

THE MALENY STP UPGRADE AND COMMUNITY WETLANDS CONSTRUCTION



Paper Presented by:

Glenn Carroll & Matt Ball

Authors:

**Glenn Carroll, STP Operator in Charge,
Matt Ball, STP Operator,**

Unitywater



*40th Annual WIOA
Queensland Water Industry Operations Conference and Exhibition
Clive Berghofer Recreation Centre,
University of Southern Queensland, Toowoomba
16 to 18 June, 2015*

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Glenn Carroll, *STP Operator in Charge*, Unitywater

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ABSTRACT

A new Sewage Treatment Plant in an environmentally sensitive area is always going to be difficult. Though in an area such as Maleny, which also has a strong history of community passion for its stance on environmental protection; information and education was a priority.

Community consultation in the past had been a formality for previous water utilities. However, Unitywater demonstrated in this project that an intensive “engaging of the community, traditional owners and regulatory authorities” would provide an outcome that meet everyone’s expectations.

The project would be a combination of two vastly different technologies. We didn't want to just get everyone's approval, we wanted to impress them. This benefited and enriched everyone involved. This project also opened a healthy line of communications, for future projects.

1.0 INTRODUCTION

The Maleny STP is situated approximately 30 km inland on the Sunshine Coast. In 2010, Unitywater inherited the plant which was well past its operating life. It was still meeting its licence requirements, thanks to a lot of operational team effort, though it was beyond its hydraulic and biological capacity of a growing population.

The old treatment plant also discharged into the Obi Obi Creek, upstream of the region’s main water supply, which was another sensitive community concern. The challenge was to not only increase the capacity and quality of the effluent but also the dispersal.

The preferred option to upgrade the Maleny Sewage Treatment Plant was to build a new membrane bioreactor and develop an irrigated rainforest and wetland system that would disperse and further remove nutrients from the treated effluent.

The successful delivery of the upgraded sewage treatment plant would require taking a partnership approach with the Sunshine Coast Council and the Maleny community, with close consultation and collaboration over several years.

In order to develop the rainforest and wetlands system, Unitywater negotiated a lease of 30 hectares of the Maleny Community Precinct from the Sunshine Coast Council. This leased area is part of a 128 hectare block of former dairy farm land being developed into a community asset incorporating a golf course, walking trails, revegetated forest and sporting fields.

2.0 CONSTRUCTION

Maleny’s old sewage treatment plant, a second hand plant from Pine Rivers was last upgraded in 1989 and could only service 2,000 people.

The new plant would be built on an adjacent block of land and have a capacity to service over 5,000 residents. In October 2012, construction began on the artificial wetlands, 1.4 km away from STP, on the 30 hectares of leased land. The two separate projects had to be synchronised for the commissioning of the new plant.

In May 2013, the earth was finally turned by the Monadelphous group, who had won the construction contract for the new STP. The heavens opened up and introduced everyone to the Maleny red mud.

Over the next 7 months it was a combined team effort of Unitywater, Civil and Operational staff to help deliver an innovative and cost effective treatment plant, well under budget.



Figure 1: *Construction Works Under Way*

The construction phase was also a challenge, being on such a small footprint with zero harm achieved to the surrounding creek area.

Good communication between both Client and Contractor kept the project on track. Monadelphous showed exceptional experience and safety record to not only deliver the new STP on time but also to work around the decaying old STP.

3.0 ENVIRONMENTAL SHOWPIECE

Unitywater officially opened its new Maleny Sewage Treatment Plant on World Environment Day, 5th June 2014. The innovative design of the \$17 million facility delivers a range of benefits to the Maleny community and environment.

At the heart of the new plant the membrane bioreactor treats sewage by using naturally occurring organisms that feed on the organic matter, reducing the quantities of nitrogen. Phosphorus is chemically removed through the sludge by dosing Aluminium Sulphate.

Then treated sewage is filtered through GE hollow fibre membranes, screening out anything larger than 0.04 microns. This fine level of filtration removes all solids including bacteria and even some viruses.



Figure 2: *Aerial View of the New Plant*

From the sewage treatment plant, effluent is pumped 1.4 kilometres to the Maleny Community Precinct where it irrigates to 13.8 hectares of revegetated native forest. Any treated effluent that isn't used by the irrigated forest seeps through the soil profile into 3 hectares of wetlands. Incorporating the irrigation and wetlands as part of the sewage treatment process takes up any residual nutrients, before it is released into the Obi Obi Creek and hence back into the water cycle.



Figure 3: *The Wetlands Area*

The forest and wetlands have transformed a section of an old dairy farm into an important habitat for flora and fauna. Unitywater worked hand-in-hand with Sunshine Coast Council, local bushcare groups and the community to develop parts of the forest and wetlands system and align them with the Maleny Community Precinct Master Plan.

4.0 BENEFITS ON COMBINING THE TWO TECHNOLOGIES

- The Membrane system has shown outstanding savings.
- Reduction in energy consumption compared to the old STP
- Over 50% greater capacity
- Innovative, simpler design of using the membranes to sludge thicken
- Leading to lower construction, installation and maintenance costs
- Also allowing a smaller physical footprint
- Over 15 months of successful data including weekly bacteriological test on the effluent all <1 before chlorination.

Table 1: Plant Performance Data

	Raw Sewage	Plant Effluent	Wetland Effluent
cBOD5 (mg/L)	351	<3	<3
Ammonia (mg/L)	48.5	<0.05	<0.05
NO_x (mg/L)	<0.5	2.55	<0.05
Total Nitrogen (mg/L)	69.6	3.12	0.38
PO₄³⁻ (mg/L)	6.30	0.12	<0.05
Total Phosphorus (mg/L)	11.2	0.16	0.09
TSS (mg/L)	468	<2	5

The Community Wetlands is an economical alternative to “hard engineering”

- The already high quality effluent nutrient level is further reduced.
- The creation of a sustainable community space for residents
- Environmental sustainability and water quality of the Obi Obi Creek
- Providing recycled water to the Maleny Golf course and availability for future connections.

5.0 CONCLUSIONS

The Maleny STP upgrade was a well planned and executed project.

Issues that seem to impact every sewerage utility upgrades were all addressed early.

- Consultation with government regulators for new licence requirements
- Meeting all community concerns and expectations
- Meeting construction and operating costs to help reduce customer bills

The balance of the two technologies complimented each other. The open approach to the community was first met with scepticism and hard line questions. Though the Official opening day, was a day Unitywater forged a new partnership with the community.

6.0 ACKNOWLEDGEMENTS

We would like to acknowledge the dedication of the Unitywater Civil and Operations team during this project.

Special mention

- Project Managers - Andrew Mills and Todd Vacher.

Also the Primary Contractors Monodelphous who went far and beyond our expectations of not only delivering an innovative, cost effective STP but backed it up with intense Operator training and support.

Special mention

- Project Manager – Sascha Kurz
- Site Foreman – Steve Tessman

7.0 REFERENCES

Unitywater Scientific and Laboratory Services
Unitywater Communications and Marketing.