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“Greening the Marthaguy”

Final Project Report

under the

Private Irrigation Infrastructure Operators Program

in New South Wales

This project report has been approved by the Board of Marthaguy Irrigation Scheme Pty Limited.

on 24th May 2012

Compiled by

Sustainable Soils Management

In conjunction with Marthaguy Irrigation Scheme Pty Limited

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This project was funded by the Commonwealth of Australia under the *Private Irrigation Infrastructure Operators Program* in New South Wales (PIIOP) which targeted rural irrigation water projects to acquire water and improve the efficiency and productivity of water use and management under the *Water for the Future* investment program.

The project helps secure a long term sustainable future for the Marthaguy district north of Warren in NSW and the Lower Macquarie Valley and it returned water to the environment including the Macquarie Marshes. The project addressed four priorities for the Marthaguy Irrigation Scheme and the broader community which are aligned with the key priorities of the *Water for the Future* program:

- taking action on climate change;
- using water wisely;
- securing water supplies; and
- supporting healthy rivers.



Photo 1. Marthaguy Irrigation Scheme pump station.

Executive Summary

The Greening the Marthaguy project is the culmination of 5 years work on behalf of the members of the Marthaguy Irrigation Scheme. It represents the changing of the guard for farming and natural resource management in the district. It brings the closing of one era of irrigated cropping in the Marthaguy area north of Warren in western NSW that saw broad scale development of land for irrigated agriculture during a period of reasonably high water availability. It is the beginning of a new era of intensive efficient irrigated agriculture concentrated in a smaller area and ready to adapt to the changes and challenges that lie ahead. It returns almost 5,000 ML of water to the environment to balance the books between environmental and extractive use of our scarce water resources, and does so in a way that promotes a more secure and viable local and regional economy with reliable employment and business prospects.

These outcomes have been achieved by the careful consultation and planning of the Marthaguy Irrigation Scheme with funding from both the scheme members and the Commonwealth of Australia.

"Greening the Marthaguy" has improved the long term viability of the scheme and its members and the Marthaguy district through an increase in water delivery efficiency to the remaining irrigator members of approximately 5 percentage points; provided a reliable and efficient stock and domestic water supply to irrigator and non irrigator members; and has returned 4,928 ML of water to the environment.

The project included a major rationalisation of the scheme and 15.5 km of supply channel have been pushed in and rehabilitated; and, 5 irrigation farms have been decommissioned. A 60 km piped stock and domestic supply has been built and commissioned providing members with stock and domestic water on demand. Management of the channel network has been improved by installation of a river gauge to monitor river heights, 2 channel gauges at strategic locations constantly monitoring channel height and a new base station and computer system improving both water delivery efficiency and labour efficiency on farm and for the scheme.

The Warren and regional economy has benefitted with a number of local businesses providing professional and construction services to the project. Capacity building of local businesses has helped develop their overall capability and range of services offered. The infrastructure works involved in the project required services of a number of local businesses providing a financial injection into the local economy.



Photo 2: Brolgas feeding alongside a private wetland in the Marthaguy area.

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2.0 Background

The predicted availability of surface water diversions in the Macquarie-Castlereagh region by 2030 is most likely to be a reduction of five percent compared to the current long term water availability (CSIRO Murray-Darling Basin Sustainable Yields Project, 2008). This figure represents the ‘best bet’ scenario investigated within the project, which looked at, *inter alia*, climate change and future development options within the catchment.

The possible reduction in water available for irrigation, and the emphasis on efficiency of water distribution, may see pressure applied to less efficient irrigation schemes to improve or cease operations. The Marthaguy Scheme is relatively efficient (average losses of 13.8%), compared to other off-river irrigation schemes in the Macquarie Valley, but losses in the last 20 years have averaged 2,600 ML per year indicating that the system can still be improved.

The likely low allocations in future years, and the introduction of free trading of irrigation water could have serious implications for the future viability of the Scheme and for its contribution to the wellbeing of the local community.

As the value of water increases, individual farmers will be faced with trade options. Decisions to permanently trade water off the Scheme will have far-reaching effects on maintenance and operation of the Scheme, and will increase financial pressures on those members remaining in a reduced water supply environment. ‘Exit strategies’ for permanent trades, while necessary for continued viability of the Scheme, may reduce the attractiveness of permanent sales or transfers out of the Scheme.

The Scheme has continually improved delivery efficiency by restructuring the scheme in the mid 1980’s to reduce the usage of the ephemeral Marthaguy Creek for transmission of water and replacing that section of the network with a purpose built supply channel; investigating sources of transmission loss and clay lining and impact rolling of leaky areas and; scheme management practices have focussed on operational strategies that improved delivery efficiency. These initiatives would cost in the order of \$12 to 15 million at today’s value and have been funded and managed by the scheme from its own resources.

The modernisation process presented an opportunity for the Scheme to review its objectives and resources, and to improve its efficiency and operation into the future.

3.0 Introduction

This final report for Marthaguy Irrigation Scheme details the journey that the scheme has taken to restructure and prepare its operation for the next 20 to 30 years. The report discusses the process of planning and consultation to develop an agreed modernisation plan, and then the establishment of an incorporated association to seek funds and manage the implementation of the plan on behalf of the members.

The purpose of the report is to provide a detailed account of the project and provide a record of the planning and implementation of the project objectives and project outcomes.

4.0 Key Objectives

Achieving a balanced scorecard for the Lower Macquarie Valley was the primary objective of the “Greening the Marthaguy” project. This was achieved by implementation of the Marthaguy Irrigation Scheme Modernisation Plan to achieve a balance of outcomes for all stakeholders. This is represented as follows:

The Environment <ul style="list-style-type: none"> <input type="checkbox"/> Use water wisely - Achieve demonstrable water savings. <input type="checkbox"/> Supporting healthy rivers – reduce water taken from river. <input type="checkbox"/> Take action on climate change. 	Scheme customers (farmers) <ul style="list-style-type: none"> <input type="checkbox"/> Secure water supplies for farmers, both for irrigation and other farm use in the face of climate change (preparedness). <input type="checkbox"/> Implement sustainable irrigated farming practices – long term profitability. <input type="checkbox"/> Support farmers decision to move away from irrigated farming practices.
Community <ul style="list-style-type: none"> <input type="checkbox"/> Supporting healthy rivers – community benefits. <input type="checkbox"/> Sustainable irrigated and other farming practices – employment, local economy, community sustainability. 	Scheme <ul style="list-style-type: none"> <input type="checkbox"/> Securing water supplies for scheme. <input type="checkbox"/> Improve efficiency of water delivery system. <input type="checkbox"/> Long term viability of scheme.

5.0 Methods used to Plan and Implement Changes

The modernisation of the Marthaguy Irrigation Scheme was conducted in 3 distinct phases including:

1. the development of an initial Modernisation Plan in 2008 and 2009 which consulted with all the members of the scheme and determined an agreed plan to modernise the scheme and improve the scheme efficiency. The Scheme participated in Irrigation Infrastructure Hotspots Assessment Project. Preparation of the Modernisation Plan was funded by the Scheme and the Commonwealth of Australia under the Irrigation Modernisation Planning Assistance program, and the Commonwealth funded the Hotspots program.
2. an application to Commonwealth of Australia under the *Private Irrigation Infrastructure Operators Program* in New South Wales (PIIOP) in November 2009 for the return of irrigation entitlement in return for funding for restructuring and the infrastructure works. An entity was established, Marthaguy Irrigation Scheme Pty Limited as the irrigation infrastructure operator to facilitate the funding and management. The Scheme self funded the PIIOP application.

3. signing of a funding agreement with the Commonwealth in August 2010, implementation and delivery of the restructuring and the infrastructure works project completed in March 2012.

5.1 Modernisation Planning

Modernisation Plan

The Modernisation Planning process included three steps to ensure that all members were consulted and that realistic options were researched and validated in detail which met the future needs of the members and was approved by the full membership.

The first step was to prepare a detailed description of the current scheme from the physical, financial, legal, social and operational perspectives. This included data on transmission losses already collected by the Scheme, which included EM31 surveys of separate sections of 14 and 8 km of the main channel collected in 1995 and 2003 respectively, supplemented by test pits and point measurements of seepage taken in 2004.

Options to modernize the scheme were presented to members at a meeting in 2009, and the meeting debated and discussed a number of alternate options and detailed estimates of water savings. The complete list of options was then circulated to all members. A second meeting of members selected five options for further evaluation and costings.

The second step was an evaluation of the impact on Scheme performance of the 5 options that were selected from the first step. This information was then presented to Scheme members, where the options were further prioritized for detailed assessment.

The third step was to prepare detailed engineering design and costing of the prioritized options. The results of this step were presented to a fourth meeting of Scheme members where the scheme voted to reduce the total length of the channel network and decommission the channel below Merenele Weir, install a piped stock and domestic system and install equipment to improve channel management.

The aim of the modernisation plan was to *“restructure Marthaguy Irrigation Scheme to reduce transmission losses by 5% of volume pumped in average years”*.

Hotspots Program

The Irrigation Infrastructure Hotspots Assessment Project (Hotspots Project) was a compulsory component of the Modernisation Planning process. The Hotspots Project used a consistent and science-based approach to identify the nature, location and amount of water losses (known as hotspots) in existing channel and piped irrigation delivery systems across Australia. A hotspots assessment is an important means by which an irrigation operator can support an infrastructure investment proposal. A hotspots assessment should also assist the Australian Government assess the integrity of Modernisation Plans.

Hyder Consulting undertook a Desktop Review of Hotspots on the Marthaguy Irrigation Scheme.

5.2 Establishment of Marthaguy Irrigation Scheme Pty Limited

Marthaguy Irrigation Scheme Pty Limited (MIS P/L) was set up on behalf of the members as the irrigation infrastructure operator for the Scheme. Shareholding of the new entity was derived from the Deed of Constitution of Marthaguy Irrigation Scheme. Seven shareholder directors were appointed to the Board of MIS P/L by the members.

MIS P/L prepared an application under the PIIOP in NSW and was successful in securing funding of up to \$9,407,190 in return for the relinquishing of 4,928 ML of water to the Commonwealth.

5.3 Implementation of the Modernisation Plan and Infrastructure Works Project

A Sub-Committee consisting of the Chairman of the Board and 3 directors was appointed by the Board to manage the implementation of the modernisation plan and the funding agreement between the Scheme and the Commonwealth. Sustainable Soils Management (SSM) was appointed project manager to manage the project on behalf of MIS P/L.

The project commenced in August 2010 following signing of the funding agreement between the Commonwealth of Australia and MIS P/L and has taken 20 months to complete.

6.0 Outcomes

6.1 Outcomes from the Modernisation Plan

The purpose of the plan was to provide an analysis of the Marthaguy Irrigation Scheme, its strengths and limitations, and to provide options for its improvement. The report assisted members in making decisions on the future development of the Scheme. The major aim of the report was to lead to the restructure of the Marthaguy Irrigation Scheme to reduce transmission losses and adapt to climate change.

The report and its development were funded by the Australian Government and by the Marthaguy Irrigation Scheme. The report was developed according to the requirements for modernisation plans as provided by the Department of Sustainability Environment Water Population and Communities (DSEWPAC).

Scheme Description

The Marthaguy Irrigation Scheme is located in the Macquarie Valley of NSW, 33 km north of Warren. It pumps water from the Macquarie River 4 km above the Marebone Weir pool. The main channel runs roughly parallel to and 6 to 26 km north of the Macquarie River for 62 km, including 17 km of Marthaguy Creek bed.

The Scheme supplies general security water and stock and domestic water to 19 members, 12 of whom irrigate approximately 6,200 ha of land on 18 properties. The Scheme holds 18,598 ML of general security entitlement, and 313 ML of Stock and Domestic, with no separate loss account. In 2009 there were 6,831 ML of additional licence, or ‘parked water’, attached to the Scheme. This water does not pay an operating and maintenance fee until it

is pumped. In addition to this members are allowed to purchase temporary water on the open market and bring it onto the Scheme to supplement their Scheme entitlement. Through this process, the Scheme has pumped up to 40,114 ML in a year, more than twice its entitlement. The Macquarie system has traditionally had large volumes of temporary water available for purchase. This has enabled several members to irrigate much larger areas than their licence would allow. This practice makes it difficult to predict the quantity of water the Scheme will pump in the future.

Self-mulching clay soils occupy most of the irrigated area. They are well suited to irrigated annual summer crops such as cotton, sorghum and corn as well as winter crops such as wheat, barley, canola and chickpeas. These soils are not suited to irrigated perennial tree cropping due to their susceptibility to water logging. Most farms, however, along the Scheme have access to areas of well-drained red soil that would be well suited to drip irrigation and a variety of horticultural crops.

Until recently water could not be taken out of the Scheme. Recent changes to legislation, requiring all water to be tradable, now apply to the Marthaguy Scheme. These changes could spell the end for systems like Marthaguy if such schemes cannot be improved.

Irrigation water losses over 18 years of pumping from 1989/90 to 2006/07 have averaged 13.8%, or 2,573 ML. There has been no relationship between volume of water pumped and level of loss, ie. % loss has not varied with volume pumped. In years of low allocation, 'block watering' masked some of the Scheme losses as, often, only 1 in 3 ML taken by irrigators was used on crops, the other 2 went into farm storages where losses were expected to be higher.

Several investigations into Scheme water losses have been undertaken which have provided a large amount of data on which to base decisions on actions to reduce the losses. EM31 surveys in 1995 and 2003 have indicated some leaky areas in the first 8 km of channel, and between 22 and 29 km from the pump. Infiltration and point seepage tests in 2004 revealed areas of abandoned river channels in this latter zone (Hulme, 2003). Some of these areas were clay lined or roller compacted to reduce losses.

Climate change modelling by the CSIRO has predicted a slight reduction in total rainfall with a shift toward summer dominance. Variability is predicted to increase. The predicted availability of surface water diversions in the Macquarie-Castlereagh region by 2030 is most likely to be a reduction of five percent. These factors combined indicate the need for a system capable of delivering both large and small volumes of water which is quite manageable if improvements are made to the delivery system.

Twenty six options for modernising the Scheme were put to members on 23rd June 2009. At the second meeting of members on 20 August, 2009, five options were selected for costing in more detail. A third meeting on 12th November, 2009 decided that both Options 7 and 22, entailing decommissioning above Merenele Weir and installing a piped Stock and Domestic water supply, would be pursued.

This was costed at approximately \$5.4 million and would save about 2,030 ML per annum at 100% allocation. An additional 2,842 ML general security water and 810 ML of high flow licence was offered for acquisition by

the Commonwealth, valued at \$4.4 million, and a further 68 ML of Stock and Domestic water valued at \$480,000 was proposed to be returned to State Water.

Funding for Options 7 and 22 was sought by Marthaguy.

Challenges and issues faced by the Scheme and the community.

The Marthaguy Scheme provides opportunities to diversify farm enterprises that are located away from the river, thus providing employment and cash flow into the local economy. In the past the Marthaguy Scheme has been directly responsible for the employment of up to 30 full time positions on farms. Most of these staff lived in the town of Warren or on the farms that surround it.

The town of Warren is heavily dependent on the irrigation industry. In 1997, 50.3% of its agricultural production was from irrigated summer crops, compared with 31.0% for Narromine (Powell and Chalmers, 1999). There has been a large reduction in economic flows in Warren because of reduced cropping due to low water allocations and changes in cropping practices (Measham *et al*, 2006). Normally cotton gins operate for three months with 2 to 3 shifts per day, which has declined to none in 2008. This has reduced the household incomes of Warren families who relied on this supplementary seasonal work.

The lack of seasonal work has decimated the influx of up to 500 itinerant workers, and affected caravan parks, hotels and other services. The population of Warren has declined by 447 between 2001 and 2006 (Powell 2008, Powell pers. comm.).

Because of the drought there has been no new irrigation development or upgrades of older layouts. This has severely affected the local earthmoving industry.

Cotton varietal change, new technology reducing the number of pesticide applications and the decline in area grown has also affected aerial and ground spray contractors.

The irrigation industry directly employed 90 people in the 2005/06 year; another 95 were employed in flow-on 'effects', which multiplied the \$40 million value of the cotton crop to \$93 million for the Warren economy (Powell, 2008). In 2005/06 the cotton crop was less than half the value of the 2000/01 crop of \$88 million.

Should water allocation return to 100%, some 3000 ha of cotton would be grown on those farms remaining part of a modernised Marthaguy Scheme. At an expected gross return of \$5,000/ha, this would represent \$15 million gross value, and with local flow-on effects described by Powell (2008), would total approximately \$37 million injected into the Warren economy from Marthaguy cotton alone.

Although some operators indicated they would sell their water if prices were attractive enough and they can still be serviced for Stock and Domestic requirements, there were issues or barriers to overcome. These include the adequacy of the water price to compensate for stranded assets including reduced value of the land itself; the legal issues in sales out of a co-held Water Access Licence; the provision of Stock and Domestic supplies; and

control of the supply channel through a property where someone exits the Scheme.

Conclusions

The Modernisation Plan identified that the Marthaguy Irrigation Scheme had operated relatively efficiently for 18 years as a supplier of irrigation water and Stock and Domestic (S&D) water. Scheme water losses have averaged 13.8% over this period. With low water allocations over the last five seasons, the supply of S&D water independently of irrigation flows has seen substantial increases in loss rates (up to 46% loss). The Modernisation Plan indicated that we could improve our deliver efficiency by approximately 5 percentage points through restructuring the scheme and installing a piped stock and domestic system.

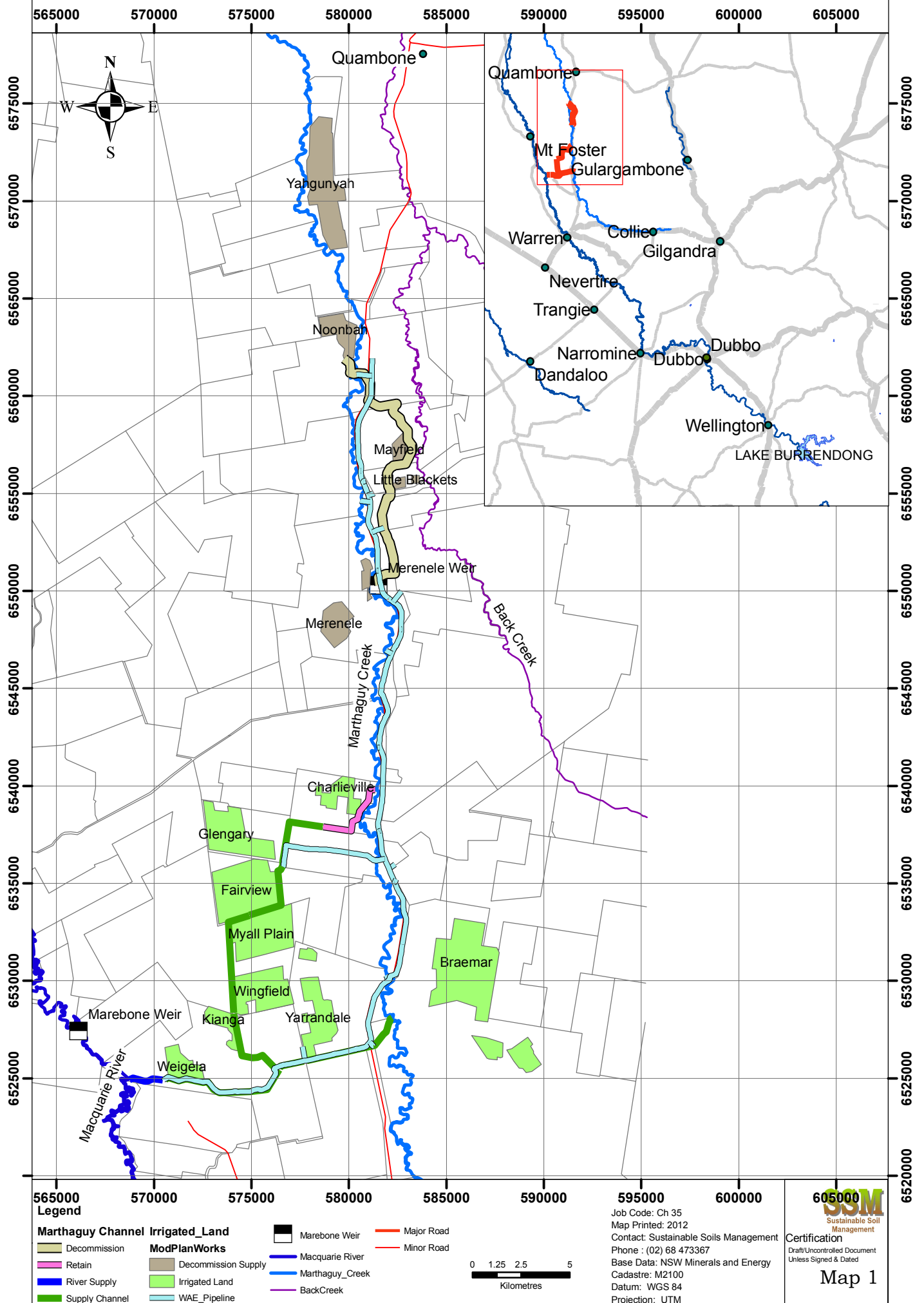
Restructuring of the Scheme included reducing the length of main channel to about 25 km in length, down from about 60 km which left some members stranded, with no irrigation and no S&D supply. These members were, however, prepared to decommission if they receive adequate compensation equal to \$430 per ML of entitlement and another form of Stock & Domestic supply (Map 1).

The new Scheme which will be 31.6 km in length, including the Braemar branch, will service 10 licence holders with 11,688 ML of licence and 5,731 ML of ‘parked’ water and 245 ML of Stock and Domestic water, representing approximately 560 ML/km of supply channel. This Scheme should achieve an efficiency of 91%, with losses of around 9%. This improvement will lead to a 13% increase in farm outputs and injections into local businesses.

The proposed new Scheme would secure the long-term viability of irrigation on the Marthaguy Irrigation Scheme. Should water allocation return to 100%, some 3,000 to 4,000 ha of cotton would be grown on those farms remaining part of a modernised Marthaguy Irrigation Scheme. At an expected gross return of \$5,000/ha, this would represent \$15 to \$20 million gross value, and with local flow-on effects described by Powell (2008), would total approximately \$37 million to \$50 million injected into the Warren economy from Marthaguy cotton alone.

On the basis of instructions from members, detailed costings, estimates of water savings, and benefits to members and the local economy, the Marthaguy Irrigation Scheme Management Committee sought funding from the Australian Government to proceed with Options 7 and 22. These options would decommission the Marthaguy channel below Charlieville offtake and install a piped Stock and Domestic supply (Map 1).

Marthaguy Irrigation Scheme: Modernisation Works



Business Case

The Marthaguy Irrigation Scheme is well placed to balance the needs of the environment, support healthy rivers and undertake necessary changes to offer all members an opportunity to take action on climate change and use water wisely. This can be achieved by terminating the scheme below Charlieville Offtake and the installation of a piped Stock and Domestic supply system. This will require an infrastructure package costing about \$9.53 million, and will return 5,738 ML of water to the river. This water is made up of 2,086 ML of savings and 3,652 ML of water from decommissioned irrigators.

The members proposed to return to the Commonwealth all the savings as general security water. Additionally there were 2,842 ML of general security and 810 ML of high flow licence to be offered for transfer to the Commonwealth, with a value of \$4.4 million. This water was available as a result of decommissioning the channel. The proposal therefore, would return 5,738 ML of water to the Commonwealth for a total project cost of \$9.53 million, or \$1,656/ML.

Additionally, the Scheme proposed to add value to the above proposal by seeking from State Water a reduction of 68 ML in the Stock and Domestic allocation. This represented water savings from a new piped Stock and Domestic system. This water was not available for transfer to the Commonwealth but as it is genuine water savings and no longer being pumped it eventually ends up being returned to the river, thus meeting the Commonwealth’s key objectives of *Water for the Future*.

The Scheme would then have 11,688 ML of capacity, 5,731 ML of parked water, and 245 ML of Stock and Domestic water totalling 17,664 ML. A new loss account would be established by contributions from on-going members. The amount to be contributed to the new loss account would be determined by the new membership. The establishment of a separate loss account according to the recent ACCC guidelines for termination will provide for free trade and movement of water both in and out of the Scheme without greatly impacting on the viability of remaining members. The proposal will give Scheme members similar operating flexibility and efficiencies to riparian irrigators.

With 31.6 km of channel and an entitlement of 17,664 ML, the Scheme could pump 560 ML/km when pumping 100% of the allocation. It would therefore have the capacity to be a very efficient scheme in years of both high and low allocations, as there is a large volume of water over a small channel length.

The loss of members and water from the system does create issues with ongoing cost recovery due to less water to levy fees. Increasing both Operating and Maintenance and pumping fees is an option to generate additional revenue which will be offset to the member by higher delivery efficiency, and associated 13% increase in farm productivity (MIS PIOP Application Myall Plain case study).

Increased reliability and decreased losses give a greater incentive to bring extra water onto the Scheme. In the past temporary water has made up a large percentage of total water pumped. It is envisaged that temporary water

would continue to be a major contributor to operation and maintenance of the new Scheme.

Developed irrigation land in the remaining Scheme is approximately 4,500 ha. This area could possibly utilize up to 40,000 ML, which is equal to the amount pumped by the old Scheme in 2001/02. Additional water could therefore be brought onto the Scheme to the benefit of members and the community. The new Scheme should improve reliability of member operations and increase employment opportunities as indicated in Section 7.

It was envisaged that the project would take up to 9 months to complete. The current infrastructure, with minor improvements, such as metering and telemetry, was adequate to meet the future needs of the new Scheme members and management.

The channel crossings and structures installed 20 years ago are generally in good condition and expected to last much longer, with some requiring minor attention. The new meters are expected to last for 15 to 20 years before major repairs are needed.

The ongoing management of the scheme, including weed control, is likely to be simplified due to a reduction in total length of the Scheme, better metering and remote monitoring.

The return of 5,738 ML of water or about 20% of the total entitlements on the Marthaguy Irrigation Scheme provides a positive lead in supporting healthy rivers and addressing over allocation, whilst maintaining and improving the viability of the members and the local and regional economies.

The increased farm productivity leads to an increase in local business of 13% from reduction of water losses alone. This will increase substantially by bringing on extra water to utilize currently developed land. Full realization of this potential could inject \$50 million into the local economy.

This proposal clearly addressed the 4 key priorities of “*Water for the Future*”:

- Taking action on climate change;
 - providing a reliable irrigation supply system that can deliver lower flows efficiently.
- Using water wisely;
 - reducing losses both in the delivery system and on farm and allowing water to be used by higher value crops.
- Securing water supplies;
 - Securing water for the environment, the grazing industry and the irrigation community.
- Supporting healthy rivers;
 - Returning 5,670 ML of General Security entitlement and 68 ML of Stock and Domestic entitlement to the river.

And further provides a mechanism for rationalization of the Marthaguy Irrigation Scheme, and a viable and sustainable irrigation community.

6.2 Hotspots Program

The desktop review of the Marthaguy Irrigation Scheme was rejected and ignored by the Board as it did not reflect the true operation of the Scheme and offered no value to the Scheme during the Modernisation process.

6.3 Establishment of Marthaguy Irrigation Scheme Pty Limited

An incorporated entity Marthaguy Irrigation Scheme Pty Limited, was established to manage the modernisation of the Scheme and secure funding for the implementation of the Modernisation Plan.

Governance and Management of MIS P/L

Members of Marthaguy Irrigation Scheme hold shares in the Scheme as detailed in the Deed of Constitution of the Marthaguy Irrigation Scheme which determine the financial liability of each member to the Scheme and their respective voting rights. Voting rights are exercised on issues relating to the Deed of Constitution of the Scheme.

Marthaguy Irrigation Scheme Pty Limited (MIS P/L), a registered proprietary company in New South Wales, was the appointed Infrastructure Operator of the association of members known as the Marthaguy Irrigation Scheme. MIS P/L appointed a committee to run the Scheme on an annual basis, and a Project Sub-Committee to supervise the “Greening the Marthaguy” project.

Decisions regarding issues relating the Deed of Constitution of Marthaguy Irrigation Scheme were made by the members with voting rights determined by the deed. Decisions regarding the project were made by the Board and the project Sub-Committee. Sub-Committee members had equal votes regarding Sub-Committee decisions.

Marthaguy Irrigation Scheme Pty Limited Shareholding

There are 18,755 fully paid ordinary shares in the company held by seventeen irrigator members of the Marthaguy Irrigation Scheme (Table 1). Shares are held in proportion equal to the sum of the watered irrigation capacity and stock and domestic entitlement of each member in accordance with the Deed of Constitution of the Marthaguy Irrigation Scheme.

Table 1: Shareholding of Marthaguy Irrigation Scheme Pty Limited.

Shareholder	# Shares
*Beach, MJ	1920
Beltana (Warren Pty Ltd)	31
*Brennan, JN	1304
*Egan, PF	1944
Haddon Rig Pty Limited	1952
Hayden, EJ & MR	675
O'Brien, MP, JH, AL, JA	25
O'Brien, DJ	25
Oriel, DP	400
Perry, NW (Major) Pty Limited	1067
*Quigley Viewcott Pty Limited	1974
Simmons, JE & DM	980
*Turnbull, MT	620
*Whittaker, GS & NM	339
*Wild, JD	646
Wild, V	1304
Yahgunyah Cotton Pty Ltd	3549
Total Shares	18755

* *Company Directors*

Marthaguy Irrigation Scheme Pty Limited Structure

The company has 7 shareholder directors including a Chairman, Nick Brennan and Company Secretary, Glen Whittaker. The affairs of the company are managed by the directors and who meet on a regular basis to discuss and develop policy. The Board strives to reach a consensus during the decision making process. Each director has 1 vote.

The “Greening the Marthaguy” project included the implementation of the Modernisation Plan and the restructuring of the Scheme and was the major activity of the company during the past 20 months.

6.4 PIIOP Application and Funding Agreement

The original application by the Scheme to the PIIOP program was for the return of 5,728 ML of water for \$9.53 million to meet expectations and commitments to members. This application was made on the basis of unanimous agreement of the membership and detailed the funding costs and payment schedule.

The Funding Agreement between the Commonwealth and the Scheme was for funding up to \$9.41 million in return for 4,928 ML of water. The water that was not returned was 810 ML of water of unregulated water that was licensed under the 1912 Water Act and could not be transferred to the Commonwealth. The Funding Agreement included a payment schedule that deferred the final payment for the infrastructure, project management, and irrigation rights until the end of the project.

6.5 Greening the Marthaguy Project Structure and Governance

“Greening the Marthaguy” was an irrigation infrastructure project undertaken by MIS P/L. A Project Sub-Committee was appointed to liaise with the Project Manager and the Project Team throughout the project.

The structure and governance arrangements as detailed below were continued for the full extent of the project, other than once the decommissioning works had been completed and the tenders for the Stock and Domestic System had been called, Tom McKeon resigned as Project Operations Manager and the Principal Project Manager assumed that role.

Project Sub-Committee

The Project Sub-Committee was appointed by the Board and consisted of the Chairman, Nick Brennan; Secretary, Glen Whittaker; and 2 other directors Mark Beach and Peter Egan. The Sub-Committee met regularly as needed and often weekly, to discuss details relating to “Greening the Marthaguy” project. It was responsible for ensuring that all obligations under the funding agreement, project milestones and compliance issues were met. The Sub-Committee monitored progress of the project against the work plan and budget, monitored and evaluated project risks on a weekly basis. The Sub-Committee developed policy and gave direction to Project Manager on at least weekly basis. The Sub-Committee was responsible for assessing tenders and making recommendations to the board to determine successful tenders based on technical, compliance, financial and geographic criteria detailed in each tender. The Sub-Committee reported to the board of directors (Figure 1). Chair of the Project Sub-Committee was the key contact for the Department of Sustainability, Environment, Water, Population and Communities (DSEWPAC) regarding matters of time, cost and quality.

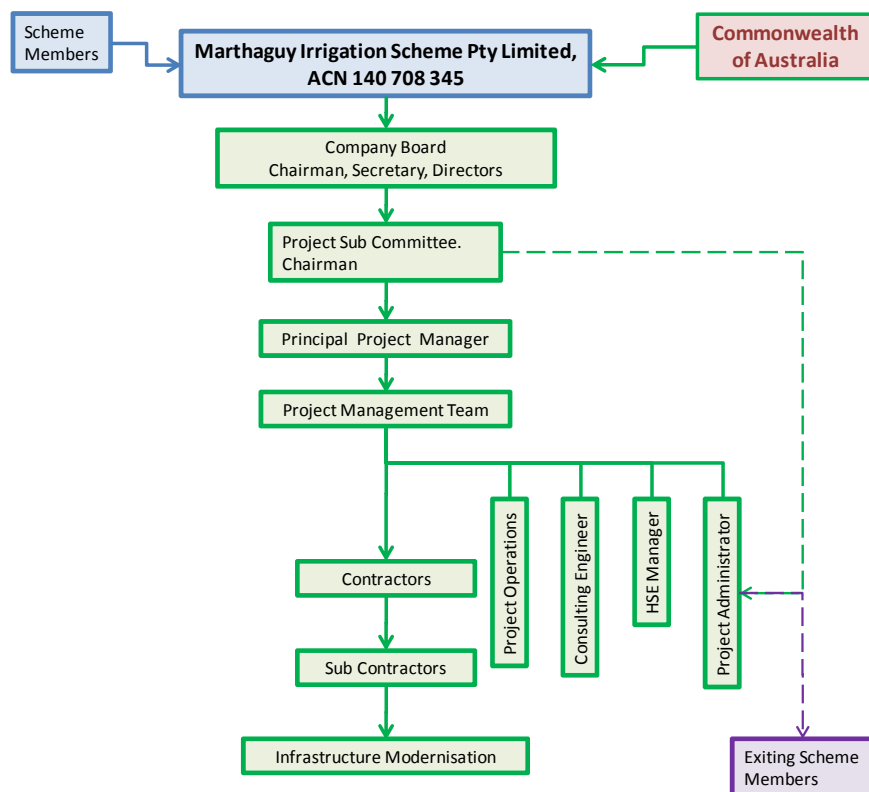


Figure 1; Structure of “Greening the Marthaguy” project.

Principal Project Manager

Sustainable Soils Management (David Duncan) was appointed as Principal Project Manager responsible for ensuring that the project ran smoothly and oversaw all aspects of the project including management of project risks, adherence to all obligations under the funding agreement, meeting project milestones, ensuring compliance issues were addressed, ensuring Health, Safety & Environment (HSE) policies were implemented, ensuring that MIS P/L policies were implemented, monitoring and evaluating progress against the work plan and budget, and overseeing administration of the project and approval of progress claims. The Principal Project Manager reported to the Project Sub-Committee on a weekly basis and the Project Sub-Committee Chairman on a daily basis or as needed.

The Principal Project Manager was also responsible for communication with the DSEWPAC, on all routine matters as they appeared in the Funding Agreement, including milestones, water transfer arrangements, invoicing, budget, risk, communications and stakeholder management.

Legal Advice

Doug McKay representing Lovett & Green Solicitors was the legal advisor for the project providing legal advice related to:

- funding agreement arrangements,
- environmental, works (and other) approval processes,
- transfer of unencumbered entitlements to the Commonwealth.

Direct communication between the legal advisor and the DSEWPAC occurred when it was approved by the Project Sub-Committee and generally related to water transfer arrangements.

Project Management Team

The Project Management Team consisted of a Project Operations Manager, Consulting Engineer, HSE Manager, and a Project Administrator. The team met on a regular basis to ensure that policies and procedures were implemented and the project progressed smoothly, and monitored and evaluated project risks so that risks were avoided or minimised.

Project Operations Manager

McKeon Associates (Tom McKeon) acted as Project Operations Manager and was responsible for management of all infrastructure works, including development of the Works Plan and budget, implementing site management and OH&S policies, development, issuing and review of tender documents. The Project Operations Manager regularly discussed and inspected works with contractors monitoring progress and evaluating project risks, and approval of “practical completion” of decommissioning works. Once the decommissioning works had been completed and the tenders for the Stock and Domestic System had been called, Tom McKeon resigned as Project Operations Manager and the Principle Project Manager assumed the additional tasks. The Project Operations Manager reported to the Principal Project Manager.

Brian Kentwell (Marthaguy Irrigation Scheme Channel Manager) was appointed by MIS P/L as Field Operations Supervisor for the project and was

responsible for implementation of all site management policies. He regularly met with the Project Sub-Committee and Principal Project Manager to discuss works and project risks. He held regular meetings with contractors and sub contractors inspecting works to monitor and evaluate project risks, and review progress of works against milestones. He reported to the Principal Project Manager and the Scheme Chairman.

Consulting Engineer

Aquatech Consulting (Jim Purcell) acted as Consulting Engineer and was responsible for approval of design and specification of the Stock and Domestic system. Jim undertook a technical assessment of the tenders and advised the Project Sub-Committee of the merits and shortcomings of the preferred tender and the alternate tender. During construction and at the completion of the pipeline the Consulting Engineer inspected and reviewed the construction and testing to ensure that all conditions and specifications were met and to certify construction. He reported to the Principal Project Manager.

HSE Manager

McKeon Associates (Jason Crooks) acted as HSE manager and was responsible for management and implementation of OH&S policies. The HSE manager developed the project HSE management system documentation and advised management and site personnel of project HSE compliance to ensure that MIS P/L complied with its Duty of Care requirements. He reported to the Principal Project Manager.

Brian Kentwell (Marthaguy Irrigation Scheme Channel Manager) was appointed as OH&S Officer for the project and was responsible for implementation of all site management and OH&S policies. He provided induction to contractors, ensuring an Authority to Commence Work (ATCW) was completed by each contractor, monitored compliance to OH&S policies, conducted and implemented Job Hazard Assessments (JHA) and ensured all incidents were documented and reviewed. He reported to the HSE Manager.

Project Administrator

Sustainable Soils Management (Kerry Duncan, CPA) acted as Project Administrator and was responsible for financial administration of the project including record keeping, preparation of accounts for payment, preparation of financial statements for the Project Sub-Committee and preparation of Business Activity Statements for approval by the Sub-Committee for lodgement. Financial accounts and records were kept up to date and at a high standard to allow regular review by the Project Sub-Committee and Project Management Team. She reported to the Principal Project Manager.

Financial Management Arrangements

The finances of the project were kept in one of two accounts at the Commonwealth Bank in Warren dedicated entirely to the project. These accounts were used to receive all monies relating to the project and make all payments relating to the project.

The finances of the project were managed by the Project Administrator, who maintained all financial transactions in the accounting package QuickBooks Premier Edition 2010-11 and QuickBooks Premier Edition 2011-12 and

provided regular up-to-date financial statements to the Project Manager and the Project Sub-Committee on an at least monthly basis.

The Project Administrator prepared all claims and accounts for payment in a prompt manner ensuring all claims were approved by the Principal Project Manager and the Project Sub-Committee Chairman prior to payment. Payments were made by cheque from the bank account, with cheques requiring the signature of two directors.

Financial auditing of the project was undertaken by WHK in Dubbo.

6.6 Project Stakeholders

This project had direct impact on scheme members and their farming businesses, the local community and regionally. It involved contracting of services from the irrigation, earthmoving and construction industries along with professional advisors and consultants. The Commonwealth Government was a significant stakeholder as it invested a large sum of money to allow the project to proceed and to ensure the project ran smoothly and was completed.

Stakeholder analysis

The Marthaguy Irrigation Scheme was a direct beneficiary of the project. Members of Marthaguy Irrigation Scheme hold shares in the Scheme as detailed in the Deed of Constitution of the Marthaguy Irrigation Scheme which determine the financial liability of each member to the Scheme and their respective voting rights. Voting rights are exercised on issues relating to the Deed of Constitution of the Scheme. Members of the Scheme are kept informed of the progress of the project with regular reports from the Project Sub-Committee Chairman.

The Modernisation Plan and Private Irrigation Infrastructure Operators program (PIIOP) application were unanimously endorsed by all members. There were no conditional agreements entered into by any members.

Members exiting as a result of this project expressed a clear need for the Stock and Domestic supply system as an essential sub-component of the project.

No Scheme member expressed direct interest in undertaking any of the sub-components of the project.

MIS P/L was the appointed Irrigation Infrastructure Operator of the Scheme. Directors of MIS P/L hold equal voting rights regarding Board decisions.

MIS P/L appointed a committee to run the Scheme. The committee manages the day-to-day operations of the scheme. Committee members have equal voting rights regarding committee decisions.

MIS P/L appointed a Project Sub-Committee to supervise the “Greening the Marthaguy” project. This Sub-Committee provided direction to the Project Manager and the Project Management team and reported back to the Board of MIS P/L. Decisions regarding operational aspects of the project were made by the Sub-Committee with each member holding equal voting rights.

The Commonwealth of Australia was the funding body for the project, and its interest to ensure that the project runs smoothly and meets the aims of *Water for the Future* are detailed in the funding agreement.

The Project Manager and the Project Management Team contracted by MIS P/L to manage the project invested significant time, energy and intellectual property into the project and maintained and improved their reputation as professional service providers.

Each sub component of the project provided a number of opportunities for local and regional businesses to provide services for the project through a tendering process. Tenders were assessed by the Project Management Team and the Project Sub-Committee based on technical, compliance, financial and geographic criteria detailed in each tender.

6.7 Development of the Work Plan

Project Risk Plan

The project included a number of sub-components and milestones and required the cooperation and commitment of all the stakeholders to ensure the project was completed successfully. Management of project risk was the responsibility of the Principal Project Manager with assistance from the Project Sub-Committee and the Project Management Team to monitor and evaluate project risks. Project risks were managed by prompt reporting of potential risks as they were identified, regular monitoring and evaluation by all members of the Project Sub-Committee and the Project Team, and intervention as required to insure that the risk was avoided or the impact minimised.

Communication Plan

The communication plan was developed to provide current and relevant information to appropriate stakeholders to ensure the project is delivered on time and to budget whilst meeting technical specification and expectations of scheme members, the Commonwealth and the broader community.

Marthaguy Irrigation Scheme continued to provide water to irrigators and stock and domestic members that remained on the continuing scheme whilst the infrastructure works were being undertaken. The operation of the scheme was totally independent of the infrastructure project.

The infrastructure project was managed by a Project Management Team that reported to the Project Sub-Committee (Figure 1). The Board of MIS P/L and the Project Sub-Committee determined policy and provided direction to the Project Management Team for implementation. All communication regarding issues arising from this project was directed to the appropriate persons via the appropriate communication channels identified in the detailed work plan.

The Project Management Team consisted of a number of people with a mixture of complementary skills to ensure the project was managed efficiently. This team provided a number of opportunities to ensure transfer of information and ideas to ensure that all stakeholders involved in the project had input into the project and were briefed on progress and issues arising whilst undertaking the project.

Review of Environmental Factors

A Review of Environmental Factors (REF) was undertaken to consider the impact of the project on the environment and in the context of various pieces of legislation which are designed to protect the environment.

The scope of the REF was for the decommissioning of the channel and installation of the pipeline on two types of land:

- land that is close to Warren Shire roads (closer than 10 m), and has been regularly disturbed for maintenance and construction of those roads;
- land which has been managed by the Marthaguy Irrigation Scheme for the purposes of providing bulk irrigation supply, including earthworks for maintenance and spraying for vegetation control.

As the project involved decommissioning of redundant channel and infrastructure; and the pipeline was able to utilise land which had regular disturbance, no new impacts or disturbance occurred from this activity. It was not deemed necessary to obtain any approvals under the following:

- The Water Management Act 2000, particularly the Macquarie River Floodplain Management Plan.
- Environmental Planning and Assessment Act 1979 NSW, the REF was intended to meet the duty of the scheme under the Act to consider the environmental impact (Sect 111) of the proposed works.
- Environmental Protection Legislation and Policy, *Environment Protection and Biodiversity Conservation Act 1999*, this Act has been considered with respect to Nationally Threatened Species and Ecological Communities; and Wetlands of International Significance.
- Conservation Legislation and Policy, Fisheries Management Act 1994 NSW.
- Warren Shire Local Environment Plan 2009.
- Aboriginal Heritage Assessment under the National Parks and Wildlife Act 1974.

The outcome of the Review of Environmental Factors was a list of recommendations, which were observed during the planning, construction and operation of the project (Table 2).

Table 2. Cultural and environmental issues and safeguards.

Issue	Implementation Stage	Safeguard	Outcome during the implementation of project
Aboriginal Heritage	Pre Construction	A high level assessment has been made of Aboriginal heritage, and the proposed site is believed free of issues.	No artefacts were found.
	Construction	Pipeline installers and earthworks contractors will be observant for detail of Aboriginal heritage and report and protect any such findings. The Local Aboriginal Land Council and MIS P/L are to be informed in the case of findings. Work shall cease if artefacts are found and the pipeline will be relocated.	
Erosion and Sediment Control	Pre Construction	Generally the alignment of the pipeline has been chosen to avoid land at risk of erosion, watercourses are avoided and plans are made to cross watercourses via existing structures.	Sediment control fence was installed when decommissioning the Merenele Weir structure. Pipeline trench was back filled the same day as excavation and compacted in susceptible areas such as creek banks to prevent erosion.
	Construction	Drainage lines and watercourses to be protected with sediment control fences until disturbed areas are stabilised. Areas of open trench to be kept to a minimum. Trenches backfilled and compacted in such a way as to prevent erosion of loose soil.	
Native Vegetation	Pre construction	Investigations were made of the site during the planning phase and no “at risk” native vegetation, was found. Typically the pipeline installation will occur on land which has been cultivated and/or cleared in the past.	The pipeline alignment was not varied from plans. Vegetation was not cleared for construction, grasses and ground cover were slashed rather than graded clear which has enhanced rehabilitation and recovery of ground cover.
	Construction	The proposed alignment for the pipeline is to be adhered to. The most likely risk to native vegetation is from equipment operating off the alignment, for access or other reasons. In all cases care is to be taken to avoid damage to remnant/native vegetation.	
Infrastructure	Construction	Contractors and installers are to make themselves aware of telephone, waterpipe and any public or private infrastructure which might exist on the alignment. Services exist such as Dial Before You Dig www.1100.com.au which contractors are to make use of.	No infrastructure was encountered or damaged during construction.

Project Approvals

Approvals were granted from the Warren Shire Council to install a buried pipeline along the shire roadway and to use shire infrastructure to cross water ways along the pipeline. Approval was granted subject to an on-site inspection, and where required Approval for a Crossing Across a Public Road was also granted.

Consent to install a buried pipeline along the Travelling Stock Route (TSR) was granted by the Central West Livestock Health and Pest Authority (CW LHPA). Approval was granted with the condition that the Scheme control weeds in the disturbed area for a period of 2 years after installation.

State Water was consulted regarding the decommissioning of the scheme offtake structure near Tenandra Weir (also known as Merenele Weir). The site was inspected by officers from State Water and they had no objections to our proposed works, and requested that a silt control fence be erected when works were being undertaken.

The local Aboriginal Lands Council was consulted and Mr George Riley conducted a survey of the proposed works and found no artefacts or marked trees.

Health Safety and the Environment

A detailed HSE plan was developed for the project by the HSE manager, it was a requirement that the organisation, proponents and sub-contractors all implemented the HSE plan. The Project Operation Manager (McKeon Associates) was responsible to ensure the HSE plan was diligently implemented and Brian Kentwell as Field Operations Supervisor and OH&S officer monitored daily OH&S procedures, recording and reporting of incidents.

Procurement Strategy

The Scheme considered a number of procurement methods including sourcing of services and materials by the Scheme, use of consultants to assist with procurement and management of contractors, the use of contractors with a responsibility of the contractors to assist procurement.

The Scheme decided to undertake three separate open calls to the market for quotes to undertake the following activities under the project:

- Decommissioning of redundant channels and infrastructure;
- Design and construction of the piped stock and domestic water supply system; and
- Design and construction of the telemetry and improved irrigation management systems in the irrigation water delivery channel.

MIS P/L sole sourced the provision of the following services:

- Principal Project Manager: Sustainable Soils Management who were selected because they were considered to have an intimate understanding of the project, the stakeholders, the issues concerning the project and the processes involved in managing the project. They are supported by an alliance of well qualified team members that met

the stakeholder objectives. Sustainable Soil Management has been associated with the project since its inception and their expertise has been an integral component of the project. They are locally based and had the capacity and capability to provide the services required. An Agreement of Costs contract was developed between SSM and MIS P/L that detailed tasks and fees associated with project management for the initial part of the project, then project management fees accumulated on a time cost basis.

- **Legal Advice:** Lovett & Green Solicitors was selected because they have an intimate understanding of the project and its requirements and provide continuity of advice for the scheme having provided advice to the scheme since the project commenced. They have developed expertise in water entitlement transfers and have a working relationship with regulatory authorities regarding water issues. Lovett and Green are locally based and had the capacity and capability to provide the services required. A Standard Costs Disclosure and Standard Costs Agreement were provided to the Secretary at the commencement of the project for all legal work.
- **Project Operations Manager:** McKeon Associates has been selected because they have a wealth of experience and expertise in management of irrigation projects and are familiar with the Scheme and its members and the requirements of the project. To reduce costs the scheme and McKeon Associates agreed that the Project Operations Manager role be dissolved once the tenders had been called and project planning had been completed.
- **Consulting Engineer:** Aquatech Consulting was engaged because they have an intimate understanding of the project, the stakeholders, the issues concerning the project and the processes involved in managing the project. Aquatech have been associated with the project since its inception and have the expertise in design and engineering certification of irrigation infrastructure. They are locally based and had the capacity and capability to provide the services required.
- **HSE Manager:** McKeon Associates were selected because they have expertise in design and implementation of HSE policies and procedures, and are familiar with the Scheme and its members and the requirements of the project.
- **Project Administrator:** Sustainable Soils Management was selected because they have expertise in financial accounting and they are actively involved in the management of the project. They are locally based and had capacity and capability to provide the services required.

Infrastructure Works Schedule and Works Plan

The project was planned to commence in August 2010 following signing of the funding agreement between the Commonwealth of Australia and MIS P/L and take 16 months to complete (Figure 2).

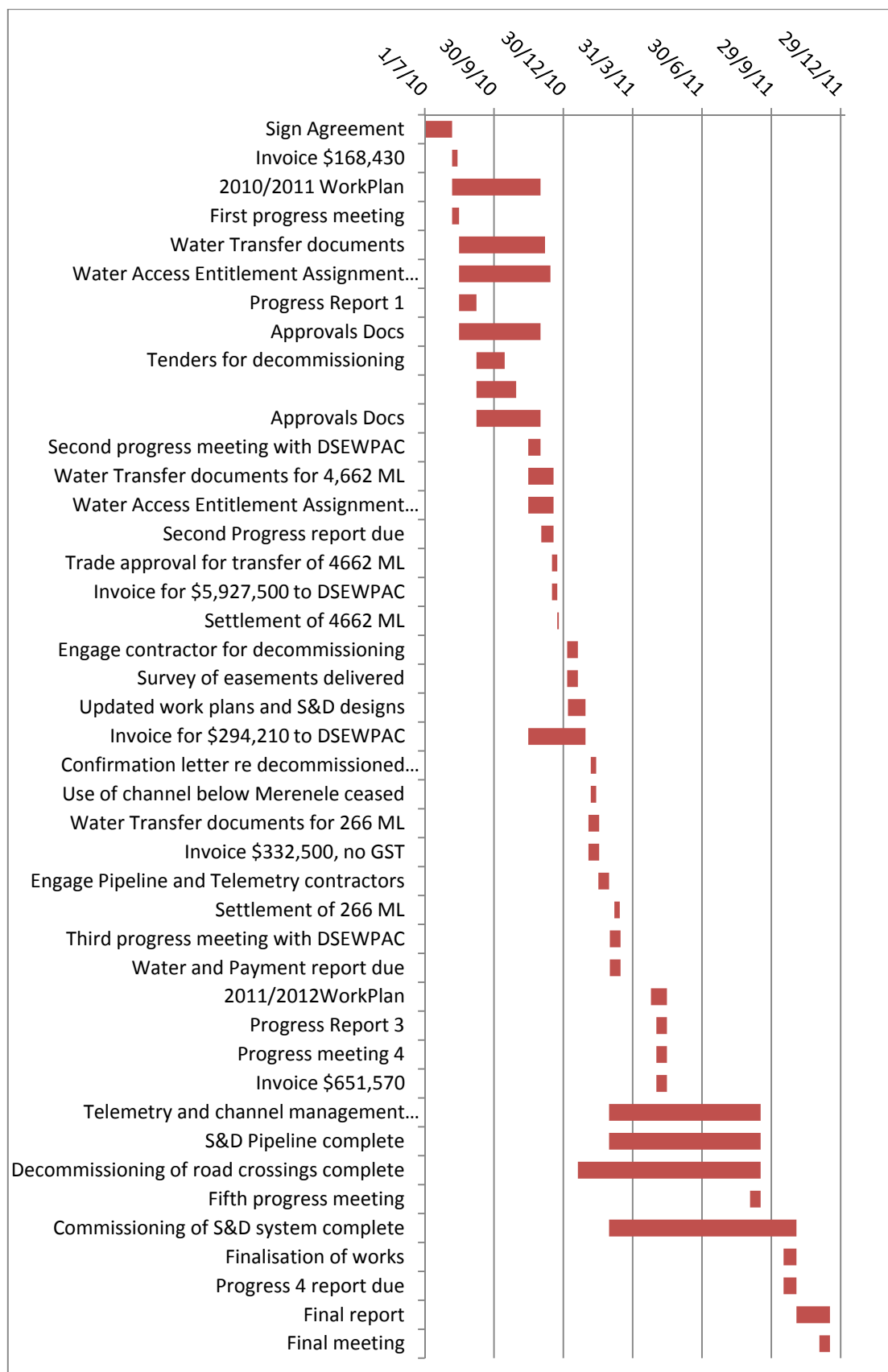


Figure 2. Schedule for delivery of key project outcomes.

Contractor Work Plans

Decommissioning of redundant channel and infrastructure.

A detailed works plan was developed by Kulkine Trust for the decommissioning of the redundant channel and infrastructure. This plan incorporated the contracting of 3 local earthmoving contractors to carry out the proposed works. It was envisaged that decommissioning would be completed by June 2011.

Installation of the Stock and Domestic Pipeline.

A detailed design and works plan was developed by Darling Irrigation for the installation of the Stock and Domestic Pipeline. This plan included the installation of a new pump station, approximately 60 km of pipeline and 23 outlets for scheme members. It included the installation of telemetry and remote monitoring and operation of the pumps. It was expected that the pipeline construction would commence in May and be completed by the end of August 2011.

Quality Assurance, Occupational Health and Safety Plan and Environmental Plans were included in the plans prepared by Darling Irrigation. A detailed site and task specific HSE plan was undertaken and provided prior to commencement of the works.



Photo 3. The garden and tanks at “Gerwa”, now supported by the Stock and Domestic pipeline.

6.8 Project Budget

The project was expected to cost almost \$9.45 million to implement commencing in September 2011 and taking 13 months to complete (Table 3). It was likely that the Scheme members be required to contribute about \$45,000 towards the completion of the project. The committee advised the membership of the anticipated call to fulfil this budget shortfall in December 2010.

Table 3. Budgeted expenses and revenue and project cash flow for the project.

Month	Works	Professional Fees	Water and infrastructure	Total Expenses	Commonwealth Funding	Scheme Contribution	Total Income	Balance
Sep-10	\$0	\$0	\$0	\$0	\$168,430		\$168,430	\$168,430
Oct-10	\$0	\$20,000	\$0	\$20,000	\$0		\$0	\$148,430
Nov-10	\$0	\$0	\$6,075,000	\$6,075,000	\$5,927,500		\$5,927,500	\$930
Dec-10	\$0	\$88,000	\$0	\$88,000	\$294,210		\$294,210	\$207,140
Jan-11	\$100,857	\$32,500	\$0	\$133,357	\$0		\$0	\$73,783
Feb-11	\$11,700	\$15,750	\$0	\$27,450	\$0		\$0	\$46,333
Mar-11	\$127,170	\$10,000	\$0	\$137,170	\$332,500		\$332,500	\$241,663
Apr-11	\$127,170	\$10,000	\$0	\$137,170	\$0		\$0	\$104,493
May-11	\$315,340	\$10,000	\$0	\$325,340	\$651,570		\$651,570	\$430,723
Jun-11	\$0	\$13,750	\$0	\$13,750	\$0		\$0	\$416,973
Jul-11	\$126,920	\$0	\$0	\$126,920	\$0		\$0	\$290,053
Aug-11	\$0	\$0	\$0	\$0	\$0		\$0	\$290,053
Sep-11	\$0	\$0	\$2,368,380	\$2,368,380	\$2,032,980	\$45,347	\$2,078,327	\$0
Total	\$809,157	\$200,000	\$8,443,380	\$9,452,537	\$9,407,190	\$45,347	\$9,452,537	\$0

6.9 Implementation of the Modernisation Plan and Infrastructure Works Project

Key outcomes of the project

"Greening the Marthaguy" has improved the long term viability of the Scheme and its members and the Marthaguy district through an increase in water delivery efficiency of approximately 5 percentage points to the remaining irrigator members; provided a reliable and efficient stock and domestic water supply to irrigator and non irrigator members; and has returned 4,928 ML of water to the environment.

The project included a major rationalisation of the Scheme and 15.5 km of supply channel have been pushed in and rehabilitated; and, 5 irrigation farms have been decommissioned. A 60 km piped Stock and Domestic supply has been built and commissioned providing members with Stock and Domestic water on demand. Management of the channel network has been improved by installation of a river gauge to monitor river heights, 2 channel gauges at strategic locations constantly monitoring channel height and a new base station and computer system improving both water delivery efficiency and labour efficiency on farm and for the Scheme.

The Warren and regional economy has benefitted with a number of local businesses providing professional and construction services to the project. Capacity building of local businesses has helped develop their overall capability and range of services offered. The infrastructure works involved in the project required services from a number of local businesses providing a financial injection into the local economy.

Key activities and outcomes of the "Greening the Marthaguy" project are detailed in Table 4 below.

Table 4. Key activities and outcomes of the "Greening the Marthaguy" project.

ACTIVITY	OUTCOME
Decommissioning the scheme below the Charleville off-take	<p>Approx 2,800 ML of water has been saved each year as a result of scheme productivity improvements in the past 2 years.</p> <p>Delivery efficiency has increased from 86% to 91%.</p> <p>The scheme can operate efficiently in low allocation years.</p> <p>As a result of the above, a more sustainable future for the Marthaguy irrigation community and the regional economy has been established.</p> <p>Efficiency and financial outcomes of scheme operations have been improved and are now sustainable and less subject to large fluctuations with water availability.</p> <p>Increased farm profitability and sustainability through better service delivery direct on farm.</p>
Establishment of Stock and Domestic pipeline	<p>Improved delivery efficiency of Stock and Domestic Water.</p> <p>Reliable, quality water on demand to meet stock requirements.</p> <p>Establish a more sustainable future for the Marthaguy grazing community and the regional economy.</p>
Implementing improved water management technology	<p>Use less water as a result of scheme productivity improvements.</p> <p>Efficiency and financial outcomes of scheme operations have been improved and are now sustainable.</p>
Transfer entitlements to Commonwealth	<p>4,928 ML returned to the Commonwealth Environmental Water Holder.</p> <p>Increase in river flows and improvement in river health.</p>

Infrastructure Works Schedule

The project commenced in August 2010 following signing of the funding agreement between the Commonwealth of Australia and MIS P/L and has taken 20 months to complete (Figure 3).

The project ran relatively smoothly from a construction perspective other than delays due to wet weather. Since the commencement of the works we have experienced a very wet period, a major regional flood and 2 minor localised flood events. Rainfall recorded during ten of the last 15 months has exceeded Decile 7 rainfall causing some longer than expected delays. None the less, we have endeavoured to keep to our schedule where possible.

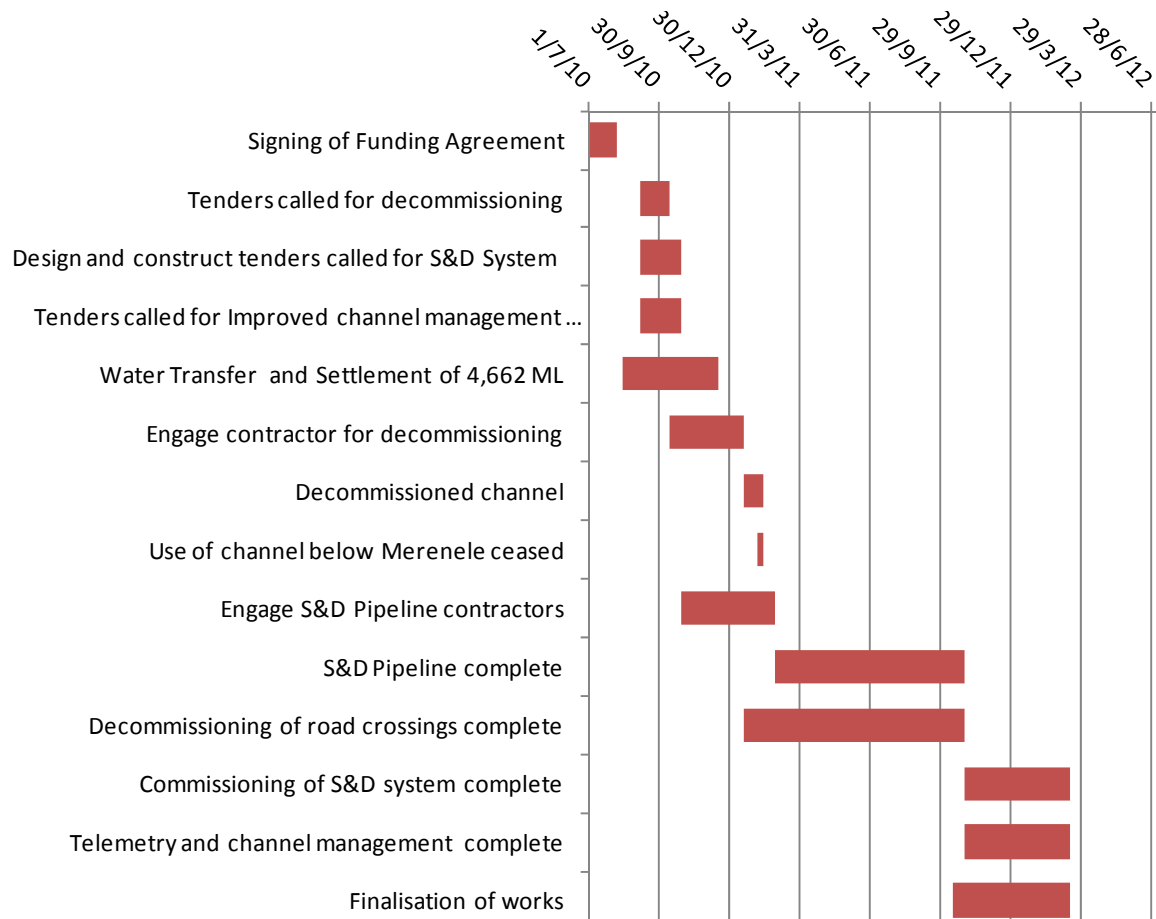


Figure 3. Timing of key project components.

Description of the outcomes from the various components

The project objectives have been achieved by implementation of the following:

1. **Transfer of 4,928 ML** of general security water to the Commonwealth Water Holder in return for \$9,407,190 in funding.
2. **Provision of Farm Restructuring** to 7 farms to allow them to make their irrigation development redundant and return their enterprises to dryland cropping and grazing, and restructure the financing of their businesses.
3. **Decommissioning the Scheme below the Charlieville off-take.**
Approximately 15.5 km of Scheme channel and that portion of Marthaguy Creek used to transmit Scheme water were decommissioned. The irrigation outlet gates at the Merenele Weir in the Marthaguy Creek were removed and the headwalls were blocked off and back filled with compacted clay.



Photo 4. MIS outlet gates at Merenele Weir before (above) and after (below) decommissioning and back filling.



Approximately 11.5 km of channel was filled in and compacted using an elevating scraper and 4.0 km of smaller channel was filled in using a grader. The outlets and pipes were removed. Regeneration of vegetation has occurred along the entire length of the decommissioned channel.

Approximately 2,000 ha of developed irrigation land, were returned to dryland cropping and grazing. Storages with a total capacity of approximately 3,700 ML and associated infrastructure are now redundant and have no connection to a source of irrigation water.

Members holding 6,848 ML of capacity exited the Scheme and the Scheme general security entitlement was reduced by 8,848 ML, approximately half of its original general security entitlement.



Photo 5. The MIS supply channel on the TSR along the Merrimba boundary, downstream of the Merenele Weir before fill in (above) and after filling in (below).





Photo 6. MIS channel through “Little Blacketts” prior to filling in and rehabilitating.



Photo 7. Local contractor, Kulkine Trust completed the filling in and compacting of the supply channel with an elevating scraper. Photo of channel in “Little Blacketts” after it was filled in.



Photo 8. Local contractor, Marty Oriel, adding the final touches to complete the backfilling of the decommissioned channel in “Little Blacketts”.

4. **Establishment of Stock and Domestic pipeline.** A Stock and Domestic scheme was established including the installation of a 60 km closed reticulated pipeline to provide access to water for Scheme members. The eight Scheme Members who lost Stock and Domestic water access as a result of decommissioning and an additional 7 of the remaining members were connected to the pipeline. The pipeline provides a regular flow of up to 20,000 l/day of water to each member through a pressure and flow controlled outlet located on their farm. Access to reliable Stock and Domestic water will support the sustainability of these farmers and facilitate restructuring of their farm enterprises and improve the reliability and flexibility of their Stock and Domestic supply. The continuing irrigator members will also have access to Stock and Domestic water via the irrigation channel. About one third of the Stock and Domestic water is delivered via the pipeline.



Photo 9. New Stock and Domestic pumps and control panel.

5. **Implementing the stock and domestic scheme** has generated substantial water productivity gains in relation to the Stock and Domestic water entitlements belonging to both those farmers on the decommissioned lower Scheme, and those remaining with access to the main supply channel.



Photo 10. Cattle grazing at “Mayfield” and watered with water delivered via the Stock and Domestic pipeline from the Macquarie River 45 km away.



Photo 11. Darling Irrigation Manager, Ivan Truscott demonstrating the operation of the outlets.

Members of the Scheme were required to supply at their own cost a tank to be connected to the pipeline for delivery of water. All costs associated with distribution of water downstream of the member's outlet have been met by each individual member. In some cases members have spent up to \$50,000 for the tanks, troughs, pipe, and installation.



Photo 12. John Simmons stands beside his 100,000 l tank that he installed after being connected to the new pipeline.

Historically, when Stock and Domestic water was pumped with irrigation water it incurred the same losses as irrigation water, of 13.8%. However on occasions when Stock and Domestic water was pumped via the Scheme without irrigation water, the losses have been substantially higher. A measured flow of this nature in May 2005, delivered 207 ML to members when 450 ML was pumped; a loss of 54 %.

The new pipeline has been operating for the past 6 months with no measurable loss.



Photo 13. Mark Robertson from Darling Irrigation flushes the pipeline at the Bullagreen Creek scour valve, 30 km downstream of the pumps during testing of the pipeline, with Chairman, Nick Brennan.

6. **Implementation of improved water management technology** has allowed the scheme to better manage water pumping activities, improve certainty of flows to scheme customers and deliver improved water productivity. The measures completed include:

Acquisition and installation of river level gauge. The flow of the Macquarie River can vary significantly and impact the efficiency of the Scheme. "Holes" in the flow (i.e. changes in river height") impact on pumping efficiency, the flow of water into the scheme and the flow of water onto fields. A movement in the river height of one metre can cause a 7% variation in pump flow. This fluctuation in pumping creates "knock on" effects along the supply channel often requiring the Channel manager to shut the channel down temporarily, creating additional losses in the channel and disrupting irrigation. A downward movement in river height will impact the flow of irrigation water on fields, resulting in decreases in irrigation water efficiency of up to 10%, through evaporation and deep drainage. It may also reduce crop yields through water logging once flow is restored. An upward movement in flow can cause a channel to blow out resulting in substantial water loss.

A river level gauge was installed and provides the Scheme Manager with appropriate river level warnings, allowing him to better manage scheme flows (Figure 4). As a result, Scheme members have had greater reliability and certainty of water flows.



Figure 4. River Gauge data displayed on the observant website.

Acquisition and installation of channel gauges. Just as the rise and fall in river levels can impact water efficiency, any change in flows within the Scheme channels impacts delivery efficiency and on farm delivery flow rates. Channel flows may vary as a result of “blow outs”, weir board management issues, blockage of channels with grass inflorescences that blow in from adjoining grassland, and irregular flows through off-takes. The impacts are similar to those noted above with changes to river flows.



Photo 14. North Branch weir and channel depth gauge.

Installation of two channel gauges at strategic locations has allowed early warning of irregularities to the Scheme manager, and allowed timely remedial action.

Acquisition and implementation of telemetry solutions. A new telemetry base station, using UHF links to the channel gauges and "3G" telephone connection to a remote server has monitored the new water level gauges and provided the Scheme Manager with up to date information and water level alerts. This has allowed him to identify water management issues remotely and respond to them in a timely manner, promoting improved water delivery efficiency and less disruption to irrigators and water loss on farm.



Photo 15. MIS Pumpshed and new telemetry base station including the 3 new C2e base station units (orange boxes) for data recording.

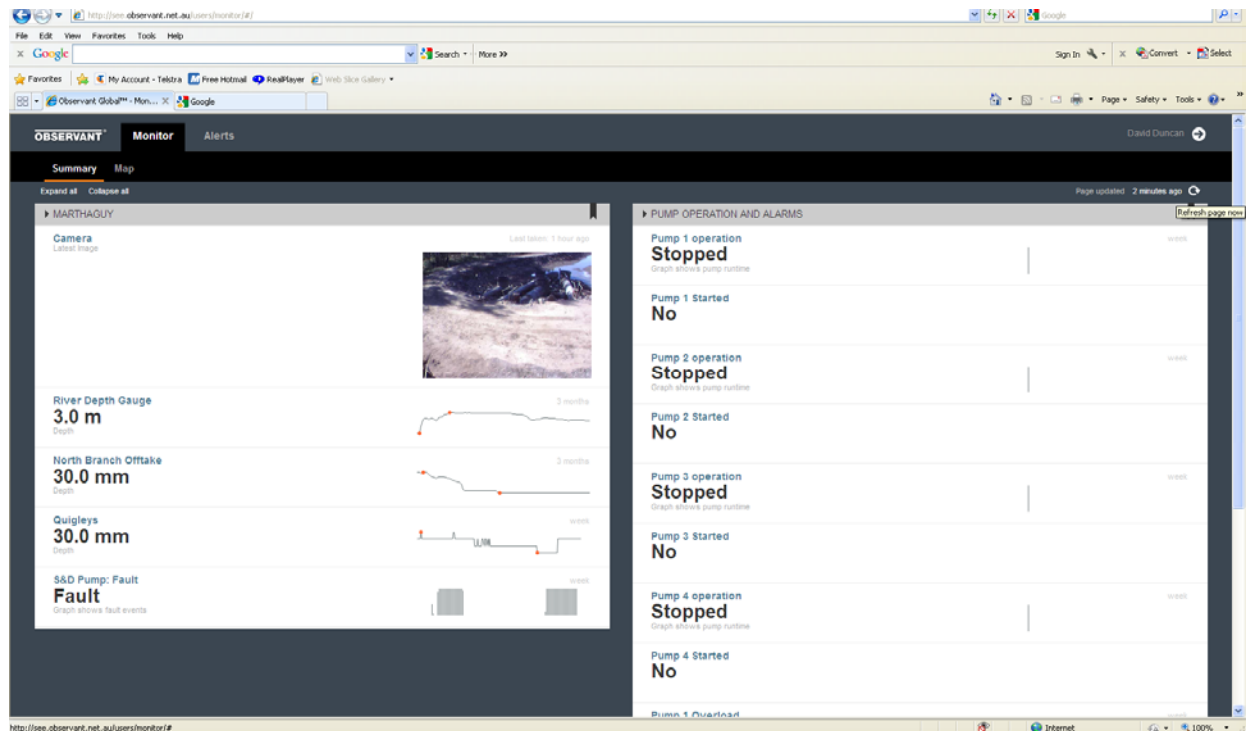


Figure 5. Scheme monitoring page hosted by Observant.

Acquisition and installation of updated metering at farm offtakes. The scheme previously had a range of water meters which measure water flows from the scheme to individual farms. The meters are the source of data for invoicing scheme members and are used to manage water efficiency. All metering was upgraded to MACE metering technology to improve water measurement and management practices.

6.10 Water Savings as a Result of Modernisation of the Marthaguy Irrigation Scheme

Introduction

Previous water studies indicated that scheme losses could be reduced from approximately 14% to 9% of water pumped. This reduction was estimated to largely come from savings in transmission losses (1,830 ML) when water is diverted to members via the Marthaguy Creek (Hulme, 2009) with additional savings from installation of a piped stock and domestic system and improvement in channel management. The scheme was asked to reaffirm the water savings at the start of the PIIOP modernisation project. These assumptions are validated by this analysis of losses for the past two seasons.

An Electro Magnetic (EM) survey of approximately 14 km of the Scheme channel identified sections of the channel that were likely to be leaky (CSU, 1995). As a result two short sections of channel were clay lined and a section of the channel was compacted with a roller. An EM survey in 2003 found that the first 8.0 km of channel was likely to contain some of the most leaky sections of the Scheme channel (Hulme 2003). Water losses are likely to be greatest in this part of the channel network as all of the water delivered by the scheme passes through this section. The decision by the Scheme not to line the leakiest sections of the channel network was challenged by reviewers of the Scheme’s PIIOP application during the planning and application process.

Methods

Estimating reduction in losses

Annual pumping data and loss data supplied by the Scheme for the 2010/11 and 2011/12 seasons were compared to data from previous seasons where the Scheme delivered water to members along its entire length, to determine the extent to which losses were reduced. The difference between total volume of water diverted and total volume of water metered at individual member outlets was considered as the total volume lost.

Estimating seepage from the supply channel

As a result of a recent stoppage in supply of water, the losses from a pondage test on the first 8.5 km of channel from the pumps to the North Branch offtake and the Marebone Road weir were calculated using a simple water balance. Data collected included daily fall in channel height as recorded by the new channel gauge installed as part of the PIIOP modernisation at the north branch offtake, estimates of leakage through the North Branch and Marebone Road weirs, daily rainfall and evaporation.

Results

Scheme Losses

Historical losses have generally varied from a few hundred megalitres to over 4,300 ML per year (Table 1). Largest losses occurred in seasons where largest volumes of water were pumped. However, the proportion of water lost generally decreased as the volume of water pumped increased and varied from 9 to 19% of water diverted or pumped from the river (Table 5), and from 1990 to 2009 annual losses averaged 13.4% of water diverted.

The seasons of high pumping occur when the amount of water available (annual allocation and or amount of water carried over) to members is high. Losses in seasons where diversions are greater than 16,000 ML (ie more than 80% of the scheme entitlement) have varied from approximately 2,000 ML to more than 4,300 ML and averaged 13.9% of water pumped. Similarly, losses when more than 25,000 ML (i.e. more than 134% of entitlement) were pumped varied from 2,700 ML to almost 4,400 ML, and averaged 13.5% of water pumped.

After restructuring, the general security entitlement of the Scheme reduced by approximately 50% from 18,598 ML to 9,689 ML. During the 2010/11 and 2011/12 seasons the Scheme pumped over 12,500 ML each season or over 130% of the Scheme general security entitlement.

Table 5. Annual volumes of water diverted from the river and delivered to members by Marthaguay Irrigation Scheme.

Season	Volume Pumped (ML)	Volume Delivered (ML)	Volume Lost (ML)	Delivery Loss
1990	13,099	11,450	1,649	12.6%
1991	16,974	14,407	2,567	15.1%
1992	20,458	16,593	3,865	18.9%
1993	15,882	15,547	335	2.1%
1994	22,973	20,996	1,977	8.6%
1995	25,547	21,177	4,370	17.1%
1996	8,725	7,198	1,527	17.5%
1997	20,882	18,055	2,827	13.5%
1998	25,547	21,715	3,832	15.0%
1999	18,361	15,821	2,540	13.8%
2000	25,654	22,949	2,705	10.5%
2001	30,659	26,303	4,356	14.2%
2002	40,114	35,746	4,368	10.9%
2003	21,169	18,008	3,161	14.9%
2004	9,394	7,632	1,762	18.8%
2005				
2006	9,157	8,299	858	9.4%
2007	10,689	9,653	1,036	9.7%
2008				
2009	1,585	1,303	282	17.8%
2010				
2011	12,602	11,562	1,040	8.3%
2012	13,443	12,201	1,242	9.2%

Losses during 2010/11 were 1,040 ML; and 1,242 ML were lost in the 2011/12 season. The average loss in other seasons where the scheme had previously pumped a high proportion (more than 130%) of its entitlement was 3,926 ML. This represents a saving from PIIOP modernisation of about 2,800 ML per year.

The proportion of water lost was 8.3% of water pumped in 2010/11 and 9.2% in 2011/12, a reduction in losses of approximately 5% compared to the average of other seasons where the scheme has previously pumped a high proportion (more than 130%) of its entitlement.

Analysis of historical losses of the scheme indicate that the losses consist of a fixed network loss of approximately 120 ML and a variable loss of 0.125 ML/ML diverted (Figure 6). The losses in 2010/11 and 2011/12 seasons represented by the red squares in Figure 3 are significantly lower than previously reported losses indicating that modernising the scheme has led to a significant improvement in delivery efficiency. The scheme will continue to monitor and evaluate the delivery performance of the modernised network to maintain an efficient water delivery system that meets members' expectations.

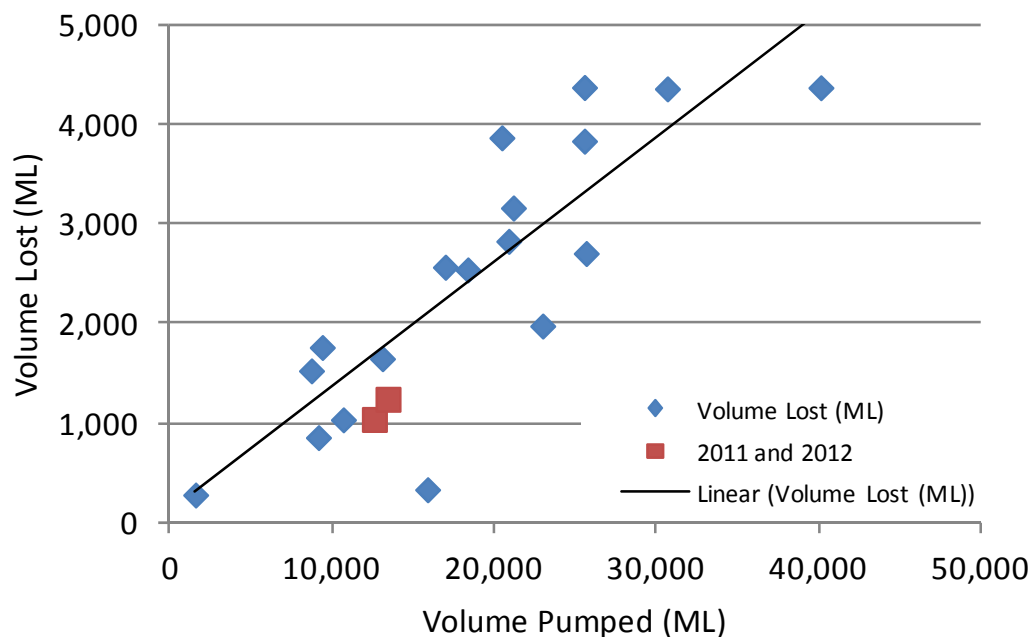


Figure 6. Annual volumes of water diverted from the river and water losses of Marthaguy Irrigation Scheme from 1990 to 2012.

Pondage Test

The North Branch channel consistently dropped at a rate of 50 mm/day during the period 4/2/12 to 9/2/12 (Figure 7). During part of that time, the gauge at Quigley's downstream rose by about 60 mm/day indicating that there was considerable leakage through the North Branch weir at that time.

Leakage was estimated by Brian Kentwell to be approximately 6 to 8 "syphons" at the North Branch weir and about 1 "syphon" at the Marebone Road weir. A 63 mm syphon typically runs at a rate 3 to 5 l/sec. This equates to a leakage loss of 18 to 45 l/sec from the channel.

Seepage from the channel was estimated to be approximately 17 mm/day (Table 6) which gives an annual seepage loss of about 200 ML per season for this section of channel.

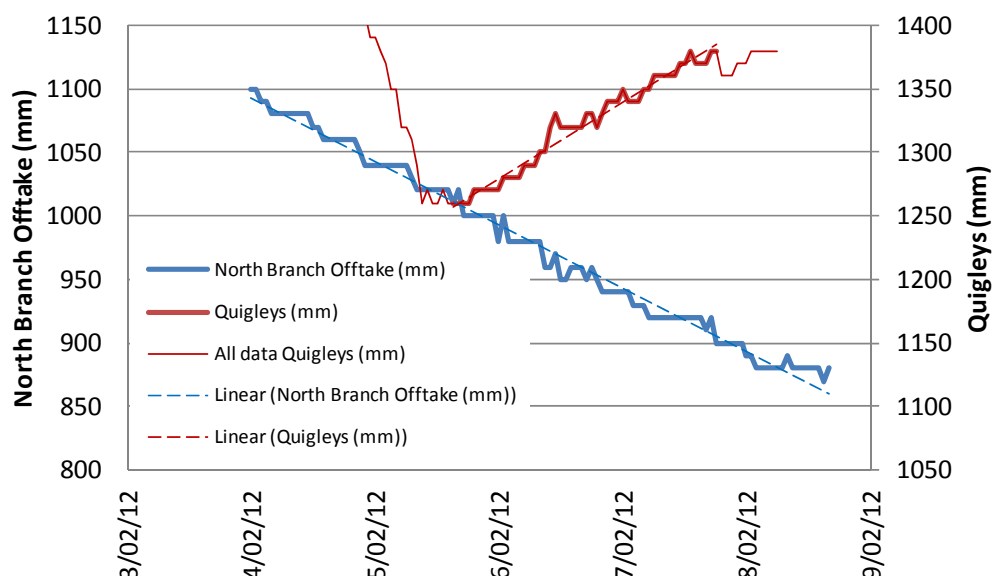


Figure 7. Height of channel at North Branch offtake from 4/2/12 to 9/2/12 and at Quigleys from 5/2/12 to 8/2/12.

Table 6. Water Balance for Pondage test on first 8.5 km of MIS supply channel from 4/2/2012 to 9/2/2012.

A	Daily Loss (mm/day)	50	Daily fall at North Branch gauge from 4/2 to 9/2/2012
	Channel length (m)	8530	Measured on Google
C	Channel Width (m)	11	Measured by Brian Kentwell
D	Evap Assumpt (mm/day)	5	Approx Silo ET_0
	Rainfall (mm/day)	0	
	Soil Wet up	0	Channel had been wet for several weeks
	Water in (ML)	0	
	Water deliveries (ML)	0	
E	Leakage Estimate (l/sec)	30	Brian estimate of 6 to 8 syphons at North Branch weir and 1 syphon at Marebone Rd weir
	Calculations		
F	Leakage loss (ML/day)	2.6	$= E*60*60*24/1,000,000$
G	Area (ha)	9.4	$= B*C/10,000$
H	Leakage rate (mm/day)	28	$= F/G*100$
I	Seepage (mm/day)	17	$= A-D-H$
	Annual Seepage Loss		
J	Pumping days	120	
K	Seepage (ML/Season)	196	$= I*G*J/100$

Value of lining this section of channel

At an average cost of \$300/m to rebuild and line channels with EDPM rubber (J. Rourke pers. comm.) it would cost over \$2.5 million to line the first 8.5 km of the MIS channel to save the 200 ML lost due to seepage. The capital cost per megalitre per year saved is approximately \$13,000. This is 10 times the current value of general security entitlement water for permanent transfer, and over 200 times the current value of water on a temporary transfer basis. It would be uneconomical for the Scheme to line this section of channel at these water values.

The amount of seepage loss is largely affected by the assumption of leakage. A sensitivity analysis was conducted to assess the impact of changing the leakage estimate on seepage losses and capital cost of water savings.

Seepage losses varied from about 100 ML/season if leakage was 40 l/sec to 300 ML/season if leakage was 20 l/sec. However, the cost of lining remained uneconomical at over \$8,500/ML/year saved even when combined leakage from the North Branch weir and Marebone Road weir was reduced to 20 l/sec which increased seepage losses to 300 ML/season (Table 7).

Table 7. Impact of changing leakage estimate on seepage and capital cost of water savings from the first 8.5 km of the MIS supply channel.

Leakage Estimate (l/sec)	20	30	40
Pumping days	120	120	120
Seepage (ML/Season)	299	196	92
Cost to Line (\$/m)	\$300	\$300	\$300
Total Cost	\$2,559,000	\$2,559,000	\$2,559,000
Capital cost per ML/year saved	\$8,549	\$13,080	\$27,827

This validates the scheme's decision not to return water to the Commonwealth in return for funds to line this section of channel as being in the best interests of the scheme members.

There may be very short sections of the channel where losses are large enough to justify remediation. Further investigation will be required to identify these areas and quantify losses.

Conclusions and Recommendations

- Restructuring the scheme and reducing the length of the channel network has seen an increase in delivery efficiency from 86% to 91%, and improvement of approximately 5 percentage points.
- Approximately 2,800 ML of system losses have been saved.
- Lining the first 8.5 km of channel from the river pumps is likely to reduce seepage losses by approximately 200 ML and cost \$2,500,000.
- The cost of lining the first 8.5 km of channel cannot be justified by water savings alone.

6.11 Project risks

Project risks were managed by prompt reporting of potential risks as they were identified, regular monitoring and evaluation by all members of the Project Sub-Committee and the Project Team, and intervention as required to insure that the risk was avoided or the impact minimised.

Time delays due to wet weather as mentioned previously were managed by communication of the status of the project to all project stakeholders to keep them aware of progress.

6.12 Occupation Health, Safety and the Environment

Occupational Health and Safety of members, contractors and the general public was a major focus of the committee throughout the project. A high level of planning and compliance was demanded by the committee and supervised by Jason Crooks and Brian Kentwell. Detailed works plans were developed by all successful contractors.

No major incidents occurred during the construction of the pipeline, decommissioning of channel or installation of improved channel management technology. Regular toolbox meetings were held with contractors, and auditing of minutes of toolbox meetings was undertaken to ensure compliance.

No major issues regarding communication were encountered. Minor communication issues were dealt with during the course of the project and did not impact on delivery of the project.

Cultural and environmental issues were identified during the project planning phase and safeguards were determined to reduce risks. No environmental issues were encountered during the implementation of the project (Table 2).

6.13 Costs associated with Modernisation of the Marthaguy Irrigation Scheme

The project cost over \$9.6 million to implement. The Commonwealth provided \$9.41 million in funding and the Scheme members contributed approximately \$200,000 towards the completion of the project (Table 8). A copy of the expenditure statement is attached as (Attachment I).

A call to the membership in the form of a management fee to complete the project was made to fulfil this budget shortfall.

Table 8. Summary of costs to complete the ‘Greening the Marthaguy’ project.

Project Component	Total
Payments To Members	\$8,444,880.00
Decommissioning of Channel & Crossings	\$116,982.07
Stock & Domestic Water Supply Works	\$649,413.76
Installation of Channel Management Technology	\$41,489.22
Professional Fees (Surveyors etc.)	\$166,527.93
Project Management	\$201,994.84
Total	\$9,621,287.82

6.14 Objectives not achieved

All key objectives were achieved.

7.0 Discussion

Relationship of the project to the Modernisation Plan

The Modernisation Plan for the Marthaguy Irrigation Scheme was approved by Scheme members in 2009. Implementation of the plan was completed with Federal Government and Scheme funding in March 2012.

This project represents the complete implementation of the Modernisation Plan, and in particular:

- Decommissioning the lower section of the Scheme.
- Implementing changes to Scheme operations (“modernisation”) and infrastructure to improve Scheme water efficiency.
- Establishing a Stock and Domestic pipeline to support both farmers exiting the Scheme and members remaining on the Scheme.
- Exiting of 7 irrigation farms from the Scheme and returning the land to dryland cropping and grazing.
- Provision of restructuring payments to members exiting the Scheme.
- Transfer and release of 4,928 ML of general security water from the Scheme to the Commonwealth Water Holder.

By undertaking the project and implementing the above measures the Scheme has supported members terminating their access to the Scheme for irrigation purposes by:

- provision of a continued Stock and Domestic water supply;
- facilitating the transfer of their Scheme water entitlements to the Commonwealth; and
- providing restructuring payments to allow them to return irrigated land to dryland cropping and grazing.

Without these measures the removal of irrigation capacity from these farms would not have been a fair and viable option for members exiting the Scheme.

7.1 How does the project contribute to a healthy river?

As a result of the project 4,928 ML of water has been returned to the Commonwealth Environmental Water Holder. This water will be used in the future to provide additional allocation of water for environmental purposes such as base flow in the Macquarie River and the lower Macquarie Valley generally and for delivery by the Macquarie River to the Ramsar listed Macquarie Marshes. Riparian vegetation and wildlife dependant on the river for food and habitat will have a greater reliability of supply of water.

Additionally the district contains numerous smaller wetlands on irrigation farms associated with their irrigation infrastructure. These wetlands are integral breeding and feeding grounds supporting the Macquarie Marshes. With improved reliability of irrigation these vital wetlands will continue to support the biodiversity of the Marthaguy and Lower Macquarie region.

And as the Macquarie Marsh cattleman claim... “Fat Ducks mean Fat Cows”.



Photo 16. Local fisherman reaping the rewards of a healthier river.

7.2 *How does the project contribute to a sustainable future for the irrigation community?*

Impact of the project on the future viability of remaining scheme members

As water availability has become the limiting factor to irrigated cropping in the Macquarie Valley due to legislative changes and variable climate, reconfiguring the Scheme and concentrating water delivery to an efficient purpose built channel network has meant that the Scheme is operable under almost all allocation years. Long term, this will allow members to irrigate crops in low allocation years to maintain farm productivity and improve resource utilisation. In years of high water availability the Scheme will operate more efficiently allowing members to transfer carry-over-water forward to secure water supplies for future years, thereby providing a more stable and reliable enterprise mix in their farming businesses.

"The project has been great for the members, with benefits for all" said Glen Whittaker from Yahgunyah Cotton Partnership. Yahgunyah Cotton was the largest member affected by the Scheme restructure and retired approximately 800 ha of developed land and over 3,000 ML of storage capacity on their property in the decommissioned section of the Scheme, to dryland cropping and grazing as a result of the project. "We have concentrated our operation on our 'Myall Plain' block where we are able to grow 400 ha of cotton almost every year instead of the boom and bust of growing 1,200 ha one year on the 2 properties and then nothing for the next few years. This allows us to reduce our production risk, maintain our staff and contractors and better utilise our resources. We have better marketing

flexibility and can forward sell with a greater degree of confidence thereby reducing our marketing risk and exposure to market fluctuations. ”

Bealcott Partnership owner Mark Beach aims to grow 200 to 300 ha of cotton on his farm each year. “We have a rejuvenated confidence in our irrigation enterprise due to the ability of the Scheme to operate in a wide range of water availability scenarios. Previously the Scheme had difficulty operating in low allocation years and efficiently delivering water to members on the bottom of the Scheme. Whilst the overall socialised loss may have been acceptable, the disproportionate loss to deliver water to members on the bottom end created issues with management of the Scheme. The improved efficiency of the modernised Scheme makes the purchase of additional water in lower availability years a viable proposition. In recent times we have had to put off our permanent staff because we did not have a reliable cropping program. With the increased efficiency and improved reliability of the new Scheme, we are now looking at ways to maintain a regular program and workforce.”

Michael and Margaret O'Brien operate a mixed farming and grazing enterprise on their property “Gerwa”, located at the northern extremity of the Scheme and the new Stock and Domestic pipeline. “The new Stock and Domestic supply under the “Greening the Marthaguy” project is the best thing that has happened for our farming enterprise”, says Margaret. “Previously we had to rely on the good grace of a related neighbour for Stock and Domestic water pumped from a bore on his place. It was difficult in summer to keep up with stock demands. Under the new arrangement we have permanent access to a good water supply, both quality and quantity. This has increased the value of our property and provides a sustainable future for our stock operations. We were quite happy to meet the cost of putting in the additional 6 km of pipeline to the property, and the supplies to all paddock troughs and house.”

“We couldn't be happier; having permanently available water is a dream”.

The O'Briens connected over 6 km of additional pipe and a 100,000 l tank to their outlet on the new Stock and Domestic pipeline costing them in excess of \$40,000 in additional expenses.

Future for the Irrigation Community

The Marthaguy Scheme provides opportunities to diversify farm enterprises that are located away from the river, thus providing employment and cash flow into the local economy. In the past the Marthaguy Scheme has been directly responsible for the employment of up to 30 full time positions on farms. Most of these staff lived in the town of Warren or on the farms that surround it.

The town of Warren is heavily dependent on the irrigation industry. In 1997, 50.3% of agricultural production was irrigated summer crops, compared with 31.0% for Narromine (Powell and Chalmers, 1999). There has been a large reduction in economic flows in Warren over the past six years due to reduced cropping caused by low water allocations and changes in cropping practices (Meashan *et al*, 2006).

The irrigation industry directly employed 90 people in the Warren Shire in 2005/06 year and another 95 were employed in flow-on positions. These 90 people produced a \$40 million cotton crop which was less than half the value of the 2000/01 crop of \$88 million (DEWR, 2006).



Photo 17. Local employees enjoying a well earned break and lighter moment during cotton picking at "Charlieville".

The August 2006 Census conducted by the Australian Bureau of Statistics list the Warren local government area as having the second largest population decline in NSW South Wales between 2001 and 2006, of 479 people or 15.2% of the population. Much of this decline has occurred in the township of Warren, where the population is reported to have declined by 447 in the same period. Since 2001, the number of young people aged from 15 to 24 years in Warren has declined by 37%. This reflects the limited job opportunities for young people in Warren, as well as the choice of people to leave home to study or travel. A revitalised irrigation industry will create more local opportunities for young people, and these opportunities will remain into the future and not fluctuate as greatly with water availability.

Normally cotton gins operate for three months with 2 to 3 shifts per day. They didn't operate in 2008 and 2009. This has reduced the household incomes of Warren families who relied on this supplementary seasonal work. The lack of seasonal work has decimated the influx of up to 500 itinerant workers who came to Warren in 2001 and earlier and affected caravan parks, hotels and other services. Reliable continuous production of cotton will provide a stable base level of operation for the ginning organisations helping maintain regular and seasonal staff numbers.

The long term employment prospects and productivity of the local economy and community will be secured by establishment of a smaller but more efficient and sustainable irrigation scheme. These improvements will be further supplemented as farms continue to implement modern farming practices that address the impacts of climate change, return water to the river and use water entitlements more wisely, and will secure the long term employment prospects and productivity of the local economy and community.

It is noted that the modernisation of the Marthaguy Irrigation Scheme has occurred at the same time as the modernisation of other schemes in the region, which combined, will provide significant long term and lasting benefits to one

another, to the region and the local communities. The total benefit from all of the schemes will be far greater than the sum of the individual benefits.

How the project will secure a long term future for the irrigation community?

Implementation of the modernization plan provides benefits for those members of the Scheme continuing to irrigate, those farmers choosing to cease irrigation, and the broader community.

Despite the impacts of climate change including reduced reliability and variability of allocations, the modernised scheme supports increased profitability for farmers and increased community benefits as a result of the modernisation. This occurs as:

- The new Scheme is suitable for current and future farm design and crop requirements. The Scheme can deliver large volumes of water for high flow surface irrigation systems and efficiently deliver lower flows at a constant rate for spray or drip irrigation systems. The improved efficiency and flexibility is likely to facilitate the production of higher value crops due to the increased reliability of water delivered from the system.
- The new system will allow for higher value horticultural crops to develop that could generate similar returns for smaller allocations. This would have positive implications for the local economy in jobs and services.
- The operation of an efficient scheme enables members to grow different crops to suit the season, water availability, market and soil conditions rather than undertaking a common cropping regime to fit in with Scheme operations. A diversified cropping program in the region will also allow for a better allocation of resources.
- The modernised Marthaguy Irrigation Scheme not only improved network delivery efficiencies to the farm but also resulted in lower losses on farm, due to the more timely delivery of water to farms and directly onto fields. This reduced the use of on-farm storage, resulting in lower evaporation and seepage losses (the major source of on-farm water loss), which has made more water available for crop production and increased the potential gross revenue from irrigation.
- Scheme members including those losing access to irrigation water have a more reliable Stock and Domestic water supply. Scheme members requiring Stock and Domestic water have generally had to wait until irrigation water was pumped or suffer very high losses. Now, good quality river water is available on demand.

How the project will contribute towards regional investment and development, secure the regional economy and support the local community.

The modernised Scheme provides benefits to the irrigation community as outlined above. It is unlikely that implementation of the Modernisation Plan will immediately contribute directly towards further regional investment and development. However, the more efficient Marthaguy Irrigation Scheme will provide members with additional opportunities for intensive future agricultural production, a chance to diversify their cropping programs and to produce crops of

higher value. This may very well create the need for further regional investment and development.

A modernised Marthaguy Irrigation Scheme will assist to secure the local economy that has been heavily impacted by the recent drought. Maintaining a smaller but more efficient irrigation community will have positive outcomes for the local economy. In a year where water allocations are 100%, some 3,000 ha of cotton would be grown on those farms irrigating from the modernised Marthaguy Scheme. At an expected gross return of \$5,000/ha, this represents \$15 m in crop production, and with proven flow-on effects to the local community, represents \$37 million for the Warren economy.

7.3 Other matters

Funding Agreement

The original application by the Scheme to the PIIOP program was for the return of 5,728 ML of water for \$9.53 million to meet expectations and commitments to members. This application was made on the basis of unanimous agreement of the membership and detailed the funding costs and payment schedule. In April 2010, the then Minister Wong announced that the Scheme had received funding up to \$9.53 million subject to Funding Agreement negotiations.

The Funding Agreement between the Commonwealth and the Scheme was for funding up to \$9.41 million in return for 4,928 ML of water. The water that was not returned was 810 ML of water of unregulated water that was licensed under the 1912 Water Act and could not be transferred to the Commonwealth.

The Funding Agreement included transfer of water entitlements and irrigation rights early in the project, and a payment schedule with payment at commercial value for water entitlements at transfer, and progressive payment for restructuring and irrigation rights throughout the project.

The Scheme invested over \$160,000 of its own funds in developing a plan and obtaining funding to secure the future of its members. The funding agreement was signed 4 months after the Minister’s announcement and after significant cost was incurred by the Scheme to negotiate the agreement.

During the project the scheme negotiated a more acceptable payment schedule where much of the payment for restructuring and irrigation rights was received during the project rather than at completion.

Costs of managing the project.

The bulk of the project expenditure (\$8.44 million) was related to restructuring payments and the related transfer of water entitlements, which were determined at the commencement of the project and detailed in each proponent agreement. The process of administering and managing this part of the project was relatively simple as it involved making payments to members according to their proponent agreements.

Approximately \$1.1 million was spent on actual costs of implementing the project, of this approximately \$800,000 was spent on infrastructure improvements that required managing during the life of the project.

The costs of professional services for advice and managing the project including legal fees and project management are disproportionate to the actual costs for infrastructure improvements. Approximately 30% of costs of the project were for

professional fees including \$110,000 for legal advice and \$160,000 for the project manager.

In our PIIOP application and subsequent funding agreement the budget included \$15,000 for project management, largely for the preparation of the progress reports. There was no allowance for additional tasks required by the funding agreement & DSEWPAC. The Scheme underestimated the expected level of input for project management which was obviously far greater than anticipated. The additional costs of legal fees and project management were funded by a call to the membership.

MIS P/L was the first irrigation operator to sign a PIIOP funding agreement with the Commonwealth and to then to complete the project. As a result, the reporting templates and processes that were required by the DSEWPAC reviewed and changed throughout the project creating additional project management expense to be incurred by MIS P/L.

8.0 Conclusions

- The completion of the Greening the Marthaguy project has returned almost 5,000 ML of water to the environment and the Murray Darling Basin.
- In doing so we have also improved the long term sustainability of irrigation enterprises, and dryland farming and grazing enterprises in the Marthaguy district north of Warren.
- The long term sustainability and viability of agriculture has been improved, along with security for those industries and communities that rely on the agricultural sector.
- Employment in farming and farm related businesses is more assured.
- Restructuring the scheme has allowed farming businesses to adjust their business models to suit the commercial reality and challenging changing conditions of the 21st century.
- A reliable good quality water supply has been installed for 17 members providing them with Stock and Domestic water on demand.
- Approximately 2,000 ha of developed land and 3,700 ML of irrigation storage capacity were made redundant.
- 15.5 km of supply channel has been pushed in and rehabilitated.

9.0 References

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Attachment I:
Expenditure Statement

MILESTONE EXPENDITURE REPORT

Project: **Greening the Marthaguy**

Summary table - comparison of budget vs spend (up to and including the last completed milestone)

	Total project budget - Grantee/Department (as per Schedule, Item 4.1)	Spend - Grantee/Depart ment-total all milestones	Total project budget - Grantee (as per Schedule, Item 4.1)	Spend Grantee- total all milestones	Total project budget - Department (as per Schedule, Item 4.1)	Spend Department- total all milestones
Payments To Members						
Rationalised water entitlements and restructuring, including connection of stock and domestic supply to farm supply points, decommissioning on-farm channels and structures, and other related activities	\$8,502,880.00	\$8,444,880.00	\$58,000.00	\$108,468.43	\$8,444,880.00	\$8,336,411.57
Subtotal Payments To Members	\$8,502,880.00	\$8,444,880.00	\$58,000.00	\$108,468.43	\$8,444,880.00	\$8,336,411.57
Decommissioning of Channel & Crossings						
Decommissioning of channel	\$80,000.00	\$83,060.57	\$0.00	\$0.00	\$80,000.00	\$83,060.57
Removal of road crossings	\$25,000.00	\$33,921.50	\$0.00	\$0.00	\$25,000.00	\$33,921.50
Subtotal Decommissioning of Channel & Crossings	\$105,000.00	\$116,982.07	\$0.00	\$0.00	\$105,000.00	\$116,982.07
Stock & Domestic Water Supply Works						
Pump Stations	\$45,000.00	\$31,697.96	\$0.00	\$0.00	\$45,000.00	\$31,697.96
Power Connections	\$30,000.00	\$8,228.31	\$0.00	\$0.00	\$30,000.00	\$8,228.31
Clearing Pipeline Route	\$12,700.00	\$0.00	\$0.00	\$0.00	\$12,700.00	\$0.00
Pipe Purchase	\$390,000.00	\$396,343.51	\$0.00	\$0.00	\$390,000.00	\$396,343.51
Fittings	\$34,600.00	\$42,575.82	\$0.00	\$0.00	\$34,600.00	\$42,575.82
System Installation	\$135,000.00	\$170,568.16	\$0.00	\$5,164.68	\$135,000.00	\$165,403.48
Subtotal Stock & Domestic Water Supply Works	\$647,300.00	\$649,413.76	\$0.00	\$5,164.68	\$647,300.00	\$644,249.08
Installation of Channel Management Technology						
Channel gauges	\$10,000.00	\$10,000.00	\$0.00	\$0.00	\$10,000.00	\$10,000.00
River Gauge	\$5,000.00	\$5,000.00	\$0.00	\$0.00	\$5,000.00	\$5,000.00
Base Stations and computer upgrade	\$15,000.00	\$26,489.22	\$0.00	\$0.00	\$15,000.00	\$26,489.22
Subtotal Installation of Channel Management Technology	\$30,000.00	\$41,489.22	\$0.00	\$0.00	\$30,000.00	\$41,489.22

Professional Fees (Surveyors etc.)						
Legal fees	\$60,000.00	\$115,662.56	\$0.00	\$7,911.90	\$60,000.00	\$107,750.66
Surveying	\$40,000.00	\$23,804.37	\$0.00	\$0.00	\$40,000.00	\$23,804.37
Engineering	\$15,000.00	\$27,061.00	\$0.00	\$0.00	\$15,000.00	\$27,061.00
Subtotal Professional Fees (Surveyors etc.)	\$115,000.00	\$166,527.93	\$0.00	\$7,911.90	\$115,000.00	\$158,616.03
Project Management						
Project management fees	\$207,010.00	\$201,994.84	\$142,000.00	\$92,552.81	\$65,010.00	\$109,442.03
Subtotal Project Management	\$207,010.00	\$201,994.84	\$142,000.00	\$92,552.81	\$65,010.00	\$109,442.03
Total	\$9,607,190.00	\$9,621,287.82	\$200,000.00	\$214,097.82	\$9,407,190.00	\$9,407,190.00

