



## Case Study 01

# Wide Bay Water Corporation Timber Plantation

Wide Bay Water Corporation (WBWC) has devised a winning solution for the dispersal of their wastewater by recycling it onto a timber plantation. Currently 300,000 trees have been planted (approximately 220 hectares) with plans to expand to 1 million trees by 2010. A centrally controlled automated drip irrigation system, using Class B effluent water from Hervey Bay's two sewage treatment plants, irrigates the timber plantations.

### Background

WBWC is the first local government corporation in Queensland providing water and wastewater services to Hervey Bay. They are recognised nationally and internationally for their work in land based water reuse facilities.

Hervey Bay is one of the top ten fastest growing areas in Australia and in the past 40 years has almost doubled every decade in population to its current size of 56,000.

As with most local councils in Australia, the Environmental Protection Agency (EPA) is toughening its stance on effluent discharge direct to creeks and rivers especially close to the ocean. Hervey Bay was facing the same dilemma and the option was to increase the level of treatment to discharge or reuse. Hervey Bay is famous for its pristine environment especially the bay, Fraser Island and whale breeding areas, which attracts many tourists each year and makes the region very unique.

### Solution

The land based reuse option was chosen with the challenge of meeting EPA regulations, locating suitable area, dealing with population growth and reaching an outcome acceptable to the community.

The first step was to undertake a full EIS (Environmental Impact Assessment) of the surrounding farms in the area, especially in areas close to existing Sewage treatment plants. This examined a range of issues, including soil and

landscape assessment, effluent characterisation and a water and nutrient balance. The water balance model was critical to determine the amount of land and level of water quality required for each crop, and the impact on climatic conditions such as evaporation and rainfall.

Once areas were designated the reuse options were determined via a number of trials including sugar cane, pasture, eucalypt plantation and tea trees. These trials showed the impact of reuse water on the soils and environment and its yield implications.

The effluent is reused on private turf farms, private cane farms, timber plantations, airport irrigation system, golf course and local industrial estate for irrigation purposes.



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The existing two sewage treatment plants, Pulgul Wastewater Treatment Plant and Eli Creek Wastewater Treatment both discharge Class B effluent. Under Queensland EPA regulations the class of water quality requires verification through monitoring of final water quality using the levels of microbiological indicators.

### Timber Plantations

“Innovation is the cornerstone of our business,” said Mr Waldron WBWC CEO, “and we chose the eucalypt plantations because they were by far the most innovative solution. The trees would be watered when we had surplus to the requirements of the cane and turf farms. And the trees are drought hardy natives so they wouldn’t suffer if they were not watered for extended periods of time.”

He said the benefits of the program, which have won a Federal Government Award for Innovation in Irrigation, were both financial and environmental.

The trees which have been planted include grey gum, grey box, forest red gum, grey ironbark, Gympie messmate and spotted gum.

### Irrigation System

Netafim has been involved in all stages of the development spanning over 10 years. Initial work was completed in the trials to determine dripper flow rates and spacings, run lengths, dripper types and filtration requirements.

The most recent project was in 2006 on a new farm called Bunya and an expansion on Pulgul totalling 220 hectares. These projects used Netafim Uniram 17, 20 & 25mm 2.3l/hr @ 0.9m spacing (4m row spacing between trees) with an application rate of 0.62mm/hr. The 2.3l/hr Uniram dripperline was chosen due to the dripper’s superior capability to handle dirty water compared with other similar products in the market. Effluent water quality is rarely constant and product selection is critical in eliminating the potential threat of clogging.

Denis Herron, WBWC Principal Executive Officer stated “the reason for using drip was the sites had poor drainage, water high in nutrients and required a low application rate. However most importantly sustainable optimisation and system efficiency is the key. We needed to have flexibility and management of the system 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.”

The design handled by Netafim’s Design Office had several challenges with difficult block shapes, run lengths and trying to reduce flush valves required and poorly draining soil types. Dirk Murrell, Netafim Queensland State Manager said, “the design of this system was key to its success, we had to deal some challenges especially dealing with the water quality. Our approach was to listen to what the client required especially as the system had to have flexibility of applying effluent in varying capacities.”

Along with dripperline selection, filtration was also critical to the project as Class B effluent was used for drip irrigation. An Arkal Galaxy 12 (130 micron) automatic disc filtration system, designed for a 380m<sup>3</sup>/hr flow rate, was chosen on Bunya Farm. The Galaxy is particularly cost effective on larger flow rates and has a regulated volume for backflush allowing for short and environmentally friendly use of flush water to clean the filter element.



## Automation and Monitoring

Careful consideration was given to choosing the Automation system. Some of the challenges were that the temporary site office had no mains power, the system had to be flexible enough to cope with future expansion, not only in the number of control valves and sensors, but geographically and topographically. It had to be simple enough to operate on a day to day basis for the system operators, yet include all the powerful logging, alarm reporting, accumulation and management tools required by upper management. The field units had to operate in full capacity in the unlikely event that the central communication system was interrupted.

The Netafim Irrinet Central Control system was chosen and installed. It consisted of a Central Base unit which is interfaced to a PC for ease of programming, viewing system status, water usage, graphing and SMS alarming, as well as graphical mapping and additional management programs. Currently the base unit manages the RF communications to three, UHF radio linked field units (Irrinet XL's) which are installed at each of the main pumping sites. Additional sensors were installed to monitor water flow, pH and dam levels. Remote infield valve control and water meter monitoring was automated by Piccolo XR's. The Piccolo XR's utilise a low power licensed UHF radio, latching output technology and store & forward (repeater) communications. This combination allows low cost, yet simple and reliable communication to the remote fields.

A Netafim Irriwise wireless monitoring system was also installed at the Bunya site to record local environmental factors, such as a weather station to monitor temperature, humidity, solar radiation, wind speed, rainfall and ET. NetaSense soil moisture probes were installed at key sites to monitor the effects of irrigation, localized rainfall, drainage and plant uptake in the soil profile. Low cost water meters were also installed on the dripperlines to report irrigation timing, duration and quantity. The Irriwise system also acts as a continuous shelf auditing system, logging, graphing and issuing alarms when set levels are breached.

For more information please contact

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