are required and where they can be located. In the past it has been allowable to use greywater in unsewered areas but not in sewered areas. In September 2005, the Act was changed to allow each Council to decide if it would permit the use of greywater in sewered areas.

Toowoomba City Council has decided not to allow the use of greywater in the sewered areas under its control. The reasons for this decision include concerns about health risks from bacteria and other pathogens, the effect of the salts in laundry greywater on Toowoomba soils, the high cost to the householder of installing the necessary treatment systems and the practical difficulty of meeting the requirements of the Act on an average sized housing block. Residents are permitted to bucket greywater from the bath, basin, laundry or shower for garden use. For information about greywater use in Toowoomba contact the plumbing section on **4688 6882** or visit the Toowoomba City Council website at **www.toowoombawater.com.au**

Did you know?

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Over 35% of the projects nominated for Toowoomba's Environmental Excellence Awards 2004 included or focused on a water theme. Most of these projects were from the business sector.

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Want to know more?

Water Futures - Toowoomba on the web

If you still have questions or want to contact Council about Water Futures – Toowoomba, the easiest way is through our website at www.toowoombawater.com.au

Visit our frequently asked questions (FAQ) section, find out about the latest news and events relating to Water Futures – Toowoomba, explore our dams, see rainfall trends and other data or send us your comments. Toowoomba City Council wants you to feel that this is your project as much as ours, so tell us how.

http://www.|

For more information about wastewater see www.toowoombawater.com.au/ waste-water.html or phone 4688 6252. Or for information regarding trade waste contact the Trade Waste Section on 4688 6799 or email at tradewaste@toowoomba.qld.gov.au

Host a Kitchen Table Conversation

Toowoomba City Council has established an independent Community Advisory Panel from a wide variety of backgrounds whose role it is to listen to the community and help residents understand the facts about the availability of water and proposed solutions for the future. A panel member or Councillor can visit your home or workplace if you wish to host a Kitchen Table Conversation about Water Futures – Toowoomba.

Kitchen Table Conversations are informal discussions with the opportunity to ask questions about the project of members of the panel, Councillors or Council staff if you prefer.

We are also available to provide formal presentations to businesses or groups on request.

If you would like more information or want to organise a Kitchen Table Conversation to discuss the project, simply contact Council:

By phone: 4688 6371

Email: mail@toowoombawater.com.au

In person: Council offices, 543 Ruthven Street, Toowoomba City Council

Or visit the web: www.toowoombawater.com.au/

We look forward to your input into this important initiative.

Leonardo da Vinci



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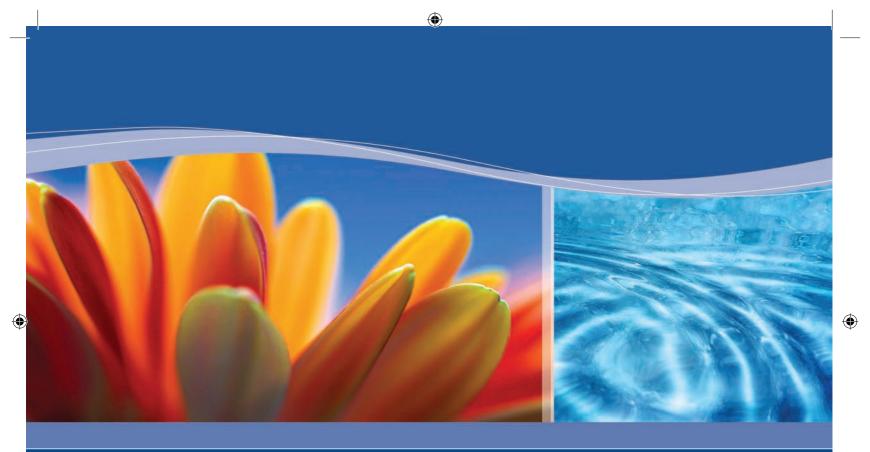
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The future of water on this planet Is the future of life on this planet

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