

## Returns on Investment? We're seeing them now!

This edition of our Newsletter is set to coincide with the Dowerin Field Days and will feature the RT-LA team's latest research and development activities in the town.

As highlighted in this issue, the new run-off detention dam and broad-based waterway will be officially opened by DAFWA Director General Ian Longson on 29 August.

The features and benefits of this innovative surface water management scheme are explained by David Stanton on page 3. Keenly awaited by the Dowerin Shire and the Field Day Committee, the water captured by the earthworks will supply local irrigation demand as well reducing the impacts of the occasional floods that sweep across the field day site and through the town.

Bob Paul reveals preliminary results of test pumping just completed in Dowerin. Early indications are that strategic pumping could reduce watertables and coupled with the flooding control work, could largely overcome the salinity risk to the town. The **Dowerin Shire** and the **Avon Catchment Council** have been long-term supporters of this work and we're hoping to show as many people as possible the results at this year's field days.



*The wide shallow channel enables water to reach the dam without impeding vehicles on the field day site*

*Groundwater removed during the pump test had to be trucked out of Dowerin for safe disposal*



*Hydrologist Bob Paul and Dowerin-Goomalling CLC Vanessa Slater check out pump testing equipment near CBH in Dowerin*

In another article, Ed Solin describes how 18 months of groundwater pumping in Wagin have had a dramatic impact on watertable levels in the centre of town. "Saving the supermarket" was how Ed described the effects. This has been another of our projects where **Wagin Shire** and the **South West Catchments Council** have been seeing a positive return on their investment.

Peter McCafferty from the Chemistry Centre outlines how RT-LA was showcased in Sydney at the National Ozwater Conference in March. The paper impressed the audience both from the point of view of the Project's *research-based delivery* operation and by the fact we are consistently battling the 'too much in the wrong place, but not enough water where we want it' conundrum here in WA.

We also have an update on the desalination process in **Merredin** and progress on plans for **Nyabing**.

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# Wagin shops out of danger

The Foodworks shopping complex in **Wagin** has had a reprieve with the lowering of the groundwater by 2 metres beneath the shops through extending groundwater pumping in the town.

Pumping out of groundwater began on 12 December 2005 at a site behind the Palace Hotel which lies 430 m north-east of Foodworks.

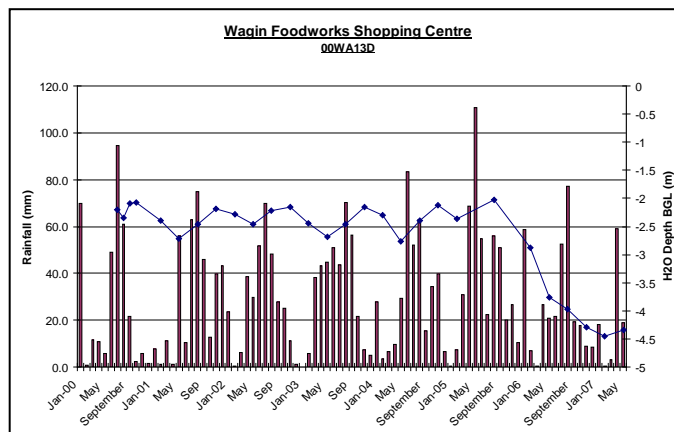
Prior to pumping, groundwater beneath the shops had maintained pressures nearing 2 m BGL (below ground level) for five and a half years – dangerously close to the surface. It's now one and a half years since pumping began, and the groundwater pressures are around 4.5 m BGL.

The graph right shows groundwater levels at the shopping centre and rainfall at Wagin since 2000. With anywhere near average rainfall, there could have been disastrous times ahead.

Two deep bores are at the site (41 m and 29 m BGL) and both indicate similar pressures, leading to the conclusion they are connected and thus form the one deep aquifer.

Since late 2005 the yield from bore 03WAPB3 has decreased from about 4 L/s to 2.5 L/s. This indicates that the aquifer is receiving limited recharge and being dewatered – a very good result.

This means that after a year of so of pumping from other bores within the townsite it may be possible to pump intermittently – say two weeks on and one week off, which is more economical than pumping constantly from all the bores with the discharge throttled back.



Quotes are being obtained to drill two additional bores, providing power, pumps and headworks, and supplying and laying of 2.2 km of new pipeline. Further groundwater de-watering planned for Wagin should go a long way to solving the town's problems as it now appears the initial disposal issues have been solved.

- **Ed Solin**, DAFWA monitoring technical officer  
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**Editor's note:** Ed Solin is probably a familiar face to many people in rural towns because he has been monitoring bores since June 2000. Most bores are checked three or four times each year to confirm water levels below ground and other changes.

# Rural Towns - Liquid Assets receives national attention

The great work being undertaken as part of the Rural Towns - Liquid Assets project was presented at a national conference this year.

A paper on 'Rural Town Water Management in the West Australian Wheatbelt: Managing Salinity and Generating Water Assets' was presented at the Australian Water Association's Conference *Ozwater 2007* in Sydney. Peter McCafferty from the Western Australian Chemistry Centre presented the paper on behalf of project authors.

The conference attracted more than 2000 delegates from Australia and around the world. It is held biannually, and attracts researchers

and industry practitioners. Feature topics included presentations on water re-use, desalination, water accounts, monitoring and the challenges presented by climate change.

The presentation was well received, particularly by an audience accustomed to hearing about the challenges associated with too little water, rather than too much water (albeit in the wrong place). There was particular interest in the project's contribution to improved water management in small rural towns in the WA wheatbelt and its innovative approaches to solving water shortages and urban salinity control. As a result of the success of the Sydney presentation Peter was asked to present the same topic at *mini-Ozwater*, a Perth-based event of the same nature.

The Chemistry Centre is one of the less visible partners in RT-LA, but supplies accredited chemical analysis for all samples. This involves characterisation of the extracted ground and surface waters, and analysis related to re-use or treatment options for each town. The nature of samples received differs widely, ranging from highly saline water to near potable water, through to the high quality product emanating from reverse osmosis treatment.

RT-LA forms part of a portfolio of Chemistry Centre projects. These include projects investigating salinity, land use, crop development and agronomy that have a direct bearing on towns within the RT-LA study.

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Peter McCafferty (second from left), with other conference delegates

# First stage of Dowerin scheme opening

The first stage of **Dowerin's** new integrated water management plan to help control salinity and gain new water supply is due to be officially opened during the Dowerin Machinery Field Days on Wednesday 29 August.

Most of the year, it is hard to believe that Dowerin could ever face excess water; but a rainfall event of only 30 mm can trigger problems that include flooding of field day exhibition sites on the lower side of the oval, and water running down the main street.

But this should happen much less following completion of a new 15,700 cubic metre dam on the field days site. The dam will collect much of the surface water run-off from land between the field day site and the top of the catchment near the Water Corporation holding dam, and then be put to good use.

The new dam has been slow to fill due to the late and dry season, but its levels were rising nicely at the beginning of August.

After this year's field days the Shire will connect a pump to the outlet pipe, enabling water to be piped to local parks and ovals.

Dowerin Shire CEO Les Crichton said that cost of water as well as availability was a growing concern in the face of reduced long-term rainfall. The Shire currently spends around \$15,000 a year on water for its parks, gardens, ovals and a road works. This is a significant impost for a small town with population of less than 1,000.

Visitors to the field day site this year may not notice a shallow channel that crosses one of the car park areas and leading to the new dam. This is only about 50 cm deep and 6-7 m wide and about 500 m long – a new style of channel devised and designed by DAFWA's David Stanton so that it can transport water efficiently without forcing vehicles to drive around it.

Building a deep drain was a particular concern for the Field Day Committee, knowing it could be a problem for exhibitors coming and going with all types of machinery for the big August event.

Dowerin has an existing dam on the Tin Dog Creek, but the water quality tends to be brackish at certain times of year due to flows from salt-affected areas. It therefore made sense to locate any new dams higher in the landscape.

Stage 1 with its dam on the field day site is only the beginning of the integrated water management process. The longer term plan is to pipe water 2.6 km up the catchment to a second much larger dam, probably on the other side of the golf course.

It is expected that preliminary works for this will begin before Christmas enabling the second dam to begin collecting water in the 2008 winter. Completion of this second stage will greatly extend water supplies.

The water improvement scheme is also being supported by the **Avon Catchment Council**.



*Dowerin's new dam will supply cheaper water for parks and gardens*

## Groundwater supplies beneath Dowerin

Two production bores were constructed in Dowerin in 2006 at drilling investigation sites with significant air-lift yields. The bores were drilled into fault zones. One bore, 06DWPB02, is in the laneway behind Elders and the other, 06DWPB03, is beside the Dowerin-Koordara road opposite CBH.

These bores were test pumped in July for 24 hours to get estimates of long-term yields and the extent of the drawdown cone.

Water quality in the bores is poor, with 06DWPB02 having an electrical conductivity (EC) of just over 1000 mS/m (approximately a fifth of seawater) and 06DWPB03 having an EC of just over 900 mS/m. Depth to water in the bores before pumping was 2.6 m and 1.16 m below ground level which is very close to the surface in 06DWPB02 and 06DWPB03 respectively.

Because the water quality was poor and the town drainage system goes into Tin Dog Creek, the discharge from the test was pumped into water trucks and disposed of away from town in an approved area, instead of into the local stormwater drainage system.

Production bore 06DWPB02 was pumped for 24 hours at a constant rate of 1.22 L/s (105 m<sup>3</sup>/day) with a final drawdown of 12.74 m. The extent of the drawdown cone from pumping was more than 100 m.

Bore 06DWPB03 was pumped for 24 hours at a constant rate of 1.72 L/s (150 m<sup>3</sup>/day) with a final drawdown of 9.27 m. The extent of the drawdown cone from pumping here was more than 150 metres.

This indicates good prospects for pumping, but one of the biggest problems will be where to dispose of the discharge water.

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# Merredin groundwater mission achieved

The **Merredin** groundwater desalination program has been declared a success and possible model for other towns to follow, following its completion in July. Project manager for road construction company ALine East, Mark Sutton, congratulated partners on a job well done, delivering desalinated groundwater for road construction and saline water for dust suppression on Great Eastern Highway.

The Merredin Water Initiative project was undertaken between November 2006 and July 2007 to pump saline groundwater from a network of six production bores beneath the townsite, desalinate it by reverse osmosis (RO) and supply both the fresh and saline water components for a major road reconstruction program. The plant shut down in July as immediate demand for water from ALine had finished, however options for on-going water uses are being canvassed to take advantage of the infrastructure.

Merredin townsite is adversely affected by encroachment of saline groundwater less than 2 m from the surface. In order to lower levels, production bores (total capacity ~700 kL/d, average EC 3000 mS/m or about half seawater) were installed. Pumped groundwater was reticulated to a central storage where about half was desalinated via a transportable RO plant and used for road construction. The remaining saline water was used directly for dust-suppression. Reject water was discharged to an evaporation pond.

The co-ordinated effort included partners from the Shire of Merredin, ALine East, Novatron, Pure Water Corporation, Coates Hire, Rockwater and Rural Towns - Liquid Assets. The technical success in delivering desalinated water on a tight demand schedule demonstrated viability in both water supply and reducing townsite groundwater levels. The long-term viability of such schemes in terms



*Bruce Sayer, a local water carting contractor picking up a tanker load from the Merredin desalination plant*

of scale and technical feasibility has been proven. One of the pleasant surprises was the ability of the RO unit to process saline water as fast as it could be delivered from the production bore network. Water production figures and costs are being analysed.

The approach provides a model for achieving dual benefits of saline groundwater management and fresh water supply for similar rural towns. Technical know-how gained means that groundwater desalination and water use opportunities in other rural towns can now be considered with confidence.

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# New dam hopes for Nyabing

The Shire of Kent hopes to have a new dam at **Nyabing** by the end of the year to provide water to help maintain local sporting facilities. The town of Nyabing, east of Katanning, has no connection with scheme water. A Water Corporation dam provides drinking water and a limited number of residents have rainwater tanks. Shire facilities such as parks and sports grounds are supplied by the sports dam which leaks and is too small. It was dry at the end of summer 2007, leaving the town in dire straits.

Kent Shire and RT-LA have been looking for an additional water harvesting site within the town and in January 2006 submitted a request to the Department of Environment (now Department of Environment and Conservation) to clear about 1.5 hectares of degraded vegetation for a new dam. Permission for this clearing was refused recently.

Kent CEO Alan Wright said the Shire had been very disappointed by the decision, particularly because the time taken to reach it meant that two rain capture seasons had been missed. A meeting to discuss Nyabing's water crisis with senior DEC officers is now being arranged. Mr Wright said that if the clearing decision was reversed, the shire hoped to begin dam construction as soon as possible. Another option being considered is to build a dam on private land on the edge of the town, and then use it as a 'sump' from which to pump to another shire dam 2 km away in another catchment. The new dam, where-ever it is built, will collect run-off from the town and help maintain the bowling green, sports and hockey ovals – vital components of the district's social structure.

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For more information about the Rural Towns - Liquid Assets project go to:

[www.agric.wa.gov.au/RTLA](http://www.agric.wa.gov.au/RTLA)



The RT-LA project is funded by DAFWA, NAP (through South Coast NRM [formerly SCRIPT], SWCC, ACC and NAC) and 16 rural shires in Western Australia

