

Rewater

Water recycling in Australia

SUMMER 07/08

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ReWater

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Wide Bay Water Corporation's recycled water storage facility.

About ReWater

This newsletter, ReWater, has been designed to make information relevant to recycled/recycled water use in horticulture more accessible to horticulturalists (growers/farmers), the water industry and other interested people. It is part of the service provided by the Australian Coordinator for Recycled Water Use in Horticulture, funded by Horticulture Australia.

Back issues and instructions for subscribing to receive ReWater electronically on a quarterly can be accessed at www.recycledwater.com.au/rewater

Your Feedback and Contributions

We would appreciate your feedback and suggestions for contributions. Please email rewater@arris.com.au or contact us on 03 9421 1701.

www.recycledwater.com.au



The delivery of research and development outcomes from this project to the horticultural industry is made possible by the Commonwealth Government's 50% investment in all Horticulture Australia's research and development initiatives.

Know-how for Horticulture™

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Trees thrive on recycled water

A centrally controlled automated drip irrigation system enables Wide Bay Water Corporation to use recycled water from their two sewage treatment plants on 300,000 trees over approximately 220 hectares, with plans to expand to 1 million trees by 2010.

Hervey Bay is one of the top ten fastest growing areas in Australia. In the past 40 years it has almost doubled every decade in population to reach its current size of 56,000. As a result, Wide Bay Water Corporation (WBWC) needed to find an appropriate solution to deal with the extra volume of waste water in the sewage treatment systems. Recognising the tough stance the Environmental Protection Agency (EPA) takes on effluent discharge direct to creeks and rivers, WBWC developed appropriate methods of effluent management for Hervey Bay.

The recycled water was best applied using drip a system which has a low application rate ensuring optimal efficiency and environmental sustainability.

The options were to increase the level of treatment and to discharge a cleaner product to the coastal estuaries; or to reuse the product in a way beneficial to the environment and the local community.

Hervey Bay is famous for its unique and pristine environment particularly Fraser Island, the whale breeding areas and the bay; all of which attract a large number of tourists to the region each year. Because of this, the option of discharge was dismissed and the alternative of reuse as irrigation onto a land based agroforestry/agricultural system was adopted.

The selection of the land based reuse option meant a number of challenges had to be met. These included compliance and consideration of EPA regulations, identifying the location of a suitable site, selecting and designing a system able to cope with continual population growth and the undertaking of appropriate communication and engagement to satisfy the local community that the option chosen was the right one.

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Wide Bay Water Corporation's eucalyptus tree plantation irrigated with recycled water.

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Trees thrive on recycled water

Firstly, a full EIS (Environmental Impact Assessment) of the surrounding farms in the area was undertaken which particularly focused on those surrounding the existing sewage treatment plants. The EIS examined a range of issues which included soil and landscape assessment, recycled water characterisation, and a water and nutrient balance. The water balance model was critical to determine the amount of land required, level of water quality required for each crop, and influence of climatic conditions such as evaporation and rainfall. Irrigation trials were undertaken on crops including sugar cane, pasture, eucalypt plantations and tea trees. These trials showed that the effects of reuse water on the soils, environment and yield were all manageable.

Today, the recycled water is used on private turf farms, private cane farms, timber plantations, the airport irrigation system, a golf course, and in a local industrial estate for irrigation purposes.

Timber Plantations are the cornerstone of reuse projects for WBWC. Eucalypts were chosen as the plantation timber. The trees are watered when there are surplus volumes of recycled water from the cane and turf farms. The trees are drought hardy natives so they don't suffer when not watered for long periods. Other varieties of trees which have been planted include Grey Gum, Grey Box, Forest Red Gum, Grey Ironbark, Gympie Messmate and Spotted Gum.

Netafim and WBWC enjoy a working relationship spanning over 15 years and covering all stages of the timber plantation reuse project development. Initially trials were conducted using dripper line to determine flow rates, dripper spacing, run lengths, dripper types and filtration requirements.

Denis Herron, WBWC Water Reuse Manager stated 'the reason for using a drip system was the poor drainage of the sites and the recycled water which was available was high in nutrients. The recycled water was best applied using a drip system which has a low application rate ensuring optimal efficiency and environmental sustainability. The drip irrigation system provided by Netafim, gave us the control and flexibility required to manage our irrigation requirements at all times - no other form of irrigation could give us that. This was highlighted in our trials when we compared drip to other forms of irrigation such as irrigation machines and flood irrigation.'

In addition to the dripper line a wireless monitoring system was also installed at the Bunya site to record local environmental factors, such as a weather sta-



Filter system in Wide Bay Water Corporation pump shed.

tion to monitor temperature, humidity, solar radiation, wind speed, rainfall and evapotranspiration (ET). NetaSense soil moisture probes were installed at key sites to monitor the effects of irrigation, localised rainfall, drainage and plant uptake of water in the soil profile. Low cost water meters were also installed on the dripper lines to report irrigation timing, duration and quantity. The Irriwise system also acts as a continuous self auditing system, logging, graphing and issuing alarms when set levels are breached.

The recycled water scheme has now been in operation for 17 years and will be expanded over coming years using similar irrigation and monitoring systems. ●

Author: Stephen Smolenaars, Arris Pty Ltd.
For more information see:
www.widebaywater.qld.gov.au
www.netafim.com.au

Werribee lettuce trial starts

The Australian Coordinator for Recycled Water use in Horticulture (a project funded by Horticulture Australia) has begun an economic comparison of drip and spray irrigation methods using recycled water. Arris with the support of Netafim Australia are conducting a trial in Werribee South on a half hectare plot of commercially grown vegetables. Three crops are planned with the first (Iceberg lettuce) harvested in late November.

The research trial is testing the theory that by using drip irrigation methods lettuce can be grown with 50% less water and that they will be better quality with less rejects (ie a higher percentage of plants can be sold).

The grower has been working with the researchers operating both the sprinkler and drip systems; with Arris and Netafim staff on hand to assist where necessary. He feels it has been a valuable learning experience and looks forward to refining the operation of the drip irrigation system in the next crop.

Variations in crop yield, water and fertiliser applied, operational costs and labour needed for the different irrigation methods will be assessed as part of the field experiments. Several key soil parameters, including salinity and sodicity will also be compared between treatments.

A field day is being planned to coincide with the planting of the second crop so growers, researchers and others in the horticultural industry can see the research trial first hand and discuss it with the researchers (Dr Daryl Stevens and Stephen Smolenaars). If you are interested in attending this field day please contact Stephen on (spsmolenaars@arris.com.au), or by phone on 0418950721. ●

Source: Stephen Smolenaars, Arris Pty Ltd.



Lettuce harvesting at Werribee

Floating reed beds on par

Fighting algal bloom and odour issues in Australia by adapting technology that has proven its success in the United States, Europe and Asia.

Golf courses throughout Australia have been using recycled water for irrigation for more than 15 years. Some courses have identified difficulties in dealing with the elevated nutrient concentrations, in particular nitrogen and phosphorous. It has long been recognized that the best known solution for high nutrient management in stored water is to mimic nature and create natural filter systems with constructed wetlands. In reality, recreating a natural system can be almost impossible to incorporate into existing water storages due to land availability or unnatural water level fluctuations.

On the south coast of New South Wales at the Catalina Country Club and Tuross Heads Golf Course, floating wetland plants on rafts were used in their reservoirs to manage the regular algae outbreaks in their reservoirs.

Environmental consultant, Sean Harris was engaged by the management of each of the two golf courses. Sean suggested the use of rafted reed bed technology. Sean had previously been working in the UK, and had seen how rafted reed beds had been used to great effect to manage polluted water. Management agreed that this option to treat and manage stored wastewater provided an excellent opportunity to adapt a technology that has proven success in the United States, Europe and Asia, but was relatively new to Australia.

The rafted reed bed system installed at both Catalina and Tuross Heads consisted of a buoyancy raft made of recycled, UV stabilised plastic, upon which a coir mat with pre-grown plants was installed.

How Rafted Reed Beds Work

The rafted reed beds depend on two key processes to provide water treatment. Firstly, the curtain of roots growing through the raft helps to calm water flows which in turn accelerate the rate of sedimentation. This reduces suspended solids and attached contaminants such as nutrients (phosphorus) and heavy metals.

Secondly, the roots provide a very large surface area that maintains a biofilm of beneficial microbes that also treat pollutants by bacterial metabolism. For water quality improvement, this microbial activity provides an environment for denitrifying bacteria, the microbial



reduction of nitrate to nitrogen gas. The microbial activity also assists in the removal of phosphorus and heavy metals from the water by aggregating these free floating elements, they then settle out of the water and eventually become part of a sludge layer on bottom of the pond.

Wetland Plant Selection

The choice of wetland plants for the golf course reservoirs was relatively easy as many of the overseas rafts use wetland plants common in Australia. For Catalina and Tuross Heads a mixture of local wetland species were used including:

- Phragmites australis
- Juncus usiatus
- Cyperus exaltatus
- Eleocharis sphacelata
- Baumea articulate; and
- Schoenoplectus vallidus

Rafted Reed Bed Installations at Work

Catalina Golf Course Reservoir

In November 2006, 300m² of rafted reed beds were installed on the Catalina Golf

Course reservoir, representing approximately 3% of the surface area. The rafted reed beds were installed as 6 x 50m² islands, anchored within the reservoir.

As the system was installed in spring 2006 using pre-established plants (6 months old), the growth was over a metre by the end of autumn creating a significant visual impression on the water body. To date, there have been no algae outbreaks; even during the relatively dry summers of 2005/06 and 2006/07, when there was not much incoming stormwater to dilute the concentration of nutrients in the reservoir. According to golf course management, algae blooms would normally be expected under such dry conditions.

The reed bed islands have attracted many compliments as a visual amenity while also providing habitat for native birds.

Maintenance issues to date generally concern anchoring of the rafts. Wind and a significant flooding event, where water rose over 1 metre, caused the rafts to move. If further rafts are needed, bet-

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Table 1. Water quality results after installation of floating reed beds, Catalina (Jan - Jun 07)

Analyte	SAMPLE POINTS						
	1	2	% Change	3	% Change	4	% Change
PH	7.2	7.9	8	8.6	16	9.3	22
T Calcium	35.1	31.3	12	15.1	132	25.9	36
T Nitrogen	10.9	7.9	38	6.3	72	3.5	211
T Phosphorus	10.0	7.0	43	6.2	62	3.7	175
Ortho Phos	8.2	7.9	3	5.0	65	4.4	87

T=Total

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Floating reed beds on par

ter anchoring will be required. During establishment, serious pressure by swamp moorhens meant full bird netting was required to prevent the birds destroying the reeds when nesting.

Tuross Heads Golf Course Reservoir

The Tuross Heads Country Club is located directly above the magnificent Tuross Lakes, a well known fish habitat and valuable estuary. Within this highly aesthetic landscape, the reservoir is situated close to the main road entering the Tuross Heads Township. The reservoir is comparatively small compared to Catalina, as it is only 300m² in surface area by 1.5m deep. It is also lined with black plastic. The golf course has 20 acres of greens and fairways under irrigation. These physical attributes provided significantly different conditions to those of Catalina Golf Course when considering using rafted reed beds for algae control.

It did not take long for algae to reach problem levels during the reservoir's short life span. Within 4 months of construction, a strong unpleasant odour emitted from the reservoir even during winter, which could be smelt by passing traffic. In addition to this, the surface of the reservoir was covered with a scum of algae. While an algae problem had been anticipated and a state of the art filter system installed to ensure treated effluent would not clog filters and sprinklers, the extent of the problem was beyond expectations.

The smelly, unsightly algae were so severe that the golf course received numerous complaints from neighbours. With the summer of 2005/2006 coming up, the installation of reed beds was considered a priority by management in December 2005, in an attempt to solve the problem.

125m² rafted reed bed was installed in late December 2005. The raft covered 30% of the surface area; a substantially larger surface area than that installed at Catalina. Results from overseas applications suggested larger areas are more effective than smaller areas in treating problems as severe as those being experienced by Tuross.

Within one month the problems with unsightly algae and the related odour issues were removed. For the rest of the 2005/2006 summer, there were no more problems with odour or algae covering the reservoir. The reed beds have also provided ecology within an artificial reservoir. Frog sounds can now be heard in the reed beds and a number of birds can be seen sheltering between the reeds.

The rafted reed beds at Catalina and Tuross Heads reservoirs have provided two Australian road tests of how this technology can be specifically used to manage high levels of nutrients in stored water. In the case of the two very different reservoirs, the rafted reed beds worked effectively to reduce algal outbreaks on



Planting reeds on a pontoon at Catalina Golf Course

both a large (30%) and small (3%) surface area.

The plants selected and raft design has proven to be suitable for the installations at both sites. Regular check-ups on the root systems underneath the rafts have found the curtain is established rapidly and after the first growing season now reaches 600mm at Tuross heads. ●

Source: Sean Harris, Harris Environmental Consulting
For more information see:
www.raftedreedbeds.com.au/index.htm

GOOD READS and website links

Recycled Water Guidelines (phase 1)

The Printed version of Recycled Water Guidelines (phase 1) is now available. Phase 1 concentrates on non-potable reuses of recycled water. Also included are the basic principles for quantitative health risk assessment used in all Commonwealth recycled water guidelines and ADWG via use of DALYs, tolerable risk, log reductions plus information on ways to minimise risk of accidental or inadvertent misuse.

Cost: \$115 plus p.& h.
bookshop@awa.asn.au



Ecohouse 3rd Edition

Designing a home which is sustainable and sensitive to the need to conserve water and energy is a dream but there are ways to make small changes around your own patch of ground and to take advantage of your location and circumstances. Colour with pictures and diagrams.

Cost: \$89.50 plus postage and handling.
bookshop@awa.asn.au

Water Reuse: Issues, Technologies & Applications.

New from AWWA. A comprehensive text which identifies the main chemicals and microbes that cause consumers problems, the technologies to effectively remove them and how they can best be applied.

Cost: \$199 plus posting and handling for AWA members (Member No. required). Contact AWA Bookshop via (Email).
bookshop@awa.asn.au

Protecting drinking water quality into the future: Priority areas and land use compatibility in Adelaide's Mount Lofty Ranges Watershed

Published by the Environment Protection Authority South Australia (EPA SA)
www.epa.sa.gov.au/pdfs/watershed_par.pdf

Australia's Water Resources; From Use to Management

Our relationships to and attitudes about water have changed substantially over the past decades. Declines in rainfall & its reliability, increased growth of cities, changes in agricultural practices have all impacted on the supply.

Cost: \$89.95 plus postage and handling.
bookshop@awa.asn.au

Tarong Power Station – tackling water supply challenges

Reducing water consumption by 55ML a day through responsible water management, conservation and recycling ensures viability of one of Queensland's largest power stations.

The Tarong Power Station (TPS) is located 180 km north west of Brisbane in Queensland. It is one of the states largest power stations with a generating capacity of 1400 megawatts and has been in operation since 1984.

TPS main water supply is Lake Boondooma. Lake Boondooma was formed when the Boyne River was dammed. It has a total capacity of 204,200 ML. The dam also supplies water for the irrigation of citrus, nuts, table grapes and pasture.

Energy turbines require cooling when in operation. TPS has two cross flow natural draft cooling towers, which cool the exiting the turbines.

At present TPS is only operating at 30 percent capacity due to the lack of available water. Currently, on average 49 ML of water a year are evaporated, however when the power station is at full production capacity approximately 78 ML are evaporated per day.

TPS looked at the history of droughts going back to as far as 1895 and realised that the current drought being faced in Australia, particularly in south east Queensland, is not unique. Over many years, forecasting and modeling has shown Lake Boondooma and Lake Wivenhoe cannot be deemed a reliable source of water for future power generation.

The severe water shortages being faced encouraged TPS to improve water management and reduce water consumption to remain viable. All employees have been made aware of the situation, and have been active in reducing water consumption, from the simplest action of installing water saving shower heads through to the more complex investigation of using hybrid cooling. Currently TPS has reduced its water consumption by a total of 55 ML per day on current production levels. This was achieved by the following actions:

Internal Water Recycling

TPS was built with a dual pipe distribution system, which has allowed untreated raw water to be used for general purposes, while also having a separate potable water system.

Significant water savings have been achieved by connecting the cooling tower

blowdown water to the general purpose raw water supply. This has saved in excess of 2ML per day.

Stormwater from the TPS site and adjoining coal mine is collected and reused in the cooling water system which saves an average of 1ML per day during median rainfall years.

TPS also recycles its own and others treated sewerage and boiler blowdown water and uses it in cooling tower water makeup which saves 0.25ML per day.

External Recycled Water

TPS has been active in the process of acquiring recycled water from the Brisbane sewage treatment plants as part of the Western Corridor Recycled Water Project. This water will be available from July 2008. The recycled water will be produced by several advanced water treatment plants located near Brisbane and Ipswich. It will be pumped via an 81 km pipeline to the Wivenhoe pipeline that currently supplies TPS, and then pumped another 78km to TPS.

Reclaimed Water Use

TPS has reclaimed water from its ash storage facility. Ash is used in the cooling system. This option of reclaiming water not only saves water but forms part of the power stations ongoing water management strategy to ensure the ash storage facility has sufficient storage capacity. In the past 1100 ML of water has been reclaimed from the facility.

'Base Load' to 'Standby and Suspended'

Demand for electricity is not uniform during the year or during the day. Power plants are not always operated at maximum capacity, but it is important that sufficient generating capacity is available to meet requirements during peak demand periods. The ongoing drought has forced TPS to scale back generation to reduce water consumption, ensuring the remaining water in Lake Boondooma is conserved while maintaining a reliable supply of electricity to the grid.

Today TPS is operating at 30 % capacity due to the drought and dwindling water supply. It has two generating units online which generate an average load of 210 MW. These two generators are also able to generate extra electricity at short notice to meet peak demand times. The reduction in generation is saving 45 ML of water per day.

TPS recognises its responsibility in the conservation and management of water and associated discharge and has a strong track record as a responsible water manager.

Over the coming years TPS will make the transition to recycled water for its cooling needs under a scheme which establishes a water grid for the benefit of all water consumers in south east Queensland and nearby regions. ●

Source: David Knights, Scientific Officer - Tarong Energy
For more information see:
www.tarongenergy.com.au

Graham Carpenter, TEC Chair (left) and Minister for Mines and Energy, Geoff Wilsonmark at the opening of the Reverse Osmosis plant.



Indirect potable reuse: identifying public concerns

Various levels of government in Australia are considering indirect potable reuse (IPR, the use of water recycled from sewage effluent to be fit for the purpose of blending with traditional drinking water sources) to supplement urban water supplies. This paper reports on acceptance by capital city populations (2004-5) and three urban water recycling communities (2006). A short summary of factors that hinder support confirm that a range of social and cultural processes need to be considered by planning authorities.

Acceptance of planned indirect potable reuse

Respondents in a sample of seven capital cities (n=2504) that had experienced water restrictions were asked: "How willing would you be to use water mixed with reclaimed water, treated to drinking water quality, for all your household needs?". At the national level, 73.7% either had no hesitation or were willing with some qualifications. This percentage was also reflected in individual city data, ranging from 72.1% in Melbourne through to 78.1% for Adelaide.

When respondents were queried on their confidence to drink the water, a more robust measure of their intention, the result levelled out around 40% for national and city samples (Table 1). Support is therefore similar to the result for the Toowoomba plebiscite when 38% voted for the implementation of an IPR system in July 2006. Only householders in Canberra and Perth, two of the cities where IPR is under consideration, are more confident (56% and 48% respectively).

Do water recyclers have greater confidence in IPR than the general population? Data collected in July 2006 from sites where householders recycle water from a dual reticulation/third pipe system for toilet flushing and garden watering suggest that the response is similar. The results are compared to the national

Do water recyclers have greater confidence in IPR than the general population?



Image: istockphoto.com

and host city data in Table 2. The slightly weaker confidence at Mawson Lakes may relate to the fact that these householders have five years less experience of recycling water than their Sydney counterparts.

The effect of prior awareness of IPR

Respondents were asked if they had previously heard of the planned concept and also if they had thought before that recycling "occurs wherever water supply for drinking is withdrawn downstream of other cities and towns that discharge sewage effluent into rivers". The range of prior awareness across the cities was from 26% to 46%, whereas water recyclers had greater awareness (32-59%). There was an association with confidence in IPR: relatively moderate to strong for water recyclers, and weaker but also statistically significant in the national finding. Therefore, people who have prior awareness or knowledge of IPR are more likely to have confidence in the technology than those who have not.

Explanations for hesitancy or concern

In the national survey, 80% (2013 householders) gave reasons why they hesitated to accept, or lacked confidence in IPR. The reasons were coded with the following distribution. Health risk is the issue clearly nominated by a third. A quarter of the comments relate to the source of the water, and another quarter (23%) queried the treatment process, standards, guarantees on compliance and accountability, coded under the umbrella category of 'trust factors'. A further 15% mentioned water quality and only 1% raised cost as an issue (3% gave other reasons).

Toowoomba

With respect to Toowoomba's experience of the IPR proposal, a review of media reports, City Council presentations, discussions with staff, industry journal articles, internet blog sites before and following the plebiscite, reveal that the community were either disengaged or disaffected. There was apathy and casual questioning of the need for water to accommodate increases in population growth, and then there were claims made about the lack of transparency and a need for more information. Some individuals and organised groups were primarily outraged by the lack of prior consultation and particularly dialogue surrounding the whole issue.

Table 1. Confidence to drink IPR water: National baseline and capital cities (percent).

Level of Confidence	City Number	National 2482	Adelaide 355	Brisbane 356	Canberra 354	Hobart 353	Melb. 351	Perth 356	Sydney 357
Great		14.8	12.7	15.4	17.8	11.9	15.7	17.4	13.2
Moderate		27.0	31.0	26.7	37.9	30.0	21.7	30.9	28.6
Total confident		41.8	43.7	42.1	55.6	41.9	37.3	48.3	41.7
Little		20.1	19.4	18.3	17.8	18.4	23.1	17.1	19.9
No confidence		38.1	36.9	39.6	26.6	39.7	39.6	34.6	38.4

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Indirect potable reuse: identifying public concerns

Conclusion

While support seems to have increased for IPR, measures of confidence in the technology confirm that potable reuse is not a preferred option in ameliorating water shortages, aligning with the response in Toowoomba.

Influencing factors suggest that if people have heard of the IPR concept before or have considered 'unplanned IPR', they may be more likely to have confidence in drinking the recycled water. Reasons for hesitation or concern that centre on health risk or source may leave little room for negotiation. Yet, the category 'trust factors', and the lack of trust seen in the review of the Toowoomba experience, underlines the need for transpar-

Table 2. Confidence to drink IPR water: National baseline, host cities, recyclers, (percent).

Level of Confidence	City	National	Adelaide	Mawson Lakes	Sydney	Newington	Rouse Hill area
	Number	2482	355	334	357	258	328
Great		14.8	12.7	7.5	13.2	12.0	11.3
Moderate		27.0	31.0	28.1	28.6	33.3	30.5
Total confident		41.8	43.7	35.6	41.7	45.3	41.8
Little confidence		20.1	19.4	27.5	19.9	21.7	24.7
No confidence		38.1	36.9	36.8	38.4	32.9	33.5

ency through deliberative approaches on water management issues and the problem to be addressed. Greater trust in the technology may therefore be engendered by ensuring people have access to information on water recycling guidelines (standards), addressing concerns about maintaining water quality (compliance), and working closely with communities on future planning in a way that estab-

lishes trust in responsible authorities and institutions (accountability). ●

Source: June Marks, Flinders University
For more information see:
www.waterrecycling.flinders.edu.au

Acknowledgements: Australian Research Council's Linkage Project funding scheme (LP0349211) and United Water International Pty Ltd.
An abridged version of an AWA Water Reuse 07 Conference presentation.

NEWS innovations & information

National

Water Use Fact Sheets Now Available

The National Water Commission (NWC) has made available consumer fact sheets on recycled water.
www.nwc.gov.au

Funding Flows Under \$10 Billion National Plan for Water Security

Minister for the Environment and Water Resources Malcolm Turnbull has announced details concerning projects to be funded under the "\$5.9 billion Modernising Irrigation component of the \$10 billion National Plan for Water Security". The projects include funding for an on-farm irrigation efficiency program, modernising irrigation delivery systems and the improvement of river operations.
www.environment.gov.au

Fantastic Plastic to help water and gas industries with recycling

The CSIRO has announced the development of a new plastic membrane for separating small molecules, which has the potential to reduce the footprint of water recycling and desalination. The hour-glass pore shape of the new material separates molecules faster and using less energy than conventional plastic membranes.
Source: AWA Water News – 22 Oct
www.csiro.au

Queensland

Watered Down Beer Company

Deputy Premier Paul Lucas has welcomed a commitment by "Brisbane's iconic Foureux brewery" to cut drinking

water consumption "by up to 1.1 million litres a day". Mr Lucas advised that the Milton Road brewery would meet the self-imposed restriction by the construction of a \$16 million on-site recycling plant.

Source:
LAWLEX - Water News feed – 31 Oct
<http://statements.cabinet.qld.gov.au>
www.brisbanetimes.com.au

Dams, Recycled Water for Far North Queensland

The construction of two major dams and the introduction of recycled drinking water are being considered for Far North Queensland as the region struggles to cope with a projected doubling of its population over the next 40 years.

Source:
Padraic Murphy @ the Australian – 26 Sept
www.theaustralian.news.com.au

Power Station Receives Recycled Water

In a joint statement, Premier Peter Beattie and Deputy Premier Anna Bligh have welcomed "the first flow of purified recycled water from Bundamba Advanced Water Treatment Plant" into the "lake at Swanbank Power Station near Ipswich". Mr Beattie advised that "purified recycled water is being piped to the Swanbank power station via a 7.3 kilometre, 800 millimetre diameter pipeline that links with the Bundamba Advanced Water Treatment Plant", stating that the "water flow will reduce the power station's reliance on the Wivenhoe Dam".

Source: LAWLEX - Water News feed
<http://statements.cabinet.qld.gov.au>

Western Australia

Recycled Water Service Providers Wanted

The Western Australian Government has called for expressions of interest to Recycled Water service providers to build, operate and manage an integrated water system for a residential development in Gracetown (including sewage and recycled water systems), opening the supply of water services to the private sector.

Source: Landcorp
www.landcorp.com.au

Water Forever

The Water Corporation (WA) is developing a 50 year plan to deliver safe, reliable water services to customers. The Water Forever project has a significant community engagement component and will result in an action-oriented strategic plan focusing on water and wastewater service delivery up to 2050.

Source: Water Corporation
www.waterforeverwa.com.au

Tasmania

Final Workshop for using the Australian Guidelines for Water Recycling (AGWR) – Phase 1.

The final AWA workshop for the AGWR was recently in Hobart Tasmania at the Hands on Energy Discovery Centre, Hydro Tasmania. Approximately 35 participants discussed the guideline with Drs Daryl Stevens and Diane Weisner before Stephen Gallagher from the EPA and John Stevens (Group Manager – Clarence City Council) who manages the Clarence Recycled Water Scheme spoke about recycled water management and use in Tasmania.

www.ccc.tas.gov.au

South Australia

6 Green Star Rating

SA WATER'S new headquarters under construction in Victoria Square has today been granted a 6 green star rating by the Green Building Council of Australia; a first for buildings in South Australia. The building includes an on-site cogeneration plan, rainwater collection and water recycling. Source: SA Premier News Release



Recycled Water Produces the Right Bouquet in SA Vines

A study by the South Australian Research and Development Institute (SARDI) has found that recycled water is not just an alternative source of water for crops, but may be more beneficial than mains water.

Dr Belinda Rawnsley, who led a three-year \$350,000 study funded by the Grape and Wine Research Development Corporation, says the results are good news for vignerons and horticulturists looking for sustainable irrigation solutions.

Source: www.farmonline.com.au

Victoria

Water Recycling Project for Geelong Textile Firms

The Victorian Government is providing \$50,000 under its 'Science, Technology & Innovation (STI) Regional Specialisation Program' to the City of Greater Geelong for a 'Recycling of dye-house waters' project involving Geelong-based textile companies Melba Industries and Brintons Carpets which has an innovative solution to treat and recycle wastewater.

Source: AWA news 10 Sept
www.dpc.vic.gov.au

2 Billion Litres of Recycled Water for Plastics Manufacturer Qenos

Melbourne's largest industrial recycled water project has signed up the plastics manufacturer Qenos, Australia's sole manufacturer and leading marketer of polyethylene resins. Qenos will receive 2 billion litres/year of Class A Recycled Water from City West Water's Altona Treatment Plant. This will reduce drinking water use by >90% at its Olefins site.

Source: AWA news 12 Nov
www.dpc.vic.gov.au

Wimmera-Mallee Pipeline delivering as promised

Water has begun to flow through stage 1 of the Wimmera Mallee Pipeline. Ant-

werp, Dimboola, Dooen, Jeparit, Pimpinio, Rainbow, Tarranyurk and Yaapeet, part of the 300,000 ha Supply System 1, are first towns to benefit and it has been announced that the towns of Berriwillock, Culgoa and Nullawil would now also be serviced by the Pipeline early next year.

Source: AWA News - 15 Oct
www.dpc.vic.gov.au

New Recycled Water Pipeline

Victorian Water Minister Holding turned the tap on a new recycled water pipeline that will save 300 million litres of drinking water each year at Sandhurst Club estate near Cranbourne, the state's first suburb connected to recycled water.

www.dpc.vic.gov.au

New South Wales

Next Step for Hoxton Park Recycling Scheme

The Decisions Report has been completed for the Hoxton Park Recycled Water Scheme to provide more than 2000 ML of recycled water/year to residents within new development areas and businesses in south west Sydney and for use outdoors and in flushing toilets.

www.sydneywater.com.au

Coffs Harbour - Water Treatment Plant Approved

ABC News reports that a new \$32 million water treatment plant for Coffs Harbour has received state government approval. The plant will reportedly "have the capacity to provide enough drinking water to meet [the region's] projected demand for the next 25 years".

Source: LAWLEX - Water News feed - 3 Oct
www.abc.net.au

Recycling Water for Irrigating

Sydney Water has announced that, in conjunction with Penrith City Council, they are implementing two separate water saving initiatives aimed at saving over 90 million litres of drinking water per year. The joint recycled water projects involve the provision of recycled water to sustain sporting ovals in the region, and ongoing investment in Sydney Water's 'Every Drop Counts' Business Program that incorporates water management into day to day business operations, as well as at a strategic level.

www.sydneywater.com.au



Review of Prices for Sydney Water Corporation's Water, Sewerage, Stormwater and Recycled Water

The Issues Paper for review of prices for Sydney Water Corporation's water, sewerage, stormwater and recycled water, for the period from 1 July 2008 has been released by IPART for comment by 14 September 2007.

www.ipart.nsw.gov.au

Major Recycled Water Scheme

A contract has been signed for the Replacement Flows Project, part of the \$250 million Western Sydney Recycled Water Initiative which will provide 27 GL of recycled water a year for the environment, industry, irrigation and new homes in Western Sydney.

www.sydneywater.com.au

\$132.5M to rescue the Hawkesbury Nepean River

The Commonwealth will provide up to \$132.5 million to improve sewage discharges at three treatment plants below the Warragamba Dam, improving urban stormwater management, managing agricultural and open space irrigation and for higher treatment to reduce nutrient runoff from local catchments for the Hawkesbury Nepean River, a vital river way for Western Sydney.

www.pm.gov.au

International

Small Water Systems, their management and operations

The Cooperative Research Centre for Water Quality and Treatment (CRC) has had resources developed to support small systems in New Zealand, a novel approach to management of trihalomethanes in small drinking water supplies in Western Australia, and a listing of useful websites for small supplies".

Source: CRC for Water Quality and Treatment
www.waterquality.crc.org.au

Sanitation is go in Bangladesh

Community-Led Total Sanitation (CLTS) is a new, effective approach the Village Education Resource Centre (VERC) is using to improve sanitation in Bangladesh. The key to its success is convincing communities to take action themselves, which has a flow-on effect as neighbouring communities see the differences sanitation makes to village life. Water Aid is now hoping to replicate the approach in other countries around the world.

Source: Water Aid Australia
www.wateraid.org

Green public spaces to benefit from recycled water

Arris, a communications and consulting company specialising in agricultural business, is developing a new 'how to' guide to make it easier to use recycled water to irrigate parks, gardens and turf sporting clubs throughout Melbourne.

Utilising a grant from the Smart Water Fund, Arris is producing the practical guide to highlight current Victorian guidelines for water recycling and address specific issues for the amenity horticulture industry. The industry covers turf applications such as golf, sports fields, race tracks, public parks and gardens and nurseries.

In creating the guide, Arris undertook a survey of managers working in open space and recreation to establish the areas to be covered within the guidelines.

"The survey found that managers were looking for information on occupational health and safety, public health and safety, managing salinity and sodicity, nutrient balances and budgets and monitoring horticultural and environmental performance," said Dr Daryl Stevens, Principal Scientist at Arris.

He said the guide has been drafted and reviewed by experts in the horticulture industry. It was recently road tested at a



Jim Kelly leads workshop at Western Water

one day workshop which was held in Western Water's Sunbury office focusing on training managers about the practical aspects of using recycled water to irrigate public spaces.

Around thirty farmers and managers of recreation reserves and golf courses attended the workshop and provided input to the guide. Due to its popularity, this one day workshop will be repeated in 2008.

"The manual is now being finalised for publication early next year," said Dr Stevens.

The manual will also be available Australia wide through the website, www.recycledwater.com.au.

For further information about the guidelines or to provide input, contact Dr Daryl Stevens, Principal Scientist Arris Pty Ltd on dstevens@arris.com.au

For those that would like to register for the workshops next year, please contact Arris on 03 9421 1701.

Author: Stephen Smolenaars, Arris Pty Ltd.
For more information: Contact Dr Daryl Stevens on dstevens@arris.com.au
Acknowledgement: Photos were provided by Anna May from Western Water.



Workshop participants measuring soil salinity

16 EVENTS diary dates

Australia

Water Information Industry Seminars

2007 Seminars Dates & Places

Adelaide	6 December, 2007
Canberra	7 December, 2007
Brisbane	14 December, 2007

The Bureau of Meteorology is hosting a series of Water Information Industry Seminars in each capital city targeting professionals involved in water resource policy, planning and management.

For more information see:
www.bom.gov.au/announcements/water/
www.pm.gov.au

IWES Sydney 2008

11-15 February, 2008, Sydney NSW

Twelve courses in water and wastewater treatment, hydraulics, environmental management, and biosolids management.

Exciting new courses include:

- Australian Drinking Water Guidelines
- Corrosion and Odour Management in Sewers
- Principles of Hydraulic Engineering and Open Channel Flow
- Carbon Neutral Wastewater Treatment

For more information see:
www.iwes.com.au

Water Recycling - Maximise Plant Yields, Health and Quality and Minimise Risks to the Environment

11-12 February, 2008, Sydney NSW

Learn about the benefits and hazards of irrigating with recycled water, the key hazards found in recycled water, and how to determine if the water quality is appropriate for the intended use.

Is your recycled water fit for the intended purpose from an agronomic and environmental perspective.

For more information see:
www.iwes.com.au

International

5th International Conference on Water & Wastewater Management - Mumbai, India

31 January - 2 February, 2008

Conference with the theme of Clear Solutions to Clean Water: Rationalise; Reduce; Reuse; Recycle; Recover will run concurrently with the hosting of eminent speakers from academia, government and the industry.

A one day training workshop on Reverse Osmosis and Membrane Technology will be conducted by the most renowned instructor in Indian membrane technology sector.

For more information see:
www.eawater.com/expo2008/