Final Progress Report
Western Corridor Recycled Water Project: Stage 2

A Water Smart Australia Project
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Introduction

In 2007 the Commonwealth Government agreed to provide funding to the Western Corridor Recycled Water Project (WCRW Project).

This was the biggest water project attempted in Australia since the Snowy Mountains Hydro Scheme almost 50 years previously. It involved the construction of three advanced water treatment plants and a network of more than 200 kilometres of large-diameter pipe to produce purified recycled water using a world-first combination of microfiltration, reverse osmosis and advanced oxidation. This would secure the region’s water supply for years to come.

The National Water Commission provided the funding to project proponent, Western Corridor Recycled Water Pty Ltd (WCRW Pty Ltd) through the Water Smart Australia Program.

WCRW Pty Ltd, together with the 17 companies that constituted the five project alliances, delivered this complex and evolving project within just two years – an incredible achievement.

With construction completed this Final Report evaluates the benefits and outcomes of the project and its effectiveness in achieving its original objectives.

This document also evaluates the success of the project in achieving the new objectives which arose as a result of a significant increase in scope.

We look forward to sharing our story with you.
Executive summary

In 2007 the Commonwealth Government provided $408 million in funding toward the construction of the Western Corridor Recycled Water Project Stage 2 through its Water Smart Australia Program.

The $2.5 billion WCRW Project is the backbone of the South East Queensland Water Grid and was delivered by Western Corridor Recycled Water Pty Ltd, a special purpose vehicle wholly-owned by the Queensland Government.

The Queensland Manufactured Water Authority, trading as WaterSecure, was formed as part of the restructure of South East Queensland’s water industry. WaterSecure took ownership of WCRW Pty Ltd and its assets, including the WCRW Project, in September 2009. It continues to own and operate the WCRW Project.

The WCRW Project is easing pressure on regional water supplies by producing an alternative water source for the region’s power stations and has the potential to supply industrial and agricultural users. It also provides an important safety net for South East Queensland, with the capacity to supplement the region’s drinking water supplies with purified recycled water. This safety net ensures that Australia’s fastest growing region will never repeat the experience of 2007 when residents faced the possibility of running out of drinking water within 16 months.

Stage 1 of the project focused on reducing pressure on the region’s drinking water supplies by providing an alternative water source for the Swanbank, Tarong and Tarong North Power Stations. These objectives were fulfilled and 25 billion litres of water was supplied to the region’s power stations from August 2007 to September 2009. Importantly, in providing this new water source for the region’s three major power stations, the WCRW Project also helped to secure the energy generation capacity of the region and network stability throughout Queensland.

Stage 2 of the project focused on increasing the capacity of the project from 66 megalitres of water per day to a maximum of 232 megalitres of water per day. It was envisaged that this additional water could be supplied to industrial and agricultural users, and used to augment potable water supplies in Wivenhoe Dam.

Capital Works

Under Stage 2 of the WCRW Project, the owner was required to complete the following capital works:

- Design and construct a large-diameter pipeline, two pumping stations and a balance tank at Mt Petrie to transport water from the Luggage Point and Gibson Island Advanced Water Treatment Plants (AWTPs) to the pumping facility at Bundamba.
- Design and construct a pipeline to transport water from the Lowood Balance Tank to Lake Wivenhoe via Logan’s Inlet.
- Design and construct an advanced water treatment plant at Luggage Point capable of producing 66 megalitres of water a day.
- Design and construct an advanced water treatment plant at Gibson Island capable of producing 50 megalitres of water a day (Note: This capacity was later expanded to include an additional 50 megalitres daily capacity, known as WCRW Project Stage 2B).
By 31 December 2008, the project team had completed the capital works originally planned for the project and the doubling of capacity at the Gibson Island AWTP. Not only was this a major feat in the fast-track construction of a major infrastructure project, it was also the first time that any project in the world had used a combination of the proven technologies of microfiltration, reverse osmosis and advanced oxidation to purify water.

Importantly, while time was the top priority in the delivery of this project the project team did not pursue this objective at the expense of all others. Instead, the team delivered significant additional value through:

- flexible plant design which accommodated innovations such as the doubling of capacity of the Gibson Island AWTP within the original footprint
- value engineering initiatives such as the removal of most anchor blocks from the Western Pipeline through improved route selection
- budget initiatives such as the engagement of an independent estimator and progressive agreement of Alliance contracts which resulted in overall savings of approximately $641 million from the initial Target Outturn Costs submitted by the Alliances
- procurement initiatives such as the use of Alliances and consultancies to procure highly skilled staff across a number of organisations, minimising project risk
- environmental initiatives such as the use of horizontal directional drilling under the Brisbane River, Aquarium Passage and Bulimba Creek, which minimised the environmental impact of the project and resulted in project savings of $20 million
- a focus on safety which saw the WCRW Project achieve a Lost Time Injury Frequency Rate which was a fraction of the industry standard, as little as zero on several significant elements of the project and
- proactive community engagement which resulted in minimal complaints and significant community investment through the WCRW Community Grants Program.

Not only did the owner deliver world-first technology in an extremely short timeframe, it did so in a way which met or exceeded every standard for infrastructure delivery.

Furthermore, the Luggage Point and Gibson Island AWTPs have been producing water which consistently meets the *Australian Drinking Water Guidelines* since construction was completed on 31 December 2008.
Achieving broader project objectives

The broader objectives of the Western Corridor Recycled Water Project, as stated in the Funding Agreement with the National Water Commission, were to:

1. Provide recycled water for one or more of the following purposes:
   a. The introduction of purified recycled water into Lake Wivenhoe as an emergency bulk water supply for potable consumption in South East Queensland
   b. Provision of recycled water for use at Swanbank, Tarong and Tarong North Power Stations to replace water drawn from the bulk potable supply (Wivenhoe Dam)
   c. Provision of recycled water for use by industry in the region (including the Australia Trade Coast) and
   d. To supply recycled water for agricultural use once satisfactory arrangements on reasonable terms are agreed with farmers in the Lockyer Valley when this water is not required for industrial, urban or other uses as determined by the Queensland Government.

2. Reduce nutrient loads into Brisbane and Bremer Rivers and Moreton Bay as a result of further treatment of treated wastewater.

With respect to the first objective, the Queensland Government has since revised its position on the timing of introducing purified recycled water to supplement the region’s drinking water supplies and as a result the WCRW Project has not yet been directed to provide purified recycled water to Wivenhoe Dam. Under the present policy this will occur when the region’s combined dam levels fall below 40 per cent.

Purified water has been delivered to the power stations as required under the regulation and to date 25 billion litres of water has been delivered that would otherwise have come from the region’s drinking water supplies.

With regard to the third and fourth objective, the responsibility for the sale and supply of bulk water in South East Queensland now rests with the South East Queensland Water Grid Manager. WaterSecure does not have authority to secure supply agreements with other parties but it is working with the Grid Manager to identify and secure potential customers for its product. WaterSecure is also contributing to the grid-wide commercial and legislative development which will allow potential customers to gain access to purified recycled water.

Discussions are in train with potential customers regarding the supply of water from the WCRW Project for agriculture. Commercial negotiations are currently underway between the South East Queensland Water Grid Manager, WaterSecure and these potential users to determine an acceptable price for the water.

Furthermore, a market scan has been conducted by the Queensland Government to identify potential industrial customers throughout South East Queensland. Discussions are underway with a number of potential industrial partners to investigate the opportunity to meet their water requirements.
In terms of nutrient reduction the project has achieved significant improvements. In the period from August 2008 to February 2009, of the water purified by the project, the mass of nitrogen was reduced by an average of 13 percent across the project. Phosphorus reduction was even more impressive at an average of 91 percent across the scheme.

This is an extremely positive result considering that scheme is not yet operating at maximum capacity.

In summary, the project has met all of the requirements of the regulated dates and is producing water which meets the *Australian Drinking Water Guidelines*. It has met all of the broader project objectives which could be fulfilled within the constraints of policy and the water market rules, and has made a significant contribution to improving the health of the region’s waterways.
Performance against construction objectives

Under Stage 2 of the WCRW Project, the owner was required to complete the following capital works:

- the design, construction and building works necessary to construct a 68-kilometre pipeline 1086mm in diameter to transport up to 166 megalitres per day of purified recycled water from the Luggage Point and Gibson Island AWTPs to the treated water pumping facility at Bundamba

- due to the scope change to increase capacity at the Gibson Island AWTP a pipeline was required to transport additional secondary treated wastewater from the Luggage Point WWTP to the Gibson Island AWTP for treatment

The Eastern Pipeline Alliance, comprising of AJ Lucas, Transfield Services, GHD, SunWater and WCRW Pty Ltd successfully delivered this element of the capital works project on time and on budget.

It involved constructing two pumping stations, a balance tank at Mt Petrie and laying 68 kilometres of large-diameter pipeline through one of Queensland’s most densely populated urban areas to transport purified recycled water from the Luggage Point and Gibson Island AWTPs in the east of Brisbane to the treated water pumping facility at Bundamba, located to the west of Brisbane.

The construction of this pipeline network was a huge challenge, involving more than 30 underground road and rail crossings and major crossings of the Brisbane River, Aquarium Passage and Bulimba Creek. It was during the river crossings that the ingenuity and expertise of the Alliance came to the fore.

Conventional pipe laying involves digging open trenches. To reduce the impact on the sensitive estuarine environment surrounding the Brisbane River, Bulimba Creek and Aquarium Passage the Eastern Pipeline Alliance used a trenchless technology called horizontal directional drilling.

Using this technique a pilot hole is drilled under the waterway using a remote controlled drilling head. The tunnel is progressively widened using a larger drill bit with each pass. The pipeline that will pass under the river is laid out on the other side of the crossing, welded into a single length and then pulled back through the tunnel and under the river.

In addition to the significant environmental benefits delivered through horizontal directional drilling this innovation also delivered $20 million in project savings.

Land access posed a major risk to the project schedule. To overcome this challenge the Department of Infrastructure and Planning, WCRW Pty Ltd land team, the Alliance land staff, design team and construction crews established a close, cooperative relationship and were in constant communication. Through this relationship, innovative design, flexibility from construction crews and award-winning community engagement, the Alliance was able to construct and commission the pipelines within the tight timeframes required by the regulation dates.

Safety was also a priority for the Alliance. Thanks to initiatives such as the ‘Come Home Safely’ campaign, which used images of workers with their families to help emphasise the broader impact of safety, the Alliance achieved a safety record of just 10 Lost Time Injuries (LTI) in over 1.8 million hours worked – well below the industry average.
In summary, the Eastern Pipeline Alliance managed significant project risks to achieve its objectives on time and on budget while preserving the surrounding environment, relationships with the local community and providing a safe working environment for its staff.
The design, construction and building works necessary to construct a 16-kilometre off-take pipeline to deliver purified recycled water from the Lowood Balance Tank to Lake Wivenhoe via Logan’s Inlet

as part of the additional scope, a 7.64-kilometre pipeline to supply water from Wivenhoe Dam to the Coominya Meatworks

The Western Pipeline Alliance, comprising McConnell Dowell, Abigroup, GHD and WCRW Pty Ltd, successfully delivered these elements of the capital works project.

The Alliance played a leading role in Stage 1 of the WCRW Project, laying more than 80 kilometres of large-diameter pipeline to deliver water from the new Bundamba AWTP to Tarong Power Station at Caboonbah. Stage 2 pipeline works focused on delivering the 16-kilometre pipeline which would transport water from the Lowood Balance Tank to Wivenhoe Dam via Logan’s Inlet. The Alliance also constructed a 7.64-kilometre section of pipeline from Wivenhoe Dam to the Coominya Meatworks to relocate the meatwork’s draw off point to a location approved by the Queensland Water Commission.

As part of Stage 2, the Western Pipeline Alliance delivered a complex telemetry system for the entire WCRW Scheme. This system is the backbone of the control system for the Scheme sending control signals over 200 kilometres between pump stations, advanced water treatment plants, five council waste water treatment plants and the power stations’ receiving tanks and dams.

Innovative design and value engineering saw considerable improvements made to the concept design. Through superior route selection the Alliance was able to remove the majority of sharp angles along the pipeline, minimizing the need for expensive concrete anchor blocks.

Productivity on the Western Pipeline Alliance was outstanding with pipe laying rates exceeding 4.5 kilometres per week and this productivity was achieved safely. The Alliance implemented innovative and proactive safety systems such as the use of the Safety Box Robot to protect workers in trenches and ultimately recorded an LTI Frequency Rate of just 0.95 per million hours worked.

Western Pipeline Alliance worked closely with Seqwater to construct the pipeline through the environmentally sensitive catchment area and the outfall in the sensitive dam receiving waters without incident. The rest of the pipeline was constructed in a manner that, in many instances, left the pipeline right of way in a condition better than it was when construction commenced.

The Alliance engaged closely with the community and local stakeholders through 96 kilometres of properties across a number of council boundaries and undertook restoration on the affected properties along the route. The Alliance also contributed to work on roads that were affected by construction, ensuring they were left in a significantly better condition than when the project commenced.

The construction team works closely with the WCRW land and environment team and the Department of Infrastructure and Planning to coordinate works, approvals and land acquisition in parallel to achieve the tight time frame. This highly unusually approach, whilst complex and challenging, was effective and instrumental in allowing the team to achieve the Regulation Date.

In summary, the Western Pipeline Alliance successfully managed the challenges of an evolving scope and schedule to deliver their sections of the Western Corridor Recycled Water Project Stage 2.
• the design, construction and building works necessary to construct an advanced water treatment plant adjacent to Luggage Point Wastewater Treatment Plant capable of producing 66 megalitres per day of purified recycled water

The Luggage Point Alliance, consisting of WCRW Pty Ltd, joint venture partners CH2MHiil and Laing O’Rourke, and sub-alliance partners Aurecon (formerly Connell Wagner) and Hatch, was responsible for the delivery of the Luggage Point Advanced Water Treatment Plant.

This cutting edge plant is one of only three of its kind in the Southern Hemisphere and the Alliance overcame the challenges of a tight delivery schedule and a riverside site situated below the flood plain to achieve its objectives.

Through the team’s strong commitment to the delivery of the project schedule, the Alliance designed, procured, installed and commissioned the Luggage Point AWTP, ready to commence its performance testing prior to the regulation date for Stage 2A works of 30 October 2008.

Under the Alliance model, the project will be delivered within the original budget without any contractual claims. This would be very difficult to achieve under any other form of contract, especially with the evolving scope and complicated process design involved.

Safety was managed successfully through strong leadership and a robust safety framework. In total the Alliance worked more than 1.1 million man hours and achieved a low LTI Frequency Rate of 2 – well below the industry average.

The project developed and implemented successful resourcing strategies which supported the on-time delivery of the project, including incentivised sub-contracts with key suppliers.

Industrial relations were managed effectively with just half a day lost through industrial action across the project. There were no breaches of the National Construction Code or the Australian Government Code of Compliance.

Communications and community engagement staff provided timely, accurate communication to affected residents and surrounding communities, with no complaints recorded against the project and strong relationships established with the neighbouring community.

The Scheme Operator and staff were effectively incorporated into the Luggage Point Team, adding significant value in terms of quality assurance.

The Luggage Point Alliance completed commissioning in accordance with the requirements of the Stage 2A regulation and provided water on the agreed date.

In terms of Project Finalisation, the Alliance has worked effectively with the owner’s transition team, taking a proactive position in establishing the requirements for handover and in preparing for handover.

After the project achieved its regulated dates the owner was required to undertake ongoing work in medium and long-range system testing to optimise system performance. This process is designed to identify any issue which might prevent the system from operating at its full design capacity throughout its intended lifespan.
This testing proved that the Luggage Point AWTP can produce 66 megalitres of water daily which consistently meets every quality specification, including the Australian Drinking Water Guidelines.

However, in order to achieve the specified production capacity the Alliance had to introduce chemically assisted solids removal in the pretreatment area during commissioning to overcome unforeseen settling characteristics of the raw water from the Luggage Point Wastewater Treatment Plant.

This change is not the Owner’s preferred solution because it is difficult to operate at maximum capacity, costs more to operate and there is potential to damage upstream equipment with an unintentional overdose of the settling chemical polymer.

The Alliance has subsequently agreed to augment the pretreatment infrastructure to provide a facility that has little or no reliance on chemically assisted solids removal. This will provide a plant that is cheaper and easier to run and has less risk of damaging downstream equipment.

This work, including the construction of two additional clarifier units, is underway and the Alliance expects to complete this project by early 2010.

In the meantime, the Luggage Point Advanced Water Treatment Plant is providing all of its water to the Tarong Power Station, contributing to the security of South East Queensland’s water and energy resources.
The design, construction and building works necessary to construct an Advanced Water Treatment Plant at Gibson Island Wastewater Treatment Plant capable of producing 50 megalitres / day of purified recycled water

The Gibson Island Alliance, consisting of Baulderstone Hornibrook, MWH, Worley Parsons, United Group Infrastructure and the owner, WCRW Pty Ltd, was responsible for the construction of the Gibson Island AWTP.

The Alliance was initially contracted to construct an AWTP with a capacity to produce up to 50 megalitres of water a day for Stage 2A which included the key processes of Actiflo Pretreatment to reduce both turbidity and phosphorous content, and microfiltration, reverse osmosis and ultraviolet disinfection to ensure 4 log virus removal and compliance with the Australian Drinking Water Guidelines. It also involved the stabilisation of water through the addition of lime and carbon dioxide.

There were a number of design innovations at this small footprint site. The first, and most significant was the innovative, value-driven design which enabled the plant to be readily upgraded to a capacity of 100 megalitre per day, a scope change which was subsequently authorised by the owner as Stage 2B. This upgrade was possible within the original site footprint as the hall was designed with capacity to house additional membrane units. As a result of the innovation Gibson Island Alliance capital cost per megalitre per day of production capacity is the lowest of the three treatment plants providing excellent value for money to the State.

The Alliance’s exceptional commitment to the schedule saw all work completed ahead of schedule. The 50 megalitre per day capacity required by 30 October 2008 was delivered in early October and the 100 megalitre per day capacity required by 31 December 2008 was delivered on 23 December 2008.

The Alliance completed its work without any significant industrial incidents and was compliant with the requirements of the National Code of Practice for the construction industry.

The small footprint available for the construction and tight time frame created a challenging safety environment with multiple concurrent activities occurring in tight working spaces. The Alliance was able to work through these challenges to complete the project within the required time frames with an injury frequency rate well below the industry average.

The plant successfully produced water which met the Australian Drinking Water Guidelines and achieved its 30-day performance test. The plant is currently configured to treat 50 megalitre per day to treat available flows from Gibson Island and Luggage Point wastewater treatment plants and the remaining 50 megalitre per day of capacity is ready to be bought in service at short notice, as and when required.

The Alliance is currently on track to complete the wrap-up of the project under budget.

Gibson Island has also been constructed with additional storage capacity and space for a separate pumping station to supply local industrial users in the Australia Trade Coast area and this facility will be commissioned to supply local industry within the coming months.

During the 90-day performance test, the Alliance altered the operating configuration of the plant in an attempt to optimise performance and inadvertently impaired the capacity of the microfiltration membranes. While the plant continued to produce water which met or exceeded the Australian Drinking Water Guidelines, the microfiltration units were unable to operate at full capacity.
The Gibson Island Alliance, in conjunction with the equipment manufacturer and WCRW Pty Ltd, undertook extensive testing and investigation to ensure they understood the cause of the failure prior to rectifying the issue. The Alliance, in conjunction with the owner, has now determined the appropriate operating configuration and damaged membranes are being replaced at the Alliance’s expense. As soon as this work is complete the plant will be put through additional testing so that it can return to its full capacity in readiness to meet demands from agricultural and industrial customers and to provide a climate-resilient water source for South East Queensland when the region’s dams hit the 40 per cent trigger level.
Performance against broader project objectives

Objective 1: Provide recycled water for one or more of the following purposes:

- The introduction of purified recycled water into Lake Wivenhoe as an emergency bulk water supply for potable consumption in South East Queensland
- Provision of recycled water for use at Swanbank, Tarong and Tarong North power stations to replace water drawn from the bulk potable supply
- Provision of recycled water for use by industry in the region (including the Australia Trade Coast) and
- To supply recycled water for agricultural use once satisfactory arrangements on reasonable terms are agreed with farmers in the Lockyer Valley, when this water is not required for industrial, urban or other uses as determined by the Queensland Government and is charged at least at short run marginal cost

The Queensland Government's policy is that purified recycled water will be introduced to Wivenhoe Dam if the region's dam levels fall below 40 per cent. As these levels are currently around 75 per cent it appears unlikely that this element of the project's 2007 objectives will be fulfilled in the near future. However, the project does have the capacity to fulfil this objective and therefore it provides a climate-resilient supply option for the people of South East Queensland. Moreover, the Queensland Premier has stated that if Traveston Dam is not approved, the Government may revisit the 40 per cent trigger level.

The WCRW Project aimed to reduce pressure on the region’s drinking water supplies, and to secure its energy generation capacity by providing an alternative water source for the Swanbank and Tarong power stations. Water was first provided to the Swanbank Power Station in August 2007 and to the Tarong Power Station in June 2008. In the period from August 2007 to September 2009 the project provided a total of 25 billion litres of water to the region’s power stations and continues to meet this need.

WCRW Project owner, WaterSecure, sees a significant opportunity in providing water to industry and agriculture. In conjunction with the South East Queensland Water Grid Manager and Brisbane City Council, WaterSecure it is currently engaged in discussions with a number of prospective customers including industrial customers from the Australia Trade Coast region such as Incitec Pivot and Boral, and with potential agricultural customers from the Lockyer Valley.

In order to establish healthy, ongoing relationships with agricultural and industrial customers, WaterSecure, together with the Water Grid Manager and the potential customers is:

- making appropriate commercial arrangements
- establishing a risk management framework to ensure that all public health standards are observed in the delivery, management and use of purified recycled water and
- determining the infrastructure which will be necessary to delivery water on a case-by-case basis and determining how this infrastructure will be funded.

Once these processes are complete WaterSecure looks forward to providing water to new industrial and agricultural customers, at the direction of the Water Grid Manager.
Objective 2: Reduced nutrient loads into Brisbane and Bremer Rivers and Moreton Bay as a result of further treatment of treated wastewater.

Western Corridor Recycled Water Project is only running at a fraction of its ultimate capacity but has already delivered promising results in terms of nutrient reduction across the scheme.

In the period from August 2008 to February 2009, of the water purified by the project, the mass of nitrogen was reduced by an average of 13 percent across the project or an average of 46 kilograms of nitrogen per day and almost 17 tonnes per year. This nitrogen would have otherwise been discharged to the region’s waterways.

Phosphorus reduction was even more impressive at an average of 91 percent across the scheme and as high as 93 percent at Luggage Point. This represented an average reduction of 394 kilograms of phosphorus daily or almost 144 tonnes of phosphorus per annum.

While the total nitrogen reduction is not expected to reach the maximum projections for the project until the project is operating at full capacity and a planned nitrogen reduction initiative is implemented, the total phosphorus reduction is already far higher than the 2007 Business Case projections, which only anticipated a maximum reduction of 60 per cent.

WaterSecure expects that such results will make a major contribution to improving ecosystem health and to the recovery of the environment of Moreton Bay from the previous decades of degradation caused by human activity in the region.

Three specific elements will combine in the future to provide even greater nutrient reduction in the region’s waterways:

1. **Achieving full production**
   Several factors determine whether the WCRW Project performs at its full capacity, namely the availability of treated wastewater, the legislative environment and customer demand.

   Due to the combination of these factors the WCRW Project is not currently required to operate at its full capacity. It is anticipated that the project will be required, and will have the ability, to operate at full capacity when:
   - volumes of treated wastewater available to the project increase through a relaxation in water use restrictions
   - the necessary commercial and legislative framework is in place and negotiations with potential customers are complete, allowing the WCRW Project to increase its production and provide water to new agricultural and industrial customers and
   - the region’s combined dam levels fall to 40 per cent, triggering the Water Grid Manager to order supply to Wivenhoe Dam.

   Once at its full capacity of 232 megalitres per day WaterSecure is confident that the project will achieve the nutrient reductions projected in the 2007 Business Case.

2. **Implementation of the Contaminant Release Reduction Strategy**
   Having delivered an extraordinary feat of fast-track construction, staff can now focus on optimising system performance, which will include reducing the volume of nutrients released in waste products from the water purification process. The project to reduce nutrients will be guided by the Contaminant Release Reduction Strategy and is expected to include developments in infrastructure to target Total Nitrogen reduction.
3. Collaboration with Wastewater Treatment Plants
The maximum potential benefit delivered by the project is constrained to a degree by the quality and quantity of treated wastewater provided by the region’s Council-owned wastewater treatment plants. The system functions more effectively with optimal quality source water and therefore WaterSecure hopes to collaborate with Brisbane City Council and Ipswich City Council in order to improve source control measures even further resulting in a greater overall improvement in water quality.

Objective 3: Depending on final management strategy for Reverse Osmosis Concentrate, diversion of metals and other toxicants may also occur.

With regard to the level of metals and other toxicants within the Reverse Osmosis Concentrate, limits are set in the licenses which require the licence holder (WaterSecure) to undertake toxicity testing in the event that trigger limits are met.

Diffusers at the discharge points release Reverse Osmosis Concentrate in small, measured quantities at different points in the river, preventing potentially harmful spikes in nutrient levels that might result from a bulk discharge without diffusion.

Additionally, a management strategy has been developed for Reverse Osmosis Concentrate, known as the Contaminant Release Reduction Strategy. This strategy details opportunities for further testing of metals and a review of emerging technologies which may assist in the further reduction of these compounds.

WaterSecure holds a membership to the Healthy Waterways Scheme which facilitates far-field monitoring regarding the long-term impacts of contaminant reduction.

Furthermore, licenses make provision for near-field and mid-field testing under the Receiving Environment Management Plan (REMP) to improve WaterSecure’s understanding of the positive and negative impacts on the Brisbane and Bremer Rivers and Moreton Bay.

Objective 4: Recycling water augments overland flows (e.g. in dams and weirs) which in turn reduces impacts of the supply system on aquatic ecosystems.

The Funding Agreement notes the potential for reduced impact of the supply system on aquatic ecosystems. While it would be reasonable to assume that a lower impact water augmentation project such as water recycling would have an overall benefit in comparison to the construction of new dams, such an impact would be difficult to quantify without extensive, whole of catchment studies over an extended period.

It is therefore impossible to measure the project’s effectiveness with regard to this objective at this time.
Objective 5: Construction of the WCRWP has potential to impact on the environment. This is being managed through Construction Environmental Management Plans and offsets for vegetation clearing.

The WCRW Project has been successful in its goal to reduce the level of nutrients being discharged to the region’s waterways and in doing so to improve the region’s environmental health.

In addition, sound environmental management policies and processes employed throughout the construction period ensured that there were no significant negative impacts on the local environment.

The environmental management strategy saw each of the five Alliances develop and implement a Construction Environmental Management Plan. The WCRW Project Environment team oversaw the implementation of these plans, worked collaboratively with the Alliances and regulatory agencies to minimise risk and proactively reported even minor environmental incidents in keeping with best practice. The performance of each Alliance was also independently audited to ensure best practice throughout the construction period.

The result is a net gain for the environment of South East Queensland.