Final Report

Pipeline NSW Program

This Program is jointly funded by the NSW Government and the Australian Government's *Water for the Future* initiative through the *Water Smart Australia* program.

NSW GOVERNMENT | Office of Water

Australian Government
Water for the Future

June 2013

Cover photograph:
Open channel and dam that forms part of the 130km network to deliver stock water for the Barwon Channel Association, Brewarrina. Photo shows channel which delivers water to the dam.
Photo: N. Wise (NOW)

Published by:
NSW Office of Water, Department of Primary Industry NSW
Level 18, 227 Elizabeth St, Sydney
GPO Box 3889, Sydney 2001

Report Prepared by N. Wise & S. Raft, NSW Office of Water

General enquires:

phone: (02) 8281 7777
fax: (02) 8281 7799

Email: information@water.nsw.gov.au
Website: www.water.nsw.gov.au

ISBN xxxx xxxx xxxx xxxx
NOW 2013/XX
June 2013

Contents

Abbreviations

AEW	Adaptive Environmental Water
BCA	Barwon Channel Association
BWT	Bore Water Trust
GABSI	Great Artesian Basin Sustainability Initiative
GIS	Geographical Information System
HS	High Security
LG	Lower Gwydir
LPI	Land and Property Information NSW
NWA	Noonamah Water Authority
NOW	NSW Office of Water (NSW Government)
NSW	New South Wales
NWC	National Water Commission
OEH	NSW Office of Environment & Heritage (NSW Government)
ppm	parts per million
REF	Review of Environment Factors
RERP	NSW Rivers Environmental Restoration Program
SCG	Steering Committee Group
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Australian Government)
S&D	Stock & Domestic
SW	Supplementary Water
WAL	Water Access Licence
WMA	Water Management Area
WSP	Water Sharing Plan

Acknowledgments

In concluding the program, it is appropriate to recognise the contributions made by staff within the NSW Office of Water, NSW Office of Environment & Heritage, NSW Public Works Department, NSW State Water Corporation, NSW Land & Property Information and the Australian Department of Sustainability, Environment, Water, Population and Communities.

Noteworthy contributions came from Paramesh Halaradhya of NOW for the designs and drawings of the pipeline projects, Neil Eigeland of NOW for the project management of the Lower Gwydir Project and Graeme Enders of OEH for valuable insight into the murky workings of environment water savings. Also notable was the professional input of staff from the NSW Public Works Department who supervised all construction, in particular David Watson who gave clear guidance at all times. At the beginning of the program submission in the early days of negotiation with the Commonwealth, Sylvia Graham, Program Manager, Dept Environment Water Heritage & Arts, Canberra ensured the Program came to fruition when it was on shaky ground because of time restraints.

It is also appropriate to recognise the effort, support and knowledge provided by the landholders involved across country NSW. Of particular recognition is given to Col Payton from the Barwon Channel Association at Brewarrina and Anthony Booth of the Noonamah Water Authority at Hay.

All photos included in this report were supplied by Norman Wise, NOW, Bathurst.

Special acknowledgement to David Harriss, Commissioner for Water for securing funding and approval for this project.

Finally acknowledgement goes to the members of the Program Steering Committee group that guided the Program for the past 4 years. These members included:

- Steve Raft, Program Director representing NOW, Parramatta committee chairperson.
- Norman Wise, Project Co-ordinator, NOW, Bathurst
- Dan Berry, General Manager Water Delivery, NSW State Water, Dubbo.
- Graeme Enders, Manager River Bank, OEH, Queanbeyan.
- Leanne Breen, (observer), Program Manager, SEWPaC.

Executive summary

This final report presents the outcomes and achievements resulting from the Pipeline NSW Program and represents the completion of Milestone 7(ii) of the funding deed. This pilot Program is a $7m jointly funded program between the Australian and NSW governments to pipe open channels that previously delivered stock & domestic (S&D) water from NSW rivers into farm dams for rural landholders and primary producers.

The NSW Office of Water (NOW) within the NSW Department of Primary Industry implemented the program in NSW in a partnership agreement with the Commonwealth Department of Sustainability, Environment, Water, Populations & Communities (SEWPaC). The NSW contribution of $3.5m for this program came from the NSW Rivers Environmental Restoration Program (RERP) Trust, through the River Bank program administered by the NSW Office of Environment & Heritage (OEH). The Commonwealth Government's contribution of $3.5m came from the Water for the Future initiative through the Water Smart Australia program. Funding was approved in August 2009.

The program was able to demonstrate through the construction of 3 project sites the benefits and water savings that can be accrued through piping open earth channels with a modern, efficient pipeline scheme. This $7m pilot program was the forerunner to the roll out of this work across NSW by the Commonwealth's $137m Basin Pipe Program under the Sustaining the Basin Program.

The open channels and dams have been replaced with efficient small diameter pipelines, tanks and troughs to provide landholders with a more secure and better quality water supply for stock and domestic use. Typically the old channel and dams system would waste up to 90% of the water taken from the river. The water saved will be reallocated and managed for environmental purposes through environmental water licences held by the NSW and Commonwealth Governments to benefit the river where the savings were created. This water will be managed by the NSW OEH in accordance with the relevant river's adaptive environmental water (AEW) use plan. In all instances environmental water will be used at adjacent wet land sites on the relevant river.

The scheme reduces the wastage of water, improves water use efficiency, helps to conserve bio-diversity and reduce feral animal populations while providing a sustainable domestic water supply for farming families within the scheme area.

Additional benefits accrued from reduced greenhouse due to less water being pumped and wasted. One of the schemes used up to 100,000 KWhr of power per year, typically over a 6 week period. Another used 10,000 L of diesel fuel per year over an 8 week period. Now up to 90% of that energy use will be saved. For the landholders involved the new system will deliver a more reliable water supply at greatly reduced costs and time to operate and manage.

The program also conducted a statewide geographical information system (GIS) mapping exercise to produce a definitive map of NSW showing the location of all S&D water licences > 50ML/yr that fill open channels or creeks. Together with a map of the extent of all channels, dams and the land serviced by them this will be used in the roll out of the Basin Pipe Program.

Implementation of the Program in August 2009 was followed soon by the breaking of the "decade of drought" which had occurred throughout much of the first decade of the 21st century. Unseasonal rainfall over 2010 & 2011 brought extensive flooding and caused a major interruption to construction. This led to a 2 year delay in completing construction and the program. Accordingly the funding deed with the Commonwealth was amended on 2 occasions. Originally the Program was due to be completed by May 2011. The program was finally completed in June 2013.

Three demonstration pipeline projects in the Lower Gwydir, Barwon and Lower Lachlan rivers were constructed to replace the old channels. Capital works include ground water bores to provide an alternative water supply, electrical pump stations, power line installation and upgrade, water storage tanks and stock watering troughs.

The completed Project details are:

- Barwon Channel Association Stock & Domestic Pipeline:
  - Location: Brewarrina, Barwon River
  - Cost: $2.84m
  - Pipeline:170km
  - Savings: 1488 ML/yr

- Lower Gwydir Domestic Pipeline
  - Location: west of Moree, Gwydir River
  - Cost: $1.69m
  - Pipeline: 125km
  - Savings: 291 ML/yr and 1,500 ML/yr

- Lower Lachlan Noonamah Water Authority Stock & Domestic Pipeline
  - Location: Corrong near Hay, Lachlan River
  - Cost: $2.17m
  - Pipeline: 115km
  - Savings: 795 ML/yr

Water savings derived from this program were 4074 ML/yr for the 3 projects involved. This met the requirements of the funding deed which were 4000 – 5000 ML/yr.

This report discusses the outcomes of the Program including key learnings and recommendations for future water infrastructure projects.

1 Introduction

The $7m Pipeline NSW Program is a pilot one jointly funded program by the Australian and NSW governments to pipe open channels that previously delivered stock & domestic (S&D) water from NSW rivers into farm dams for rural landholders and primary producers. This final report presents the outcomes and achievements resulting from the Pipeline NSW Program and represents the completion of Milestone 7(ii) of the funding deed.

The NSW Office of Water (NOW) within the NSW Department of Primary Industry had the responsibility for the implementation of the program in NSW. The Department of Sustainability, Environment, Water, Populations & Communities (SEWPaC) was responsible for the Commonwealth. The NSW government's contribution of $3.5m for this program comes from the NSW Rivers Environmental Restoration Program (RERP) Trust, specifically the River Bank program administered by the NSW Office of Environment & Heritage (OEH). The Commonwealth Government's contribution of $3.5m comes from the Water for the Future initiative through the Water Smart Australia program. Funding was approved in August 2009.

The program was able to demonstrate through the construction of 3 project sites the benefits and water savings that can be accrued through piping open earth channels with a modern, efficient pipeline scheme. This $7m pilot program was the forerunner to the roll out of this work across NSW by the NSW/Commonwealth's $137m Basin Pipe Program under the Sustaining the Basin Program.

The 3 projects are:

- Barwon Channel Association Inc. pipeline scheme on the Barwon River just upstream of Brewarrina adjacent to Narran Lake. This group pump water into a network of 130km of channels to fill 48 farm dams. Three of the members also diverted water from Narran Lake into the same channel and dams system.
- Lower Gwydir water users on Lower Gwydir River west of Moree. This group take supplementary water (SW) flow from the Lower Gwydir River near the property "Old Dromana" in the Gwydir Wetlands. This water is diverted into a network of over 100km of channels to fill 26 farm dams at each homestead.
- Noonamah Water Authority pipeline scheme on the Lachlan River near Corrong west of Hay near the Lachlan Wetlands. This group pump water into a network of 150km of channels to fill 43 farm dams.

The location of these project sites are shown on Figure 1.

The open channels and dams have been replaced with efficient small diameter pipelines, tanks and troughs to provide landholders with a more secure and better quality water supply for stock and domestic use. Typically the old channel and dams system would waste up to 90% of the water taken from the river. The water saved will be reallocated and managed for environmental purposes through water licences held by the NSW and Commonwealth Governments to benefit the river where the savings were created. This water will be managed in accordance with the relevant river's adaptive environmental water (AEW) use plan by the NSW OEH. In all instances environmental water will be used at adjacent wet land sites on the relevant river.

A conceptual diagram of the channel system replacement by a piped system is shown in Figure 2.

Figure 1 – Location of the pipeline projects funded by Pipeline NSW Program

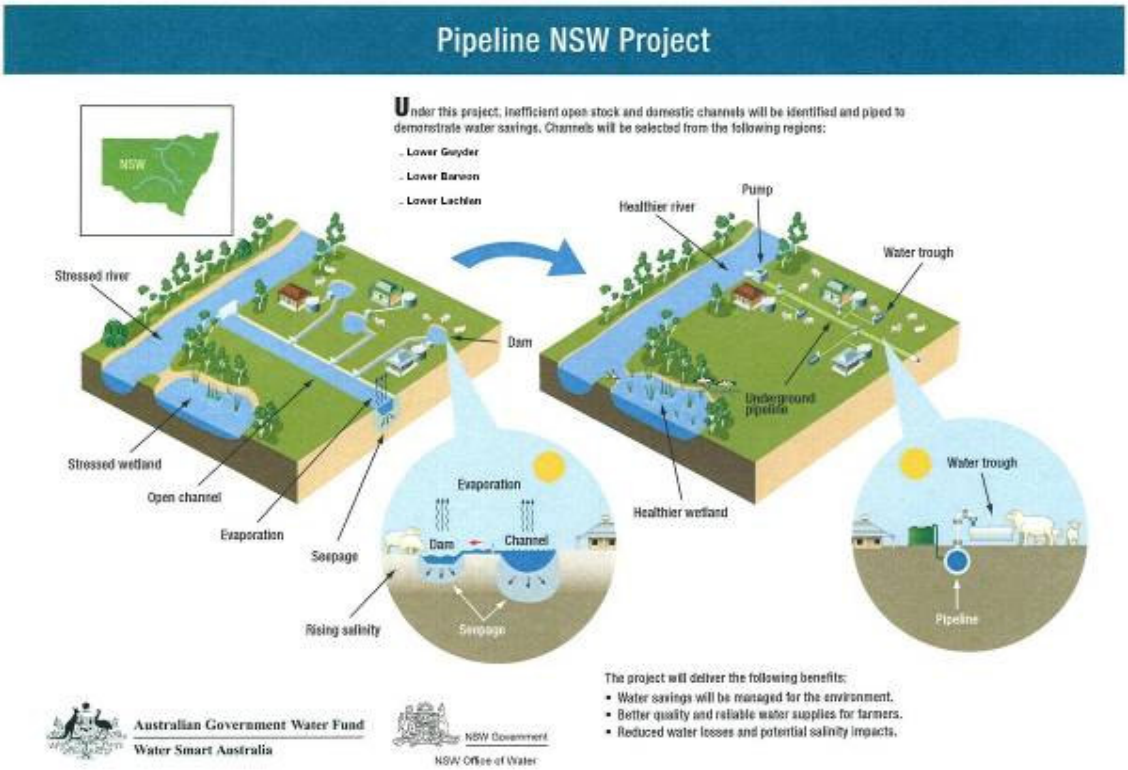


Figure 2 – Diagram of the channel replacement by a piped system

In addition to pipeline construction, the program also conducted a statewide geographical information system (GIS) mapping exercise to produce a definitive map of NSW showing the location of all S&D water licences > 50ML/yr that fill open channels or creeks. The map also shows the extent of all channels, dams and the land serviced by them. This work is being used in the roll out of the Basin Pipe Program.

2 Aim & Objectives

The Pipeline NSW Program is a $7m partnership between the NSW and Australian Governments and incorporating the NSW RiverBank program. The primary objectives and outcomes of the program were to:

- Construct 3 pipeline Schemes to replace open channel systems;
- Save an estimated 4 GL to 5 GL of water per annum from piping the four open channel systems – this estimate will be refined and finalised when the 3 demonstration sites selected are submitted to the Commonwealth for approval (2nd Progress Report);
- Register Water Savings to a Water Access Licence with an Adaptive Environmental Water Condition and be used for Environmental Purposes by an Environmental Water Manager as provided in clause 8A;
- Provide enhancement to river flows, wetting regimes, reduced aquifer stress, return creeks to a more natural ephemeral cycle, improve water quality through reduction in algal blooms and other habitat protection and biodiversity conservation outcomes through the use of Water Savings for Environmental Purposes;
- Provide landholders with a more secure domestic and stock water supply particularly during drought periods and will enable better control of total grazing pressure; and

Identify and prioritise other potential Schemes capable of significant Water Savings (Section A10 - Pipeline NSW Funding Agreement, Commonwealth of Australia, Dept. Environment, Water, Heritage & Arts, August 2009).

To achieve these primary outcomes several key objectives were required. These were:

- Engage the rural community to take up the offer of funding for piping channels.
- Carry out a statewide audit of all S&D licences >50 ML/yr to produce a GIS map of all extractions and channels for future planning of these pipeline projects.
- Investigate design options to achieve a reliable new water supply system.
- Complete a satisfactory procurement process to provide value for money projects.
- Finalise construction of all projects in a timely manner.
- Complete administrative dealings to create new environmental water access licences for the water savings accruing from the Program.
- Submit a final report of the Program.

3 Methodology

3.1 Program delivery

The Pipeline NSW Program is governed by a funding agreement between the NOW, on behalf of the NSW Government, and SEWPaC, on behalf of the Commonwealth. The funding agreement outlines the obligations of the two parties including the Program's financial provisions, reporting requirements, objectives and activity plan (Pipeline NSW Funding Agreement, Commonwealth of Australia, Dept. Environment, Water, Heritage & Arts, August 2009). The final deed was signed in May 2009 and an amendment to the final deed was signed in August 2009.

The plan period commenced on 9 August 2009 and ended June 2013.

3.2 Governance

An inter-agency Steering Committee Group (SCG), was established to coordinate the Pipeline NSW Program, set strategic direction and oversee and monitor the performance of the Program. Membership of the SCG includes:

- NSW Office of Water (NSW Government)
- NSW Office of Environment & Heritage (NSW Government)
- NSW State Water
- Dept. Sustainability, Environment, Water, Population and Communities (Commonwealth).

A representative from SEWPaC is an observer on the SCG. The SCG met generally on a six-monthly basis, reviewing the progress of the program including the status of individual projects and the program budget. A Program Manager employed by NOW managed the day-to-day business of the Program. The Program Manager was responsible for the overall operation and performance of the program, ensuring consistency with the funding agreement and annual implementation plan. This included liaising with project managers within NOW and partner agencies, managing the budget, reporting, acting as Executive Officer to the SCG and communicating with SEWPaC. A Project Co-ordinator employed by NOW is responsible for the day-to-day operation of each of the 3 pipeline projects. The Project Co-ordinator ensured reporting requirements and budgets were maintained. The NSW Office of Environment & Heritage was the NSW sponsor of the Program and provided environmental oversight to the Program.

The program steering committee was formed by the following members:

- Steve Raft, Program Director representing NOW, Parramatta was the committee chairperson.
- Norman Wise, Project Co-ordinator, NOW, Bathurst
- Dan Berry, General Manager Water Delivery, representing NSW State Water, Dubbo.
- Graeme Enders, Manager River Bank, OEH, Queanbeyan.
- Leanne Breen, (observer), Program Manager, representing SEWPaC.
- The construction superintendent of each pipeline project as required.

The steering committee met on 9 occasions over the duration of the program on the following dates:

21/10/09, 21/4/10, 18/11/10, 22/2/11, 12/4/11, 26/5/11, 2/11/11, 28/5/12 & 10/12/12.

4 GIS Study

A NSW GIS study was conducted to map, collate and verify the location of Stock & Domestic water access licences that use open earthen channel to convey the water from the river to the paddocks west of the Great Dividing Range in the major inland rivers.

A report of the results of the GIS Study was presented to SEWPaC in April 2012as part of Milestone 5 of the funding deed.

The study included the following:

- *Extraction of existing stock & domestic (S&D) licenses & allocations and S&D replenishment flows from NSW Office of Water (NOW) databases for western inland rivers.*

  After discussions with NOW senior licensing staff the dataset used was restricted to licences equal to and greater than 50 ML/yr. It was deemed licences less than 50 ML/yr were most likely to be piped. Some 196 data points were extracted (as shown on the map below), ranging as high as 7300 ML/yr. However generally most allocations are between 100 – 500 ML/yr (105 data points), with 70 points < 100 ML/yr and 21 points > 500 ML/yr.

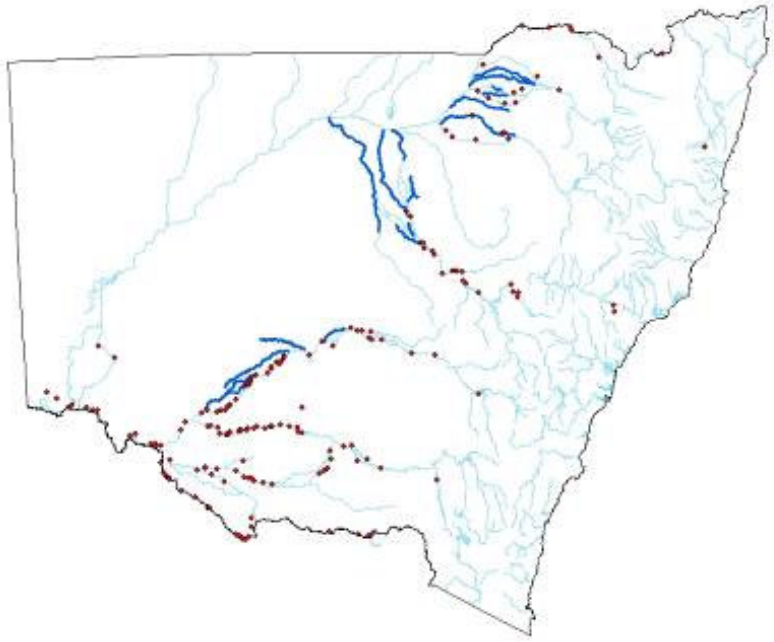


Figure 3 - NSW map of existing S&D license holders over 50ML (red dots) & watercourses subject to S&D replenishment flows (shown as dark blue)

- *Compilation of current, accurate location information for installed works for pumps and extraction points (eg diversion weirs for S&D river deliveries and replenishment flows) as collected by State Water Customer Field Officers.*

  This was a critical starting point to allow the identification of water supply channels and other infrastructure associated stock and domestic water licences & allocations identified in step 1. Staff from NOW visited State Water offices at Goondiwindi, Moree, Narrabri, Warren, Dubbo, Lake Cargelligo, Deniliquin, Leeton and Buronga over a 6 month period. NOW staff included the GIS operator with a laptop computer loaded with the GIS computer program ArcGIS. All license data

points were shown on a SPOT 5 satellite image. State Water officers were able to confirm the pump extraction points either through identification from the satellite image or GPS location. In most cases they were also able to identify the location and extent of the channel systems extending from these river extraction points.
The final, as constructed ground truthed pump sites for the NOW licensed extractions and replenishment flows are summarised in Appendix 1. These data points formed the basis for the final GIS maps.

- *Undertake data capture project (ArcGIS) to digitally map all infrastructure and associated data identified in steps 1 & 2.*

- *Collation of existing data (licenses, allocations, streams, channels, dams etc) from all existing data sources.*

- *Preparation of draft maps in ArcGIS Project for review by key NSW Office of Water and State Water specialists.*

- *Update maps and ArcGIS Project following the review process.*

- *Link the ArcGIS project to existing departmental databases so that the project details and information behind it can always be easily updated.*

The maps produced will be used to report progress on future piping programs like the Commonwealth's SEWPaC $137m Basin Pipe Program which will see the broader roll out of channel piping projects across inland NSW. The map will track the completion of piping projects and show those yet to be done. The link to departmental databases will be implemented progressively as pipeline projects are implemented...

- *Present final ArcGIS project and associated maps.*

The final 4 maps are presented in Appendix 2 for the Lachlan River; the Murrumbidgee/Murray Rivers; the Macquarie / Bogan Rivers and the Border, Gwydir & Namoi Rivers.

5 Barwon Channel Association Project – Barwon River

5.1 Project Description

Barwon Channel Association Inc. (BCA) pipeline scheme is on the Barwon River 35km upstream of Brewarrina, adjacent to Narran Lake. The Group supplies water to 7 members. The scheme takes water from the weir pool formed by the Brewarrina town weir 53 km downstream of the scheme pump. This group pump water into a network of 130km of channels to fill 48 farm dams. Three of the members also diverted water from Narran Lake into the same channel and dams system.

The Barwon Channel system was first built in the mid 1950's using a channel from Narran Lake. By the early 1960's the lake proved too unreliable and a channel branch was extended to the Barwon River where a large pump (Photo 1) and channel supply header dam (Photo 2) were built.

A map of the old channel system is shown in Figure 4.

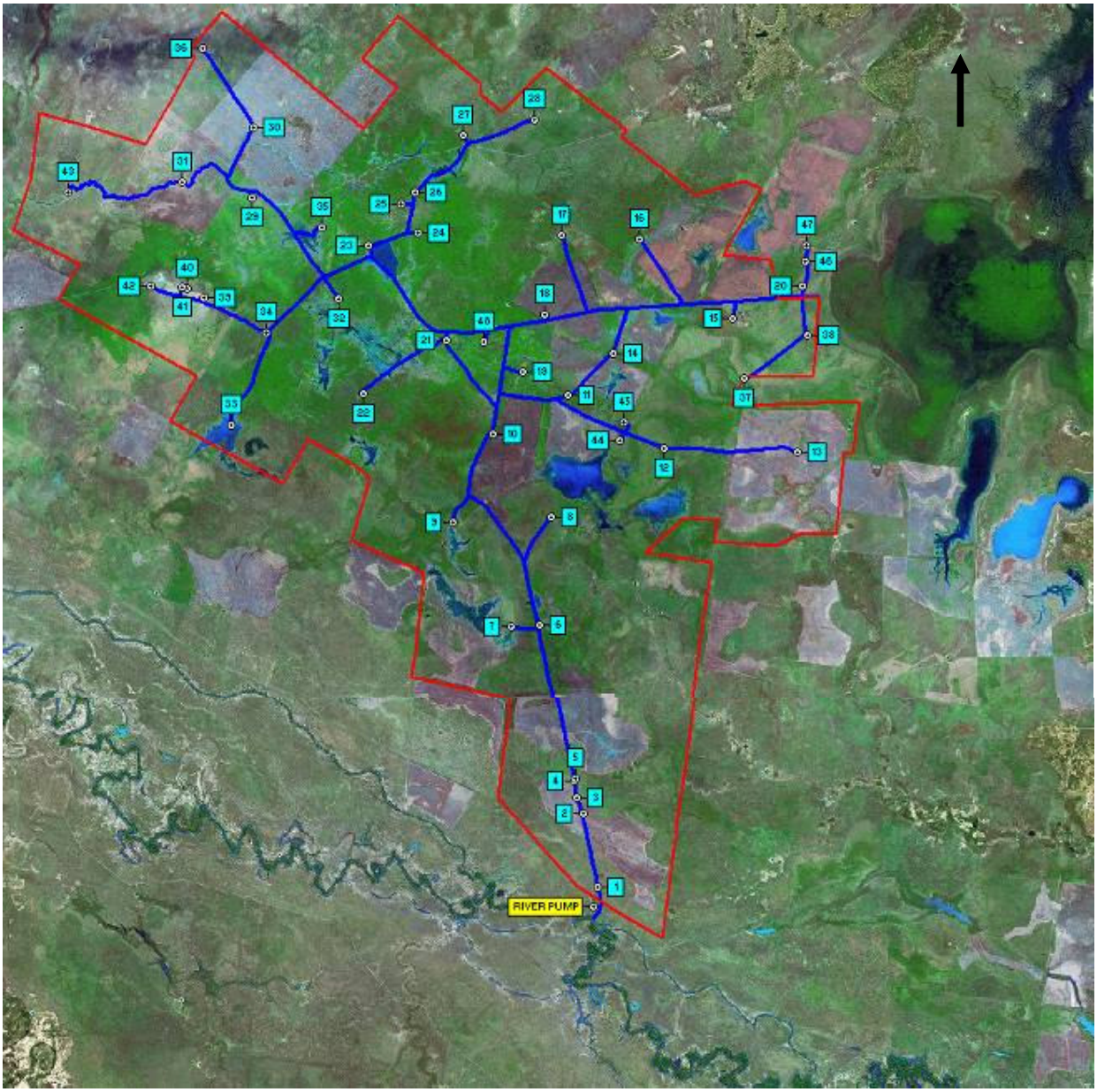


Figure 4 – Barwon Channel Association, Dams, Channels, Scheme Boundary

The map shows the channel system emanating from the Barwon River (bottom of Figure 4) branching out to all the farm dams. The map also shows Narran Lake on the eastern side (adjacent to tank 46) from which 3 members used to draw channel water under gravity when the Lake was full.

The **River Pump** on the Barwon River (Photo 1) delivers water using a large electric irrigation pump rated at 26 ML/day. The old water access licence under the previous WAL 35396 to fill the channels was 1860 ML/yr from an un-regulated flow. This licence had a cease to flow condition of <750 ML/day at the Brewarrina town weir gauging station 422002. This cease to flow licence condition was similar to the old Class B irrigation licence (~ 825 ML/day) but is a slightly lower figure, discounted approximately 10%. Operating the channel system was very problematic because of the unregulated nature of the river flow. Channel & dam filling was generally done in autumn/winter if river flows were high enough over an 8-10 week period to fill dams. Once dams were full they provided stock water for extended periods of 12 – 18 months, irrespective of river flow.

Photo 1 – BCA River Pump Fills Header Dam

Photo 2 – BCA Channel Header Dam Adjacent to River

Annual electricity consumption was as high as 100,000 KWhr. Prior to filling, channels had to be made ready for water transmission by grading to remove any vegetation or soil that had washed or blown in and repairing any potential leak points caused by erosion. The annual cost of operating & maintaining the channels was estimated to be around $60,000/yr. Addition to that was the cost of lost grazing opportunities when the river flow was too low for pumping when there was grass for stock feed but no water for stock to drink. This additional cost was estimated at a further $110,000/yr. Total annual cost of the BCA channel system was estimated at $170,000/yr. In one instance a large landholder member of BCA carted water to paddocks in a drought when no river water was available over a 3 month period. The cost of this exercise was estimated to be $86,000 over the 3 months. By contrast it is estimated the total cost of operating the new BCA pipe scheme will be around $25,000/yr, a saving of nearly $145,000/yr.

As described previously 3 members of the BCA had access to water from Narran Lake that drew channel water under gravity when the Lake was full. Generally this was only available about every 10 years so was not a reliable source of water. It was more a relic of the old original 1950's channel system. Photo 3 below shows the concrete channel controls structure in July 2009 during the drought with a very dry Narran Lake in the background. This control prevented lake water being drawn from the lake when not needed. However, in 2011 during flooding of Narran Lake a severe erosion gully formed a breach around the structure as shown in Photo 4. This photo was taken in August 2011. However it appears the breach may have occurred in May 2011 (Photo 5). In January 2012 a temporary block dam was constructed to stop Narran Lake prematurely emptying and flooding the BCA construction site (Photo 6). A 50m long permanent block dam was constructed in January 2013. As a result no further channel water will flow from Narran Lake which will have significant environmental benefits.

Photo 3 – Narran Channel Control Structure

Photo 4 – Narran Channel Control Structure Failure

Photo 5 – Narran Channel Breach & Flooding

Photo 6 – Narran Channel Block Dam to Stop Breach

5.2 Planning & Design

One of the most important issues of the landholders involved with this project concerning the design has been the reliability of water supply. The first decade of the 21st century was the "decade of drought". This manifested in long periods of low flow in the Barwon River. Between 2000 & 2008 the flow in the Baron River at Brewarrina had extended periods of flow <750 ML/Day. Over this period flow <750 ML/Day occurred on average for 65% of the time. Figure 5 shows a graph of Barwon River flow at Brewarrina from 2002 – 2008.

In the worst period over the 6 years between 2002 & 2008, the longest period of flows <750 ML/Day was for 482 days from June 2006 till November 2007. The next longest period of flows <750 ML/Day was only for 354 days in between June 2002 till June 2003. By contrast the longest period of flows >750 ML/Day was only for 90 days in May 2005. The next longest period of flows >750 L/Day was only for 43 days in October 2005. This prevented pumping to fill the channels and much of the area owned by the BCA was de-stocked over this period.

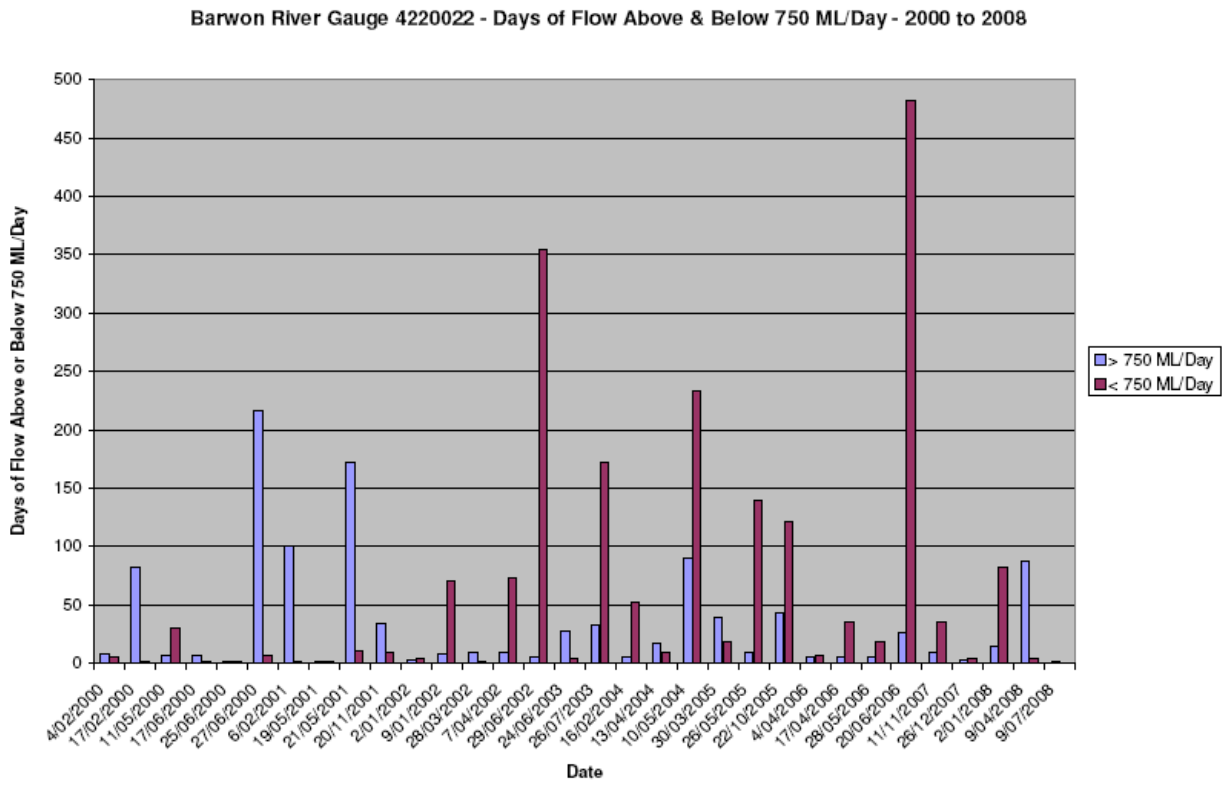


Figure 5 – Barwon River Flow at Brewarrina 2002-2008

Another view of long term river reliability came from looking at flows for each decade from 1893 to 2008. These are shown in Figure 6 which shows flows >750 ML/Day. From 1893 to 1950 flows >750 ML/Day generally occurred 50 – 60% of the time. From 1950 to 1980 flows >750 ML/Day generally occurred 70 – 80% of the time. However worryingly form 1980 to 2008 flows >750 ML/Day have gradually decreased from 80% to 35%. Possible reasons include increased catchment irrigation development, a changing rainfall trend (drying) and less catchment runoff.

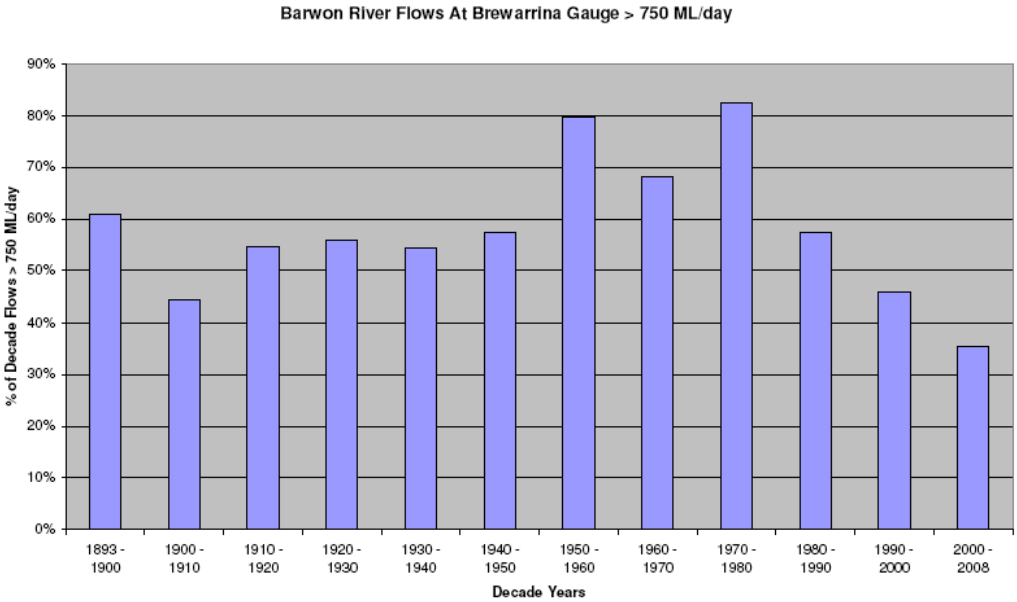


Figure 6 – Barwon River Flow > 750 ML/Day at Brewarrina 1893-2008

One of the fundamental problems of a piped system which use small storage tanks is that these tanks generally only provide 3-5 days of storage. For an unregulated river this system will be extremely

unreliable. To provide a satisfactory reliable water supply a groundwater bore GW273148 was sunk to the Great Artesian Basin (GAB) to a depth of 206m (Photo 8) to provide a back up water supply when flows in the Barwon River are <750ML/Days. This bore is located at the northern end of the BCA service area some 37km away from the river. The bore was constructed by the Drilling Unit, NOW, Dubbo (Photo 7). Total cost of the bore was $92,502 incl GST.

Photo 7 – Drilling Rig New BCA Bore

Photo 8 – GAB Bore GW 273148 sunk to 206m

The new pipe system has been designed around these 2 sources of water supply. At the river a submersible pump is used to provide a flood proof system (Photo 13). This water is pumped to a transfer pump station 500m away that is located behind a levee bank that delivers the water to the storage tanks (Photos 14 & 15). At the bore again a submersible pump is used to pump water to the surface to a transfer pump station that then delivers the water to the storage tanks. The pipe has the capacity to deliver the full demand from either end. A third transfer pump station (Photo 18) is located on the western side of the project area near existing power to service the west side of the scheme.

All planning, design and tender document preparation was done by staff from NOW (Photo 9). The pipeline and tank design process began with a property plan of all works. This involved meeting with the landholders concerned and conducting detailed property planning of all property infrastructure, including pegging and capturing the GPS location of all tanks sites.

Photo 9 – Property Planning with Landholders

Photo 10 – Pipeline Survey by NSW State Water

The final pipeline route survey was done by surveyors from State Water, Parramatta (Photo 10). The project Review of Environment Factors (REF) was done by NSW Public Works Department (Water Solutions) with field inspections by OzArk Environmental & Heritage Management Pty Limited, Dubbo.

The final design included 3 pump stations, 170 km of polyethylene pipe, 73 storage tanks, 99 troughs and a 4.5km power line extension to the new bore site. Pipe sizes range from 125mm to 50mm. Storage tanks range from 115KL to 5KL. The final tender plan is shown in Appendix 3.

5.3 Procurement Tender, Costs & Construction

All pipeline procurement for the Pipeline NSW program was in accordance with the NSW Government Procurement Guidelines. To this end the NSW Public Works Department (PWD) Dubbo and Hay offices from within the NSW Department of Services were contracted to be responsible for all aspects of procurement, tendering and contract supervision during construction.

Tenders for the BCA were called 28/3/2011. Tenders closed 5/5/2011 and 6 tenders were received. Prices (incl GST) varied from $2.58m, $2.64m, $2.83m, $3.59m, $3.85m & $5.40m. These compared with the pre-tender estimate of $2.72m.

The final contract was awarded to Aquawest Pty Ltd, Dubbo on 27/7/2011 for the lump sum price of $2.64m. Variations during construction totalled a further $0.042m. Additional works outside the contract were done to close down the Narran Channel and install associated pipe works at a cost of $0.11m. Total final project cost including the bore was $2.792m.

The original contract completion date was 7/3/12, however due to long periods of rain and flooding the construction was not completed till 2/5/13.

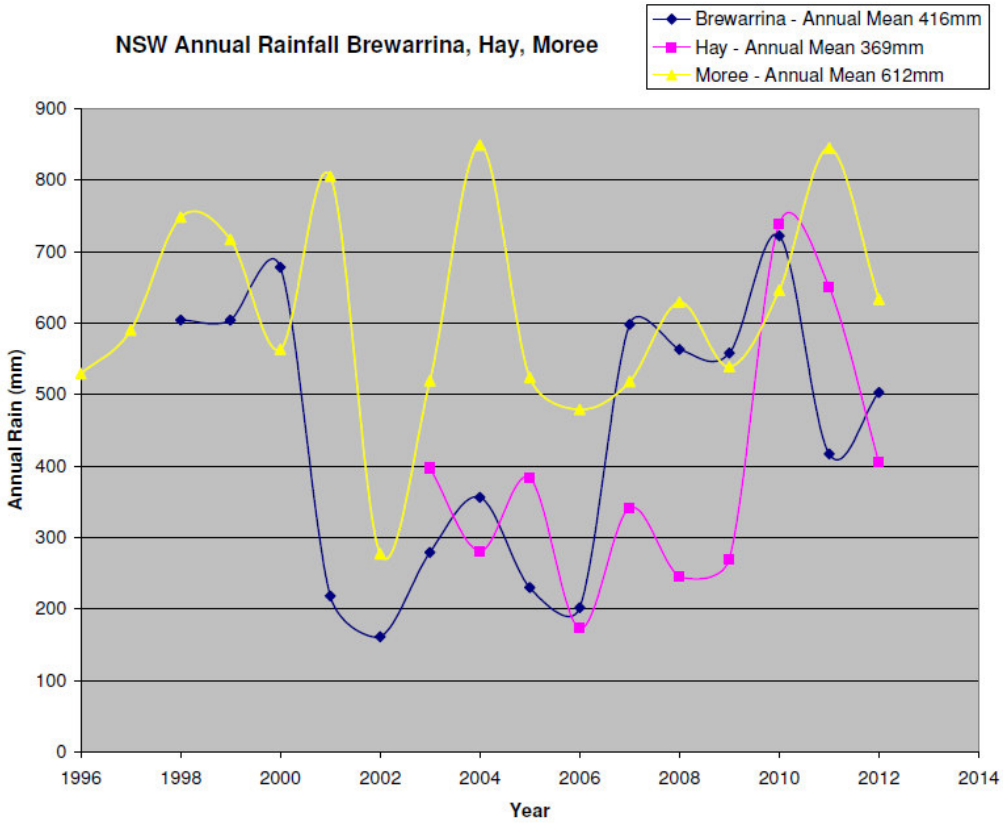


Figure 7 – NSW Annual Rainfall at Brewarrina, Hay & Moree 1996 - 2012

Figure 7 shows 720mm of rain occurred in 2010 compared to the annual mean of 416mm. In late December 2010 and January 2011 extreme rainfall caused severe flooding of the BCA site and delayed the project by over 12 months. Finally on 2 May 2013, PWD issued a completion certificate.

The photos below show some of the project construction activities.

Photo 11 – Pipe Trencher on BCA project

Photo 12 – Pipe Dispenser on BCA project

Photo 13 – BCA River Submersible Pump

Photo 14 – BCA River Transfer Pump Shed

Photo 15 – BCA River Transfer Pump Station

Photo 16 – Stock Trough on BCA project

Photo 17 – Cup & Saucer Tank on BCA project

Photo 18 – BCA Western Transfer Pump Station

6 Lower Gwydir River Project

6.1 Project Description

The Lower Gwydir (LG) pipeline project is located approximately 70km west of Moree at the end of the Gwydir River. The Gwydir Regulated Water Sharing Plan makes provision for a stock and domestic replenishment flow of up to 4000ML a year for use by landholders located in the Lower Gwydir area. This group take the supplementary water (SW) flow from the Lower Gwydir River near the property "Old Dromana" in the Gwydir Wetlands.

Originally, landholders placed an order for stock and domestic replenishment water once a year that was diverted from the river at Hatton's Weir (Photo 33) into approximately 100 km of channels and stored in 26 farm dams for domestic use at the homesteads to the west.

Most of these landholders in the project area are members of Meroe & Curregundi Artesian Bore Water Trusts (BWT) that were piped a few years ago. These schemes already provide low salinity stock water to the properties as well as domestic service water (toilets, showers, washing) at each homestead. Previously river water was diverted down bore drains during winter under gravity to fill dams at each homestead to provide fresh water for garden watering.

A map of the old channel system is shown in Figure 8.

Figure 8 – Lower Gwydir Water Users, Homesteads Gwydir River, Channels

Within the project area lies the internationally recognised RAMSAR listed Gwydir Wetlands which is located on the property 'Old Dromana' just to the north of Hatton's Weir. Water savings from the project will be used to enhance the environmental values in the Gwydir Wetlands.

6.2 Planning & Design

The new fresh water pipeline will continue to provide fresh water for garden purposes. To provide a satisfactory reliable water supply, 3 shallow groundwater bores GW273195, GW273213 and GW273217 were sunk to a depth of around 60m into the sediments of the GAB Surat groundwater source to a depth of around 60m (Photos 19). Bores GW273195 & GW273213 will be the main production bores for the Lower Gwydir Water users (Photo 20) and bore GW273217 will be primarily used on the property "Gallibaraay". The bores were constructed by the Drilling Unit, NOW, Dubbo. Total cost of the bores was $285,370 incl GST.

The new pipe system has been designed around the 2 main production bores for the Lower Gwydir Water users. Each bore is equipped with a submersible pump. This water is pumped to a transfer pump station (Photos 21&22) nearby that then delivers the water to the storage tanks. The 2 bores will be used alternatively and then given time for the aquifer to recover.

All planning, design and tender document preparation was done by staff from NOW. The pipeline and tank design process began with a property plan of all works. This involved meeting with the landholders concerned and conducting detailed property planning of all property infrastructure, including pegging and capturing the GPS location of all tanks sites.

The final pipeline route survey was done by surveyors from State Water, Parramatta. The project Review of Environment Factors (REF) was done by SMK Consultants, Moree.

Final design involves 125 km of polyethylene pipe and 36 storage tanks. No stock troughs were required. Pipe sizes range from 110mm to 50mm. All storage tanks are 23KL. The final tender plan is shown in Appendix 3.

6.3 Procurement Tender, Costs & Construction

All procurement for the Pipeline NSW program was in accordance with the NSW Government Procurement Guidelines. To this end the NSW Public Works Department (PWD) Dubbo and Hay offices from within the NSW Department of Services were contracted to be responsible for all aspects of procurement, tendering and contract supervision during construction.

Tenders for the LGPID were called 22/8/2011. Tenders closed 20/9/2011 and 5 tenders were received. Prices (incl GST) varied from $1.39m, $1.39m, $2.09m, $2.94m, $3.75m. These compared with the pre-tender estimate of $1.58m.

The final contract was awarded to Darling Irrigation Pty Ltd, Bourke on 15/11/2011 for the lump sum price of $1.39m. Variations during construction totalled a further $0.038m. Additional works outside the contract were to provide water meters to the bores and the pump station at a cost of $0.027m. Total final project cost including the bore was $1.74m.

The original contract completion date was 1/5/12, however due to long periods of rain and flooding the construction was not completed till 24/4/13. Figure 7 shows 845mm of rain occurred in 2011 compared to the annual mean of 612mm. In November 2011 extreme rainfall caused severe flooding of the LGPID site and delayed the project by nearly 12 months. Finally on 24 April 2013, PWD issued a completion certificate.

The photos below show some of the project construction activities.

Photo 19 – Bore Drilling on LG Project

Photo 20 – Bore Headworks on LG Project

Photo 21 – Balance Tanks LG Pump Station

Photo 22 – LG Bore Transfer Pump Station

Photo 23 – Pipe Trenching on LG project

Photo 24 – Water Tanks on LG project

7 Noonamah Water Authority – Lachlan River Project

7.1 Project Description

Noonamah Water Authority (NWA) pipeline scheme lies on the Lachlan River near Corrong west of Hay. The Group supplies water to 4 members. This group pump water into a network of 150km of channels to fill 43 farm dams. Three of the members from the properties "Noonamah", "Keiross" & "Tarwong" have participated in the Pipeline NSW Program. The fourth from Nandum/Duckshot is being funded from the new Basin Pipe Program that is also administrated by NOW.

A map of the old channel system is shown in Figure 9.

Figure 9 – Noonamah Water Authority, ▢ Dams, — Channels

The **River Pump** on the Lachlan River delivers water using a large diesel irrigation pump rated at 25 ML/day (Photo 25). The old water access licence under the previous WAL 15138 to fill the channels (Photo 26) was 1329 ML/yr. A second WAL 15139 owned by "Keiross" of 162 ML/yr also contributed to the total project water savings.

In a typical year the NWA have used 10,000 L of diesel fuel per year over an 8 week period. The annual cost of operating & maintaining the channels was estimated to be around $60,000/yr. No estimates were given for the situation of lost grazing opportunities when the river stopped flowing as this has rarely occurred on this regulated part of the Lachlan River. However one landholder estimated the cost of de-stocking for a period of 4 months when the river stopped flowing in the 2009 was more than $50,000.

Photo 25 – NWA Diesel River Pump

Photo 26 – NWA Channel Stilling Basin

7.2 Planning & Design

One of the most important issues of the landholders involved with this project concerning the design has been the reliability of water supply. During the first decade of this century the Lachlan River stopped flowing on a couple of occasions for a period of 3 – 6 months. For the landholders concerned they needed to have an alternate water supply.

Groundwater bores seemed the obvious solution, but the Lower Lachlan Groundwater zone is highly variable and highly saline. Three bores were sunk to find groundwater. For design purposes the landholders concerned wished to maximise water supply options and preferred to split apart from the Group and to construct 3 separate water pipelines.

Tarwong

On "Tarwong" all water is sourced from a bore near the homestead and a large dam close by. Bore GW 273196 was sunk to a depth of 232m, with a water quality of 5800 parts per million (ppm). As "Tarwong" is the furthest property from the river, some 40km away, a dedicated pipe from the river was not economically feasible.

To provide a second water supply option a large 16,000m3 dam was constructed on a 20Ha clay pan (Photo 32). This dam was sized to have a 2 year storage including seepage and evaporation. A solar powered pump delivers this water back to the homestead 3.4km away where the new bore is located near power. A novel solution has been developed whereby 2 x 115KL balance tanks, one with fresh water the other with salty water at 6000ppm sit side by side adjacent to the central transfer pump station. Fresh and salty water can be blended within the pump impellors to give a water dilution of around 2900ppm or half that of undiluted bore water. This has 2 benefits. The fresh water demand is halved so that the dam supply can last longer and the salinity is reduced so this shandied water can be consumed by cattle. The NSW Department of Primary Industry (DPI) recommends a maximum salinity for cattle of 4000ppm. Sheep on the other hand can tolerate up to 10,000ppm.

The transfer pump station at the homestead delivers water to 2 loops. One loops east and delivers fresh or shandied water with a salinity of 2900 ppm for use primarily by cattle on flood plain pasture. The other loops west and delivers bore water only for use primarily by sheep on dry land pasture.

Keiross

This property has an existing pipeline from the river to power at the homestead. This pipe is the primary source of water for the property. On "Keiross" bore GW 273197 was sunk to a depth of 328m to provide a back up source of water. However only a thin aquifer was found and the bore could only achieve a yield of < 0.1 L/s. The bore was deemed a failure and a large 16,000 m3 dam was sunk near the woolshed on a large clay pan as a back up water supply. This dam was sized to have a 2 year storage including seepage and evaporation.

Noonamah

This property has direct frontage to the Lachlan River. A river pump station provides the primary water supply (Photos 27&28). As a back up supply, bore GW 273198 (Photo 29) was sunk to a depth of 272m, water quality was 5800ppm. This bore is located 150m away from the river pump. A submersible pump is used to pump bore water to the surface to a balance tank. This water then flows under gravity to the river transfer pump station to then be pumped to the tanks in the field (Photo 30) and stock troughs (Photo 31).

All planning, design and tender document preparation for this project was done by staff from NOW. The pipeline and tank design process began with a property plan of all works. This involved meeting with the landholders concerned and conducting detailed property planning of all property infrastructure, including pegging and capturing the GPS location of all tanks sites.

The final pipeline route survey was done by surveyors from State Water, Parramatta. The project Review of Environment Factors (REF) was done by OzArk Environmental & Heritage Management Pty Limited, Dubbo.

The bores were constructed by the Drilling Unit, NOW, Dubbo. Total cost of the bores was $480,886 incl GST.

Final design involves 113 km of polyethylene pipe, 41 storage tanks and 60 troughs. Pipe sizes range from 90mm to 50mm. Storage tanks range from 115KL to 5KL.

7.3 Procurement Tender, Costs & Construction

All procurement for the Pipeline NSW program was in accordance with the NSW Government Procurement Guidelines. To this end the NSW Public Works Department (PWD) Dubbo and Hay offices from within the NSW Department of Services were contracted to be responsible for all aspects of procurement, tendering and contract supervision during construction.

Tenders for the NWA were called 7/9/2011. Tenders closed 11/10/2011 and 7 tenders were received. Prices (incl GST) varied from $1.50m, $1.52m, $1.60m, $1.60m, $1.70m, $1.90 & $3.22m. These compared with the pre-tender estimate of $1.63m.

The final contract was awarded to Watertight Solutions, Condobolin on 14/12/2011 for the lump sum price of $1.70m. Variations during construction totalled a further $0.074m. Total final project cost including the bore was $2.26m.

The original contract completion date was 1/5/12, however due to long periods of rain and flooding the construction was not completed till 12/3/13. In mid 2012 flooding from the upper Lachlan

catchment inundated the area and delayed the project by nearly 6 months. Finally on 13 March 2013, PWD issued a completion certificate.

The photos below show some of the project construction activities.

Photo 27 – Noonamah River Pump Shed

Photo 28 – Noonamah River Pump Station

Photo 29 – Noonamah Bore Pump Station

Photo 30 – Tarwong Water Tank

Photo 31 – Keiross Stock Trough

Photo 32 – Tarwong dam & solar pump

8 Water Savings & Environmental Benefits

8.1 Water Savings

In line with the funding deed, the water savings are to be shared in equal part by the NSW and Commonwealth Environmental Water Holders and secured for environmental purposes. To give effect to this, access licences equivalent to the savings are to be issued to the NSW Minister for the Environment and conditioned as adaptive environmental water. The Commonwealth interest in these savings will be via a charge (registered interest) registered with the Land and Property Information NSW (LPI) in this licence once created.

Water savings accruing from the Pipeline NSW Program are summarised in Table 1 below. Total savings derived from this program are 4074 ML/yr. This meets the requirements of the funding deed. The water saved will be reallocated and managed for environmental purposes through environmental water licences held by the NSW and Commonwealth Governments to benefit the river where the savings were created. This water will be managed in accordance with the relevant river's adaptive environmental water (AEW) use plan by the NSW OEH. In all instances environmental water will be used at adjacent wetland sites on the relevant river.

Pipeline NSW Program - Summary of Environmental WALs Created						
Type	New WAL	ML	Holder	WSP	AEWU Approved	Project
Regulated river (high security)	36318	291	NSW Minister for the Environment, with Commonwealth registered interest	Gwydir Regulated River Water Source	7/09/2012	Lower Gwydir
Supplementary	36319	1,500	NSW Minister for the Environment, with Commonwealth registered interest	Gwydir Regulated River Water Source	7/09/2012	Lower Gwydir
Regulated river (high security)	36312	795	NSW Minister for the Environment, with Commonwealth registered interest	Lachlan Regulated River Management Zone downstream of Cargelligo	7/09/2012	Lower Lachlan
Unregulated River	36273	1,488	NSW Minister for the Environment, with Commonwealth registered interest	Barwon Darling Unreg River Water Source, Boorooma to Brewarrina Management Zone	31/05/2013	Barwon Channels
	Total	4,074				

Table 1. Summary of Environmental WALs from Pipeline NSW Program

Lower Gwydir Water Savings

River simulation computer models were used to calculate the amount and characteristics of the water savings achieved from the project. As a result of this project the Water Sharing Plan will be amended to remove the requirement for Lower Gwydir Domestic and Stock Replenishment flows.
Savings associated with the Lower Gwydir Domestic Water Supply Project have been assessed as being equivalent to 291 ML regulated river (high security) entitlement and 1,500 ML supplementary water entitlement.

The savings accrued in this river will be used in the Lower Gwydir Wetlands near the property "Old Dromana" in the Gwydir Wetlands adjacent to Hatton's weir. This was the offtake point for the S&D replenishment flows that used to fill the channels of the Lower Gwydir Water Users. This environmental water will be managed in accordance with the Gwydir AEW use plan that was approved 7th September 2012.

Photo 33 – Hattons's Weir on the Lower Gwydir River

Barwon River Water Savings

The BCA originally accessed water from WAL 35396 that had a volume of 1860 ML/yr. The pipeline project agreement provided for an 80% grant from the Pipeline NSW Program in return for 80% of the water savings ie 1488 ML. The savings accrued in this river will be used in Ngemba Lagoon on the Barwon River 26km downstream of the old BCA pump/channel offtake. Both the BCA pump site and the proposed pump site for the Ngemba Lagoon environmental water offtake are within the Brewarrina town weir pool. This environmental water will be managed accordance with the Barwon-Darling AEW use plan that was approved 31 May 2013.

Photo 34 – Ngemba Lagoon on the Barwon River

Lower Lachlan River Water Savings

The NWA originally accessed water for the channels from WAL 15138 and WAL 15139. WAL 15138 which took in the properties of "Tarwong" & "Noonamah" had a volume of 454ML & 211 ML respectively to trade for water savings. Both these properties traded 100% of their water for funding of the pipeline project ie 665 ML in exchange for 100% project funding. WAL 15139 which took in the property "Keiross" had a volume of 162ML to trade for water savings. This property traded 80% of their water for funding of the pipeline project ie 130 ML in exchange for 80% project funding. Total water savings for this project were 795 ML. Table 2 below summarises the water savings from this project.

Noonamah Water Authority (NWA) - Water Allocations & Savings

Noonamah Water Authority Property	S&D License Allocation ML	% Allocation	Area Serviced by Channel before piping Ha	Area Currently Piped Ha	Area Currently Serviced by Channel Ha	% Area Serviced by Channel	Water Available to Trade ML	Water to Trade ML	Water to be retained on license ML
Tarwong (see note)	454	49%	10570	0	10570	100%	454	454	0
Noonamah	302	33%	8100	2429	5671	70%	211	211	91
Keiross	162	18%	6053	0	6053	100%	162	130	32
Total	918	100%	24723	2429			827	795	123

100% Pipeline NSW grant
80% Pipeline NSW grant

Table 2. Summary of Water Savings for the Lower Lachlan Pipeline Project

The savings accrued in this river will be used from Booligal Weir near the town of Booligal on the Lower Lachlan River. This environmental water will be managed accordance with the Lachlan AEW use plan that was approved 7th September 2012.

Photo 35 – Booligal Wetland on the Lower Lachlan River

8.2 Environmental Benefits

The NSW government's contribution of $3.5m for this program came from the NSW Rivers Environmental Restoration Program (RERP) Trust, through the River Bank program administered by the NSW Office of Environment & Heritage (OEH). One of the aims of the Trust was to deliver long-term and permanent benefits to ecologically significant wetlands through water efficiency projects. Investment in the Pipeline NSW Program makes a significant contribution to this aim.

The open channels and dams have been replaced with efficient small diameter pipelines, tanks and troughs to provide landholders with a more secure and better quality water supply for stock and domestic use. Typically the old channel and dams system would waste up to 90% of the water taken from the river. Much of this water is lost through seepage and this would add to localised shallow groundwater aquifers, adding to the increased risk of rising salinity.

The scheme also helps to conserve bio-diversity and reduce feral animal populations while providing a sustainable domestic water supply for farming families within the scheme area.

Additional benefits accrued from reduced greenhouse due to less water being pumped and wasted. Now up to 90% of that energy use will be saved, whilst a small amount of energy will be used to pump the 10% of water used in the pipeline. For example the BCA scheme used up to 100,000 KWhr of power per year, typically over a 6 week period. The NWA scheme used 10,000 L of diesel fuel per year over an 8 week period.

9 Expenditure Statement

A full detailed financial statement cannot be presented at this date due to the proximity of the end of the financial year. Currently the NOW books are not closed so a full financial position cannot be presented. However in accordance with the Deed a detailed financial statement will be presented to SEWPaC within 60 days of the 30/6/2013.

The following table 3 presents the summary of project construction expenditure & commitments for all construction works carried out under the Pipeline NSW Program from 2009 – 2013. This totals $6,230,360 excl GST.

Pipeline NSW - Summary of Project Construction Expenditure & Commitments 30/05/2013

Project	Approval excl GST	% of awarded Pipeline Contract
1. Barwon Channel Association		
Pipeline Survey	$36,660	1.5%
REF	$53,364	2.2%
Tendering - PWD	$36,655	1.5%
Construction Supervision - PWD	$86,998	3.6%
Bore Drilling - GW 273148	$84,093	3.5%
Pipeline Construction - awarded tender $2,643,300 incl GST	$2,403,000	100.0%
Pipeline Construction Variations to date	$134,507	5.6%
sub-total	$2,835,277	
2. Noonamah Water Authority - Lower Lachlan River		
Pipeline Survey	$20,200	1.3%
REF	$35,873	2.3%
Tendering - PWD	$25,695	1.7%
Construction Supervision - PWD	$65,684	4.3%
Bore Drilling - GW 273196, GW 273197, GW 273198	$418,988	27.2%
Pipeline Construction - awarded tender $1,694,175 incl GST	$1,540,159	100.0%
Pipeline Construction Variations to date	$67,489	4.4%
sub-total	$2,174,089	
3. Lower Gwydir Pipeline Project		
Pipeline Survey	$0	0.0%
REF	$8,000	0.6%
Archeological Survey	$0	0.0%
Tendering - PWD	$25,418	2.0%
Construction Supervision - PWD	$78,354	6.2%
Bore Drilling - Test Bores GW 273140, GW 273141,GW 273142,GW 273143	$54,953	
Bore Drilling - Production Bore 1 GW 273195	$75,028	20.5%
Bore Drilling - Production Bore 2 GW 273213	$71,382	
Gallibaraay - Production Bore GW 273217	$58,064	
Pipeline Construction - awarded tender $1,390,564 incl GST	$1,264,149	100.0%
Pipeline Construction Variations to date	$58,547	4.6%
sub-total	$1,693,895	

Total Commitments $6,703,261

Summary of Commitments	**Approved**	
Project Planning & Studies	**$472,901**	
Bore Construction	$762,508	
Pipeline Construction	$5,207,308	
Pipeline Construction Variations	$260,544	5.0%
Total Project Construction	**$6,230,360**	

Table 3. Summary of Project Construction Expenditure & Commitments to 30/05/2013

The following table 4 presents the Program Budget Summary to 30/5/2013. Income budgeted to be received was $7,000,000 excl GST from the Commonwealth & NSW governments. Landholder contributions to the construction projects totalled $857,434 excl GST. Total available funds were $7,857,434 excl GST. With regard commitments NOW salaries were $1,200,747, Project Planning & Studies were $472,901 and Project Construction were $6,230,360 excl GST. Total commitments were $7,904,008 excl GST. This resulted in a predicted budget deficit of $46,575 excl GST that will be met solely by NOW. The Commonwealth will not share the cost of this deficit.

Pipeline NSW Program Budget Summary **30/05/2013**

Summary	Budget	Landholder Contribution	Total Funds excl GST	Approved Commitment excl GST	Balance Funds Less Commitments
Salaries, GIS Study, River modelling	$625,000		$625,000	$1,200,747	-$575,747
Project Planning & Studies	$375,000		$375,000	$472,901	-$97,901
Total Project Construction	$5,400,000	$857,434	$6,257,434	$6,230,360	$27,074
Program Contingency	$600,000		$600,000		$600,000
Total excl GST	**$7,000,000**	**$857,434**	**$7,857,434**	**$7,904,008**	**-$46,575**

Landholder Project Construction Contribution Details		incl GST	excl GST	
	Barwon Channel Association	$822,147	$747,406	20% contribution
Barwon Channel Association variations	$139,113.98	$27,823	$25,293	20% contribution
Lower Lachlan Project	$466,036	$93,207	$84,734	20% contribution
		Total	$857,434	excl GST

Table 4. Program Budget Summary to 30/05/2013

By way of feedback for future projects the following table 5 presents an analysis of project cost expenditure. The cost of other components to the project eg pipeline survey, design, REF, bores have been expressed as a % of the Pipeline Construction Budget. Of note it is important to allow for pre-tender cost contingencies of at least 15% and post tender cost contingencies for variations during construction of at least 5%. Also bores, which were important in finding alternate sources of water, accounted for 12% of the cost expressed as a % of the pipeline cost.

Pipeline NSW Project Cost Expenditure Analysis

Project Component	% of Final Pipeline Construction Cost
Pipeline Survey	1%
Pipeline Design	1.5%
Pipeline REF	2%
Bores	12%
Pipeline Tendering sub-contract	1.5%
Pipeline Construction Supervision sub-contract	4%
Contingency	3%
sub-total	25%
Pipeline Construction Budget	100%
Pre-tender Pipeline Cost Contingency	15%
Post-tender Pipeline Cost Contingency for variations	5%

Notes: Figures & contingencies derived from actual performance of the Pipeline NSW Program 2009 - 2014

Table 5. Pipeline NSW Project Cost Expenditure Analysis

10 Program Development, Progress & Milestones

The idea of seeking funding to demonstrate the piping of open channels that delivered river water to farm dams began in 2003 with a submission to the Commonwealth's *Water Savings Idea Project* in 2003. Funding was not approved until August 2009, over 6 years latter. The submission was inspired by the highly successful NSW/Commonwealth funded Great Artesian Basin Sustainability Initiative (GABSI) that has piped many 1000s of km of open bore drains in NSW saving 1000s of ML of ground water.

The history of submissions for this program is detailed below:

1. Idea first submitted to the Commonwealth's *Water Savings Idea Project* June 2003.
2. Commonwealth invitation to NSW to make submission to Water Smart Program mid 2005.
3. Pipeline NSW program submission to NSW Cabinet in December 2005.
4. NSW Cabinet approval June 2006 and program submitted to National Water Commission (NWC).
5. Draft NWC Deed sent to NSW September 2007.
6. **Final NWC Deed signed by NSW March 2008** and sent to NWC.
7. In July 2008 the NWC was no longer responsible for the Program which was transferred to the Commonwealth DEWHA. A new DEWHA Deed sent to NSW in August 2008.
8. NSW amended Deed sent to DEWHA December 2008.
9. DEWHA sent final Deed to NSW April 2009.
10. **NSW signed final revised Deed May 2009**.
11. NSW signed amendment to final Deed in August 2009 to reduce scope from 4 projects to 3 projects because of reduced time available to meet Commonwealth funding deadlines (only 2 years available instead of original 3 years because of long time to get final deed signed).
12. Funding Deed further amended 2nd August 2011 to provide new completion date of 30th May 2012 because of flooding delays.
13. Funding Deed again amended 31st May 2012 to provide new completion date of 30th April 2013 because of continuing flood delays.
14. Program finally completed June 2013.

The original Program proposal was to construct 4 demonstration sites. This original program, set out in the June 2006 submission, was to go over 3 years. However because of delays in finalising the Deed, that didn't occur until May 2009, the program was reduced to 3 sites only to be constructed over 2 years. This tight timetable resulted in the proposal to construct a 4th site on the Macquarie River being removed.

The final amended funding deed milestone table is included in Appendix 4.

11 Promotional Material

The following promotional material was released during the Pipeline NSW Program:

Media Release National Water Week 21/10/11
The Australian Pipeline Magazine January 2012
The Land 19 January 2012
Ministerial Media Release January 2013
The Land January 2013

Copies of all material are included in Appendix 5.

12 Key Learnings & Recommendations

Key learnings & recommendations resulting from the Pipeline NSW Program include:

- Be prepared for wet weather which can cause significant delays to pipeline construction. Future projects should factor in that the north of the state experiences summer dominated rainfall while the south of the state experiences winter dominated rainfall.
- The need to have a clear and concise agreement with landholders and the importance of ensuring agreed works are properly reflected in designs.
- The availability of competent drillers may be a constraint on a future larger project implementing multiple projects.
- The need to implement streamlined tendering and contractor selection processes as delays in awarding some tenders under Pipeline NSW caused issues with meeting deadlines.
- Additional time needs to be allowed to issue WALs as the process to include Adaptive Environmental Water Use conditions can be complicated.
- The project benefited by developing a standard contract document and this will be continued in future projects.
- The project benefited by utilising lump sum contract tendering to ensure good control of contract expenditure as the alternative of schedule of rates would have caused a cost blow out due to the extended time frame of construction due to wet weather and flooding.
- The project benefited from the use of standard design procedures developed over many years by the CAP & Pipe the Bores Program. This will be continued in future projects.
- Where landholder contributions are involved these should be clearly agreed up front and payments to the project should be in linked in advance of key deliverables.
- Water reliability is a key element to landholder engagement to ensure uptake of future programs.
- The project developed schemes where groundwater was used to supplement river water or completely replace the use of river water. This concept will be useful in future projects.
- Alternate sources of water (where possible) may assist in convincing landholder to participate in a project where there are concerns about the reliability of river flows during a drought.
- The development of statewide GIS maps identified potential piping projects for future projects.
- It is now evident that large water savings of up to 90% can be accrued through piping open earth channels with a modern, efficient pipeline scheme. This needs to be promoted to landholders.
- The project highlighted the reduction in operating cost to landholders of running and operating an open channel system compared to a piped one, in one case from $170,000/yr to an estimated $25,000/yr, a saving of up to $145,000/yr.
- After initial landholder contact it was important to keep them informed of cost estimates and water reliability options associated with feasibility design options, landholders were not willing to proceed if water reliability issues were left unanswered
- Extensive engagement with landholders is required to develop funding proposals. The engagement process is magnified in group schemes due to the conflicting issues between group members. This was evident in the Lower Gwydir project.

13 References

Pipeline NSW Funding Agreement, Commonwealth of Australia, Dept. Environment, Water, Heritage & Arts, August 2009.

Appendices

Appendix 1 – S&D Licence Co-ordinates & WSP Replenishment Flows

Lachlan River Stock & Domestic Access Licenses

	Access License No	Share ML	Latitude	Longitude	MGA Zone	GDA 94 Easting	GDA 94 Northing
1	70CA601244	1756	-33.3998	147.7758	55	572149	6304119
2	70WA602155	1329	-34.1436	144.5511	55	274207	6219208
3	70CA601295	870	-34.2447	144.2283	55	244743	6207237
4	70WA602409	575	-33.8680	144.8788	55	303793	6250451
5	70CA600074	481	-33.0882	147.0493	55	504600	6338936
6	70WA601818	280	-33.8498	144.9015	55	305848	6252519
7	70CA601443	271	-34.2199	144.3961	55	260123	6210398
8	70CA601235	246	-34.2227	144.4718	55	267112	6210261
9	70WA602190	211	-33.0851	146.9521	55	495529	6339279
10	70WA600091	198	-33.2336	146.1887	55	424410	6322523
11	70WA600023	160	-33.2930	146.3813	55	442396	6316054
12	70WA602384	160	-33.0763	146.7994	55	481273	6340233
13	70CA602112	138	-34.1324	144.5780	55	276655	6220510
14	70WA601479	128	-33.2113	147.2423	55	522576	6325261
15	70WA601660	126	-33.7355	144.9487	55	309965	6265283
16	70CA602169	122	-33.8396	144.9081	55	306438	6253662
17	70CA601932	121	-33.4339	145.5362	55	363921	6299651
18	70WA601699	120	-33.1775	147.0188	55	501749	6329038
19	70CA602315	119	-34.2444	144.3373	55	254781	6207542
20	70WA601477	112	-33.2108	147.0809	55	507541	6325341
21	70CA603060	110	-33.0306	146.7007	55	472049	6345280
22	70CA600592	109	-34.0575	144.6819	55	286052	6229048
23	70WA601695	102	-33.5380	145.3956	55	351030	6287916
24	70CA602265	100	-33.6809	145.2374	55	336615	6271830
25	70WA601935	92	-33.5181	145.4841	55	359215	6290244
26	70CA603352	88	-33.5348	145.4005	55	351483	6288277
27	70WA602328	88	-33.4341	148.1762	55	609337	6299973
28	70WA603050	56	-33.7018	145.0454	55	318852	6269192
29	70WA601486	54	-34.1823	144.5247	55	271871	6214859
30	70CA601955	53	-33.5390	145.4106	55	352423	6287821
31	70CA603117	52	-33.5434	145.4521	55	356289	6287394

Murrumbidgee River Stock & Domestic Access Licenses

	Access License No	Share ML	Latitude	Longitude	MGA Zone	GDA 94 Easting	GDA 94 Northing
1	40CA403245	7345	-34.1998	145.8389	55	393019	6215080
2	40WA401858	6420	-34.5600	144.5267	55	273082	6172969
3	40WA401774	1306	-34.5409	144.5389	55	274145	6175117
4	40WA403183	955	-34.5147	144.7291	55	291536	6178436
5	57CA500286	864	-35.2939	145.1255	55	329556	6092747
6	40WA401994	685	-34.4704	145.0260	55	318708	6183922
7	40WA402434	619	-34.5582	144.5198	55	272438	6173151
8	40WA402434	619	-34.5392	144.4276	55	263931	6175055

9	40CA402315	491	-34.4560	145.3152	55	345244	6185997
10	57CA500290	485	-35.0729	144.2968	55	253515	6115525
11	40WA403139	470	-34.4865	144.9982	55	316189	6182083
12	40CA402351	460	-34.5149	144.7277	55	291417	6178402
13	40CA402351	460	-34.5141	144.8266	55	300494	6178690
14	57CA500140	455	-35.0988	144.6270	55	283698	6113422
15	57CA500140	455	-35.1092	144.6533	55	286120	6112323
16	40CA402480	425	-34.7021	143.3266	54	713094	6157524
17	40WA402671	411	-34.7688	146.5711	55	460755	6152513
18	40CA401912	407	-34.4720	145.3070	55	344517	6184206
19	40WA403183	405	-34.5147	144.7291	55	291536	6178436
20	40CA401457	370	-34.4949	144.8756	55	304946	6180916
21	40WA401578	363	-35.1672	146.1289	55	420671	6108068
22	40CA403009	360	-34.4945	144.3600	55	257591	6179847
23	57WA503726	308	-35.2662	144.9652	55	314916	6095535
24	57WA503726	308	-35.2792	144.9928	55	317455	6094142
25	40WA402051	290	-34.4703	145.0264	55	318736	6183931
26	40CA401834	288	-34.4518	144.1973	55	242522	6184181
27	40WA401690	245	-34.4940	145.1761	55	332542	6181564
28	40CA403133	233	-34.5084	144.7697	55	295257	6179210
29	57WA500430	211	-35.0513	144.1062	55	236060	6117443
30	40WA400025	195	-35.1293	146.2155	55	428527	6112336
31	40CA402531	188	-34.6738	143.2357	54	704839	6160851
32	40CA403133	173	-34.5084	144.7697	55	295257	6179210
33	40CA401830	171	-34.4423	144.2135	55	243979	6185279
34	40CA403237	171	-34.5449	144.4903	55	269695	6174558
35	40WA402694	168	-34.7562	146.7095	55	473414	6153949
36	40WA402454	152	-34.9562	146.3399	55	439734	6131620
37	40WA401194	152	-34.8381	146.3293	55	438673	6144701
38	40WA403118	151	-34.5396	144.4270	55	263875	6175004
39	40WA403118	151	-34.5389	144.4349	55	264596	6175101
40	40WA402107	148	-34.5093	144.7272	55	291350	6179024
41	40WA401554	145	-34.4465	145.4544	55	358015	6187246
42	40CA401657	144	-34.4849	143.6829	54	746378	6180806
43	57CA500154	135	-35.2562	144.9272	55	311432	6096576
44	40WA405106	125	-34.3757	143.7838	54	755976	6192674
45	40WA402342	115	-35.1068	146.2647	55	432990	6114870
46	40CA400875	105	-34.5214	144.7094	55	289752	6177651
47	57CA500478	105	-35.2202	144.8632	55	305520	6100448
48	57CA500340	91	-35.2020	144.7963	55	299391	6102331
49	40WA402393	88	-34.9615	146.9828	55	498428	6131229
50	40CA401745	83	-34.5204	144.7111	55	289906	6177760
51	40WA400727	80	-34.5187	144.8617	55	303726	6178252
52	40WA402619	74	-35.2555	148.2325	55	612123	6097929
53	40CA402515	73	-34.5475	145.7715	55	387283	6176447
54	40WA400064	69	-34.5525	145.8234	55	392053	6175956
55	40WA403092	67	-34.5835	145.8394	55	393553	6172533
56	40WA402996	65	-34.9850	146.8079	55	482466	6128607
57	57CA500312	65	-35.3127	145.2863	55	344214	6090931
58	40CA400151	60	-35.0822	146.2668	55	433164	6117597
59	57CA500395	59	-35.0514	144.1062	55	236060	6117431
60	40WA402032	56	-35.0931	147.2242	55	520437	6116606
61	40CA400155	56	-34.4612	145.5747	55	369083	6185787
62	40CA402520	50	-34.6745	143.2359	54	704854	6160774
63	40CA403133	50	-34.5084	144.7697	55	295257	6179210

Murray & Lower Darling River Stock & Domestic Access Licenses

	Access License No	Share ML	Latitude	Longitude	MGA Zone	GDA 94 Easting	GDA 94 Northing
1	50CA503906	1151	-35.9303	144.9057	55	311063	6021756
2	50CA503484	736	-36.0190	146.3017	55	437074	6013717
3	50CA503450	573	-35.0742	143.9596	54	769863	6114719
4	60WA582143	565	-34.0899	141.7329	54	567612	6227637
5	50WA503307	546	-36.0848	144.7184	55	294564	6004239
6	50WA503603	534	-35.6342	144.1324	55	240324	6052835
7	50CA500503	533	-35.8315	145.2218	55	339389	6033277
8	60CA581273	490	-34.1053	142.0444	54	596328	6225674
9	60CA581273	490	-34.1750	142.1857	54	609276	6217810
10	60CA581273	490	-34.1111	141.9836	54	590719	6225090
11	50CA503450	383	-35.0742	143.9595	54	769860	6114723
12	60CA580491	350	-34.0161	141.8982	54	582930	6235699
13	50CA502982	348	-35.1446	143.3913	54	717850	6108305
14	50WA503688	319	-36.0605	144.6896	55	291915	6006868
15	60WA581888	200	-34.5452	142.7921	54	664444	6175935
16	50WA503787	188	-36.1068	144.7399	55	296562	6001840
17	60WA582143	185	-34.0898	141.7329	54	567612	6227640
18	50WA503164	180	-35.7975	144.9029	55	310500	6036486
19	60WA581486	169	-34.5221	142.8823	54	672769	6178343
20	50WA503121	160	-36.0633	146.8213	55	483904	6009021
21	50WA502513	153	-36.0848	144.7184	55	294567	6004238
22	50CA502982	149	-35.1446	143.3913	54	717850	6108305
23	50WA502964	128	-36.0888	144.7261	55	295273	6003809
24	50WA502810	128	-36.1078	144.7379	55	296385	6001725
25	50WA500589	128	-36.0892	144.7265	55	295308	6003765
26	50CA503625	125	-35.1510	144.2066	55	245528	6106635
27	50CA500492	112	-35.6435	144.1477	55	241739	6051838
28	50CA500498	111	-34.9554	143.3201	54	711850	6129446
29	50CA503212	105	-36.0311	144.6169	55	285278	6009969
30	50WA503200	104	-36.0307	144.6138	55	285002	6010017
31	50CA503133	96	-36.0668	144.9332	55	313868	6006665
32	60WA582098	87	-33.9323	141.2411	54	522284	6245322
33	60WA580515	84	-34.5453	142.7923	54	664463	6175921
34	50WA503604	80	-35.4940	143.9124	54	764194	6068273
35	50WA502968	80	-35.1892	143.4459	54	722704	6103231
36	60WA581703	78	-34.1499	142.1615	54	607078	6220612
37	50WA502410	74	-35.6422	144.1532	55	242237	6052003
38	60WA581232	73	-34.1454	142.2410	54	614412	6221030
39	50CA503104	72	-35.2545	144.4287	55	266070	6095700
40	50WA502051	72	-35.1907	143.4510	54	723159	6103055
41	50WA503750	72	-35.2134	143.5067	54	728169	6100408
42	50WA503351	71	-36.0611	147.0572	55	505153	6009276
43	50CA501828	67	-35.1032	143.3618	54	715271	6112961
44	60CA581899	64	-34.6928	143.1294	54	695047	6158965
45	60WA580440	64	-33.3890	142.5704	54	646063	6304480
46	50WA501587	63	-34.9202	143.4833	54	726847	6132996
47	60CA582003	57	-34.1057	141.4239	54	539094	6226038
48	50WA503021	56	-36.1160	144.7730	55	299568	6000893
49	50WA502289	56	-36.0822	144.8416	55	305656	6004781
50	50CA501550	50	-35.3518	143.5992	54	736185	6084843
51	50WA502058	50	-36.0861	146.9991	55	499918	6006497
52	50CA500495	48	-35.6024	144.1144	55	238594	6056315

Macquarie River Stock & Domestic Access Licenses

	Access License No	Share ML	Latitude	Longitude	MGA Zone	GDA 94 Easting	GDA 94 Northing
1	80WA702712	562	-31.9501	148.1441	55	608124	6464519
2	80WA702501	313	-31.4082	147.7421	55	570541	6524915
3	80WA704315	248	-31.6773	147.7664	55	572644	6495074
4	80 WA701563	173	-31.3545	147.6703	55	563753	6530915
5	80WA702942	120	-31.7809	147.9009	55	585297	6483501
6	80CA701074	112	-31.7887	147.9500	55	589937	6482588
7	80CA702651	88	-31.8716	148.0059	55	595143	6473352
8	80WA700407	64	-31.9025	148.0955	55	603585	6469852

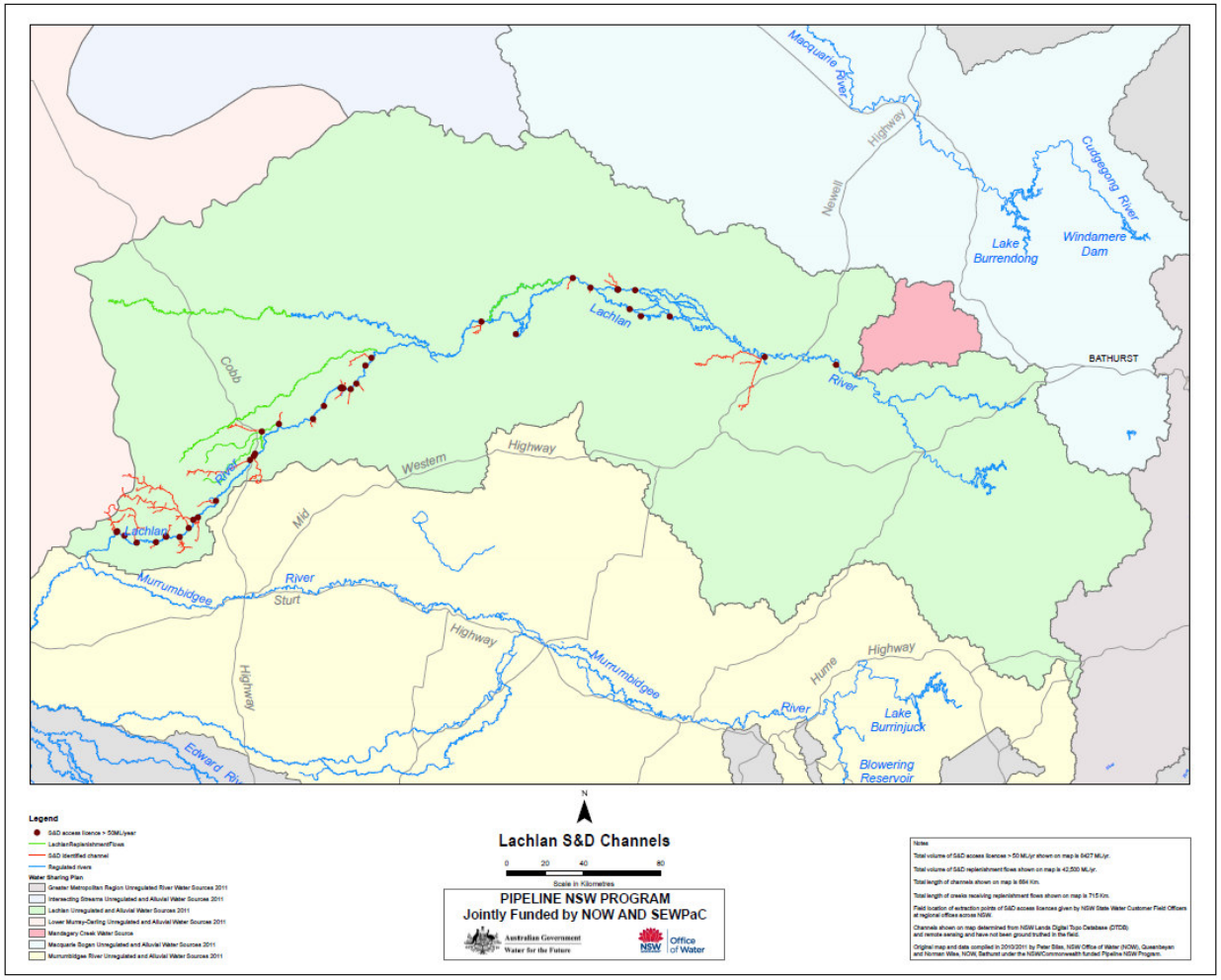
Gwydir Namoi River Stock & Domestic Access Licenses

	Access License No	Share ML	Latitude	Longitude	MGA Zone	GDA 94 Easting	GDA 94 Northing
1	90WA800227	360	-29.1596	148.9297	55	687681	6772789
2	90WA804623	224	-29.6696	149.0961	55	702858	6715991
3	90WA812261	224	-28.5843	150.3497	56	240784	6835196
4	90WA800838	184	-29.6442	148.9523	55	688982	6719042
5	90WA800041	168	-29.5655	149.5766	55	749630	6726593
6	90WA800144	160	-29.4666	148.9206	55	686242	6738785
7	90WA802252	151	-30.1305	148.3082	55	626016	6666036
8	90WA800694	128	-29.7035	149.4713	55	739098	6711514
9	90WA812319	128	-28.6315	150.3845	56	244302	6830040
10	90WA800794	112	-29.5650	149.4578	55	738114	6726891
11	90WA804688	109	-30.1646	149.2688	55	718488	6660800
12	90CA802525	106	-30.2696	148.8121	55	674313	6649953
13	90WA800561	96	-29.3226	149.7784	55	769831	6753064
14	90CA812746	90	-28.5812	150.0697	56	213374	6834903
15	90CA804626	80	-29.4085	149.9265	55	783974	6743187
16	90WA809764	80	-29.5170	150.1941	56	228019	6731447
17	90WA812224	80	-28.5810	149.5533	55	749734	6835769
18	90WA802301	64	-30.2311	148.4236	55	636988	6654755
19	90WA804667	64	-30.2535	149.3708	55	728107	6650743
20	90WA804717	56	-30.1733	149.2924	55	720739	6659795
21	90WA802105	53	-29.9117	148.8335	55	677005	6689581
22	90WA800302	50	-29.7261	149.2982	55	722295	6709350

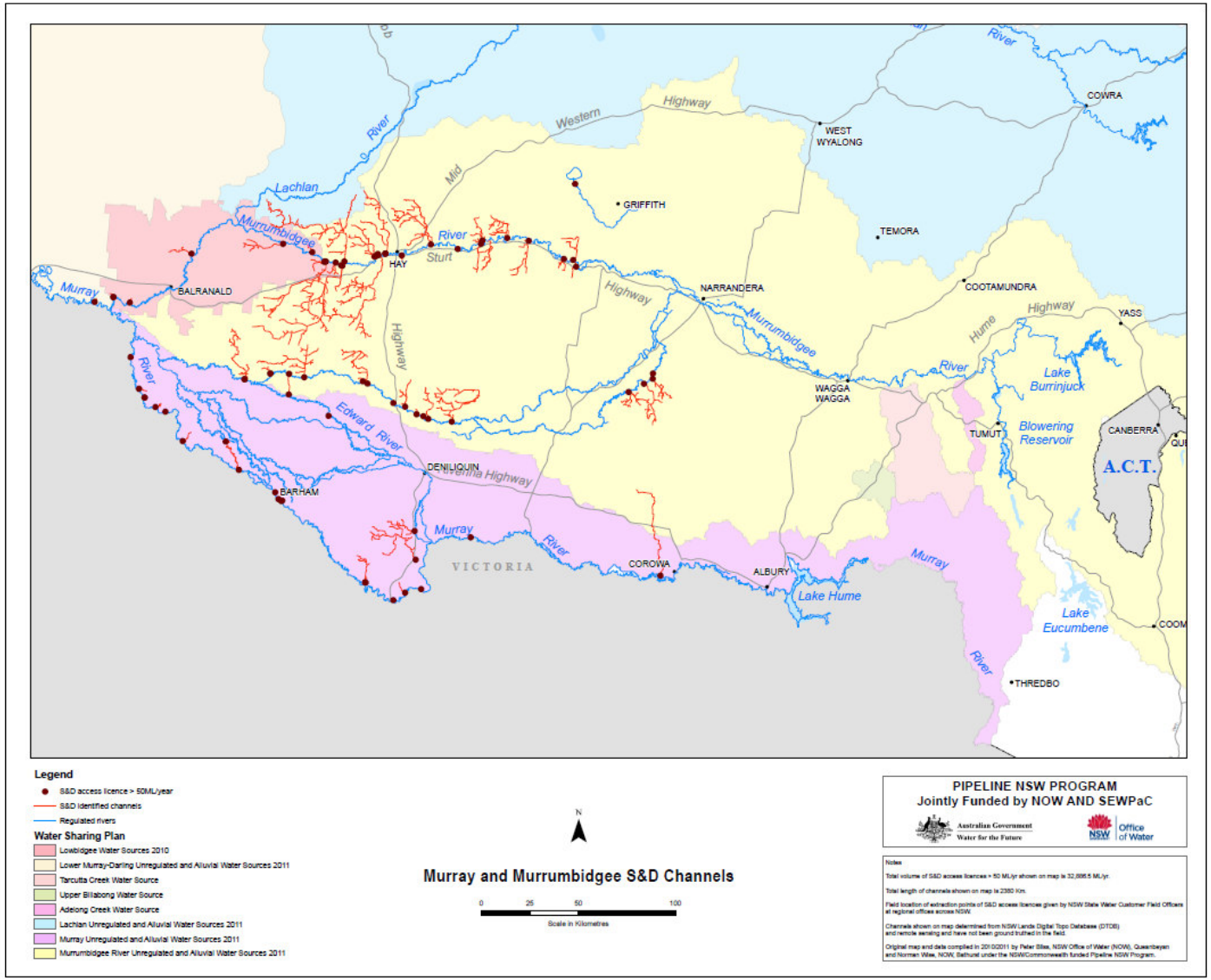
NSW Published Inland Water Sharing Plans - Stock & Domestic Water Allocations - Replenishment Flows

WSP	S&D Replenishment Flows Details	ML/year	
Border Rivers	Boomi River & Gnoura Creek	**10000**	
Gwydir	Gingham Watercourse	6000	Piped under RERP
	Gwydir Rr downstream of Gingham	4000	Piped under Pipeline NSW
	Mallowa Creek	6000	
	Thalaba Creek	4000	
	Ballinboora Creek	1000	
	Sub total	**21000**	
Namoi Reg Upper Namoi Reg Lower Namoi Unreg	Pian Creek downstream of Dundee Weir	**14000**	
Macquarie	Gum Cowal/Terrigal System	10000	
	Crooked Creek below "Mumblebone"	4000	
	Upper Bogan River, Nyngan to Gunningbar Creek	1000	
	Beleringar Ck., downstream of Albert Priest Canal	1000	
	Reddenville Break	1500	
	Beleringar Ck.,	5000	
	Marra Creek, between offtake and Barwon River	15000	
	Lower Bogan River, between Gunningbar Creek and Barwon River	15000	
	50Ml/day below Macquarie Marshes (see Note)	?	
	Sub-total	**52500**	
Lachlan	Willandra Creek downstream from Homestead Weir (inc township of Ivanhoe & Morrison's Lake)	12000	
	Marrowie Creek Trust District downstream to Cuba Dam	9000	
	Torrigany, Muggabah & Merrimajeel Creeks Trust District downstream to Murrumbidgil Swamp	9000	
	Booberoi Creek (inc township of Euabalong)	12500	
	Sub total	**42500**	
	Sub Total	**140000**	
Murrumbidgee Reg	Forest Ck below Warriston Weir	**0**	now piped
Murray Reg			
Lower Darling	Great Anabranch (subject to available water in lake Cawndilla)	**0**	now piped
	Sub Total	**0**	
	Total	**140000**	**ML/yr**

Appendix 2 - GIS Maps of S&D Licences, Channels and Replenishment Flows

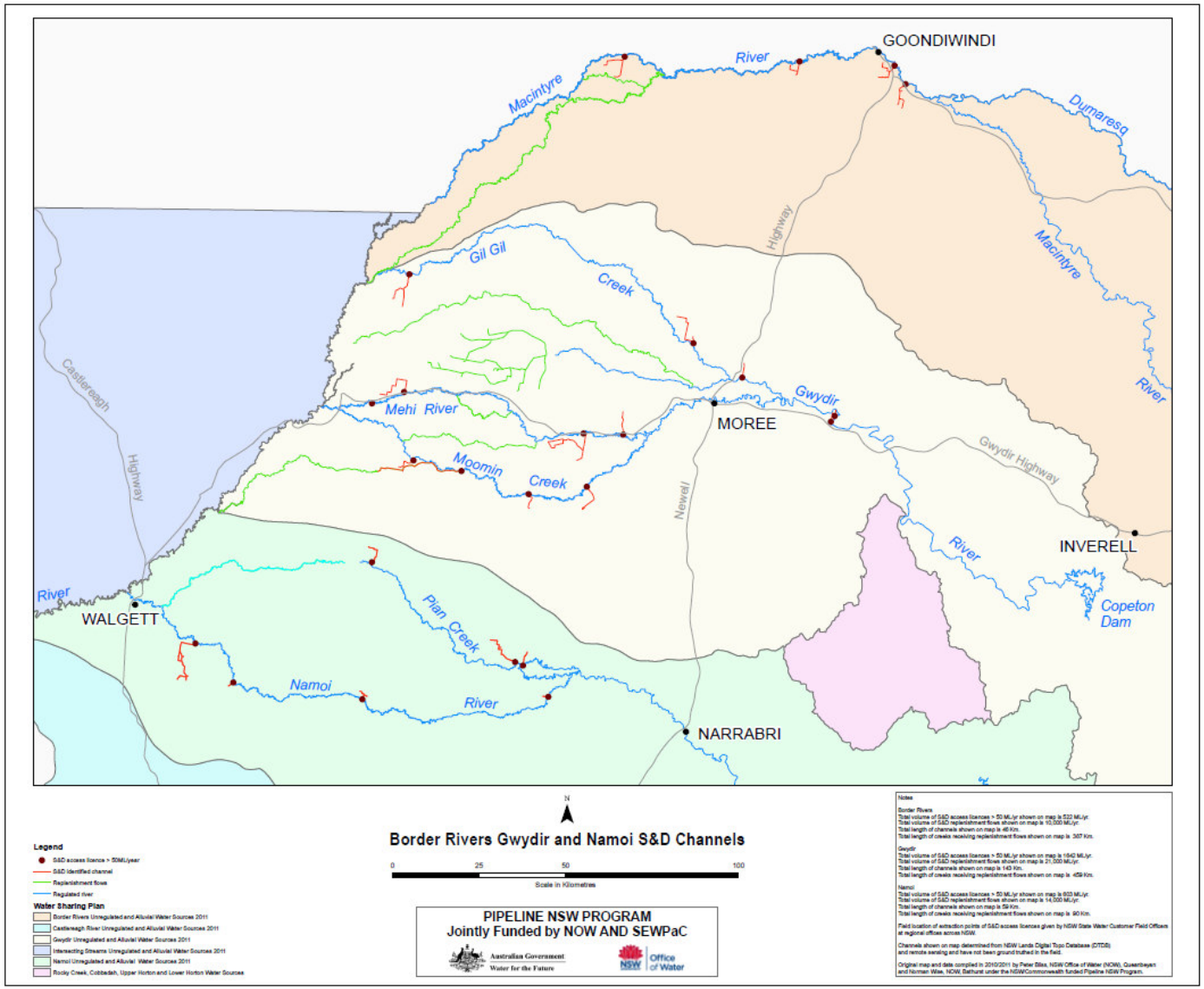


Map 1 – Lachlan River S&D Water Licences ▪ , Channels ▬▬ and Replenishment River & Creek Flows ▬▬



Map 2 – Murrumbidgee/Murray Rivers S&D Water Licences ▪ , Channels ▬▬ and Replenishment River & Creek Flows ▬▬

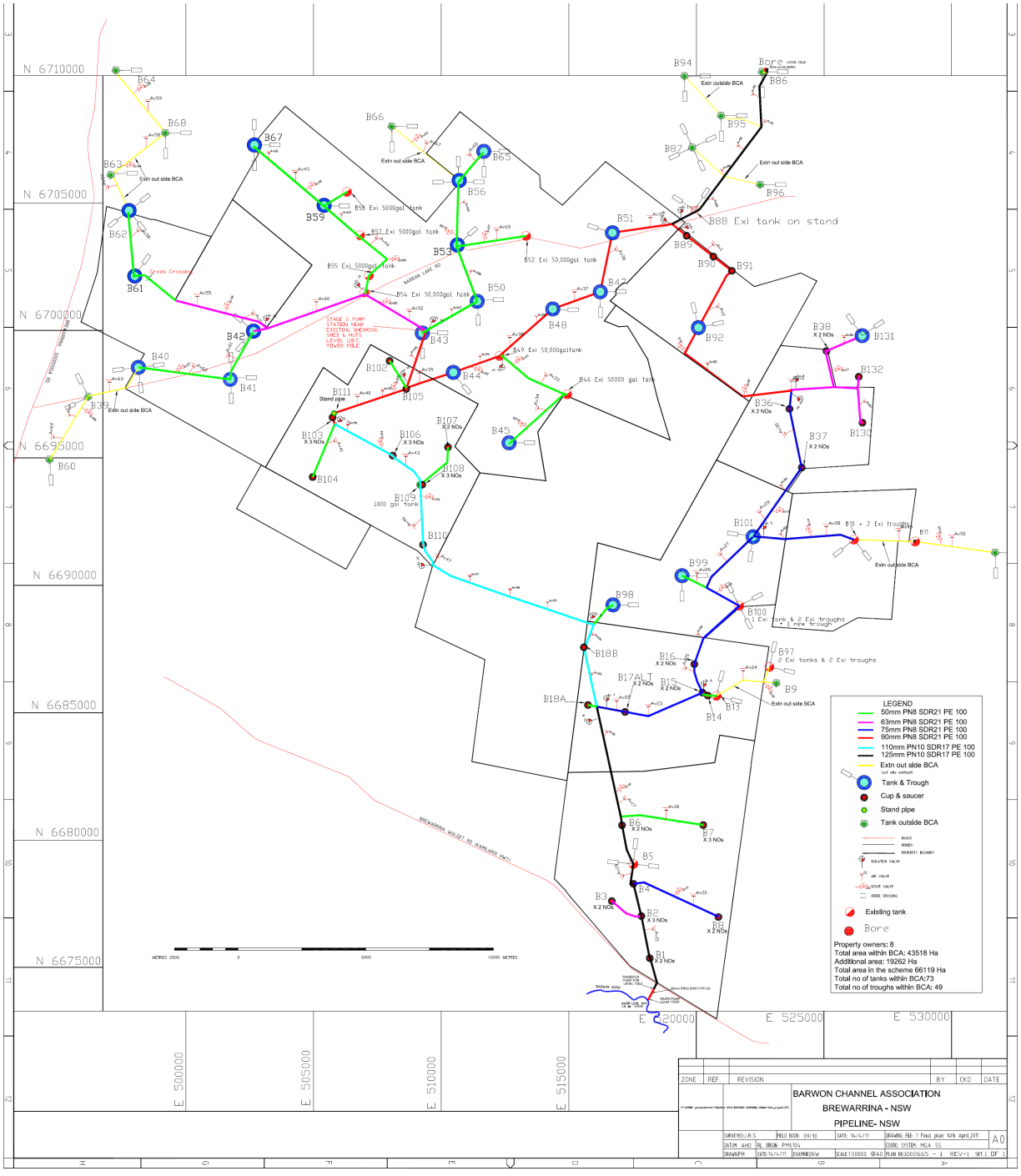
Map 3 – Macquarie/Bogan Rivers S&D Water Licences ▪ , Channels ▬▬▬ and Replenishment River & Creek Flows ▬▬▬



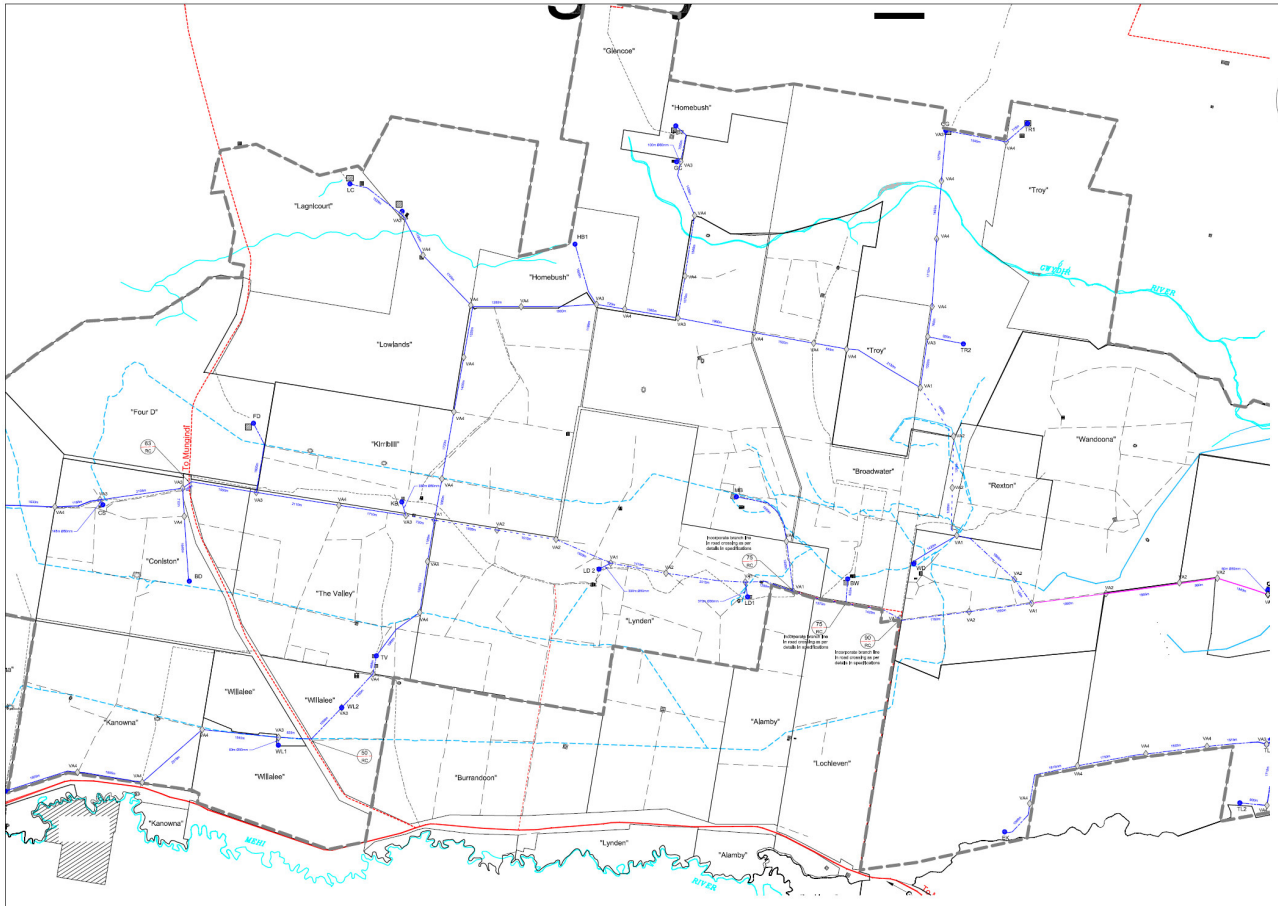
Map 4 – Border, Gwydir, Namoi Rivers S&D Water Licences ▪ , Channels ▬▬▬ and Replenishment River & Creek Flows ▬▬▬

Appendix 3 – Final Tender AutoCad Pipeline Plans

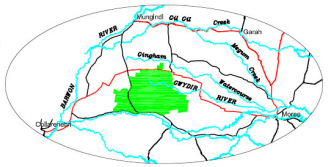
3.1 Barwon Channel Association Pipeline Project – Final Plan



3.2 Lower Gwydir Pipeline Project – Final Plan



Pipe Network Plan



Locality Sketch

LEGEND

Poly Pipe S1 PN 8 SDR21 PE100

nominal Ø

- 90mm
- 75mm
- 63mm
- 50mm
- New Watering Point
- Valve Assembly
- New Bore
- Creek Crossing
- Road Crossing
- Watercourses
- Bore Drains
- Internal Fences
- Property Boundary
- Scheme Boundary
- Tracks
- Road (sealed / unsealed)
- Single Building
- Cluster of Buildings
- Yards
- Dam

Notes

Pipelines

Polyethylene pipelines shall be of the classes, materials and diameters shown on the plan and manufactured in accordance with AS/NZS 4130:2003 from material in accordance with AS/NZS 4131:2003.

Polyethylene pipelines shall be transported, laid, bedded, jointed and backfilled in accordance with AS2033-1980 and the manufacturer's instructions.

Due to scale, the pipeline location in relation to existing infrastructure, is indicative only. At the discretion of the Works Superintendent, pipelines can be placed on either side of existing infrastructure (eg, fences, roads, etc.). In all other instances, pipelines are to be laid in accordance with GPS positions provided, unless directed otherwise by the Superintendent. Pipeline lengths indicated on the Plan are approximate only and provided to assist contractors in installation.

All polyethylene pipelines are to be trenched.

Depth of cover for polyethylene pipes shall be:

(i) 600mm minimum;
(ii) In accordance with State Rail requirements at a rail crossing; and
(iii) In accordance with Local Shire Council and other appropriate authority requirements at a public road crossing.

Utilities

Particular attention should be paid to the existence of buried utilities such as existing pipelines and telephone and power cables, the location of which can be obtained from the controlling authorities. Utilities are not shown on this Plan. It is the Contractor's responsibility to determine the location of any buried utilities across the scheme area.

D:\Imagery\Logos\Now_Logo.tif

Water Efficiency Unit

No.	Date	Variation	By

Surveyed:		Filename:	INV0904-PL1.DWG
Field Book:		Designed:	
Date:		Drawn:	
Datumn:	AHD	Checked:	
Coord. System:	GDA' 94 MGA Zone 56	Date:	8-May-2012
RL Origin:	PM's	Scale:	N.T.S.
		Sheet:	of

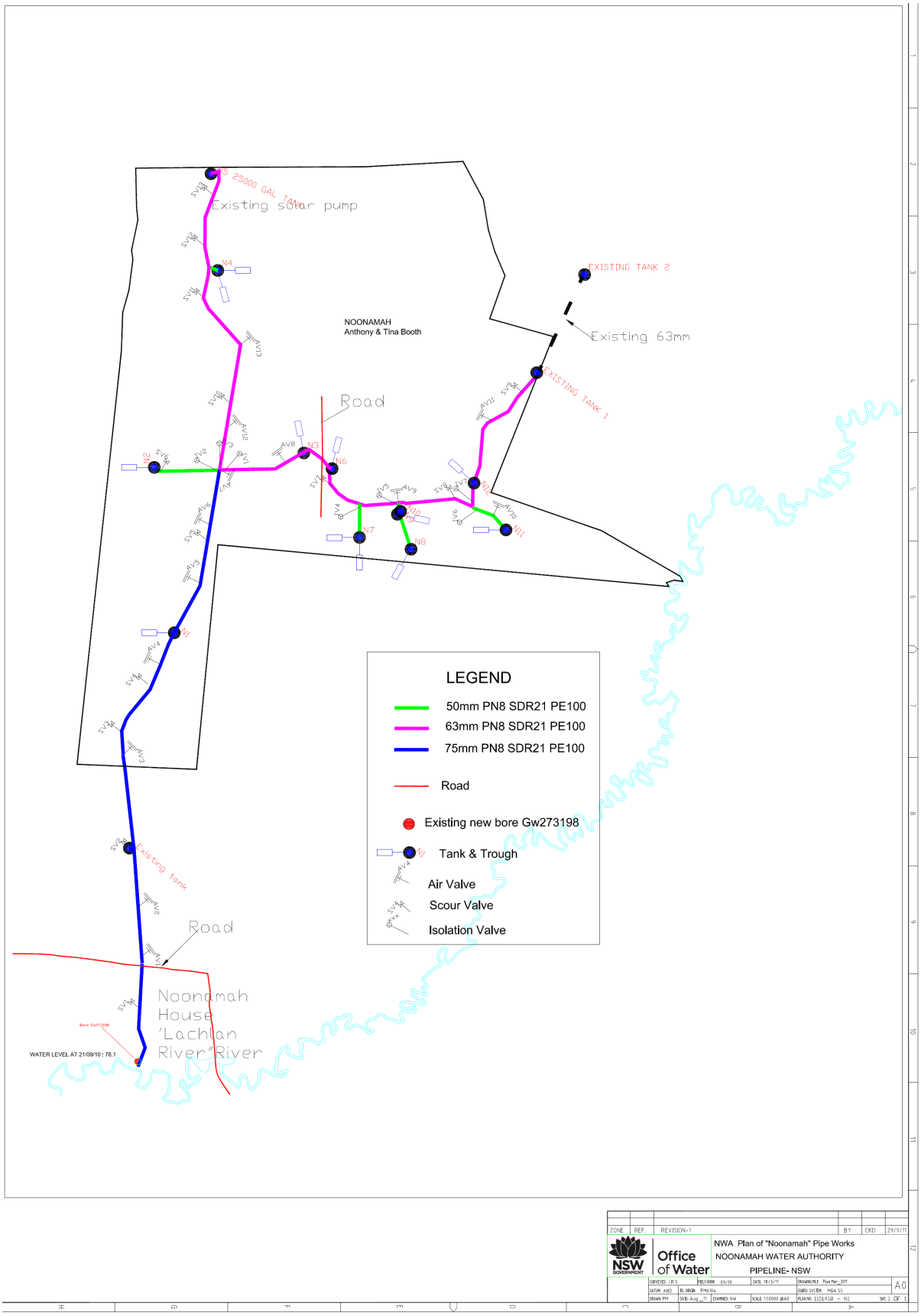
SCHEME

Enter Sheet Title Here

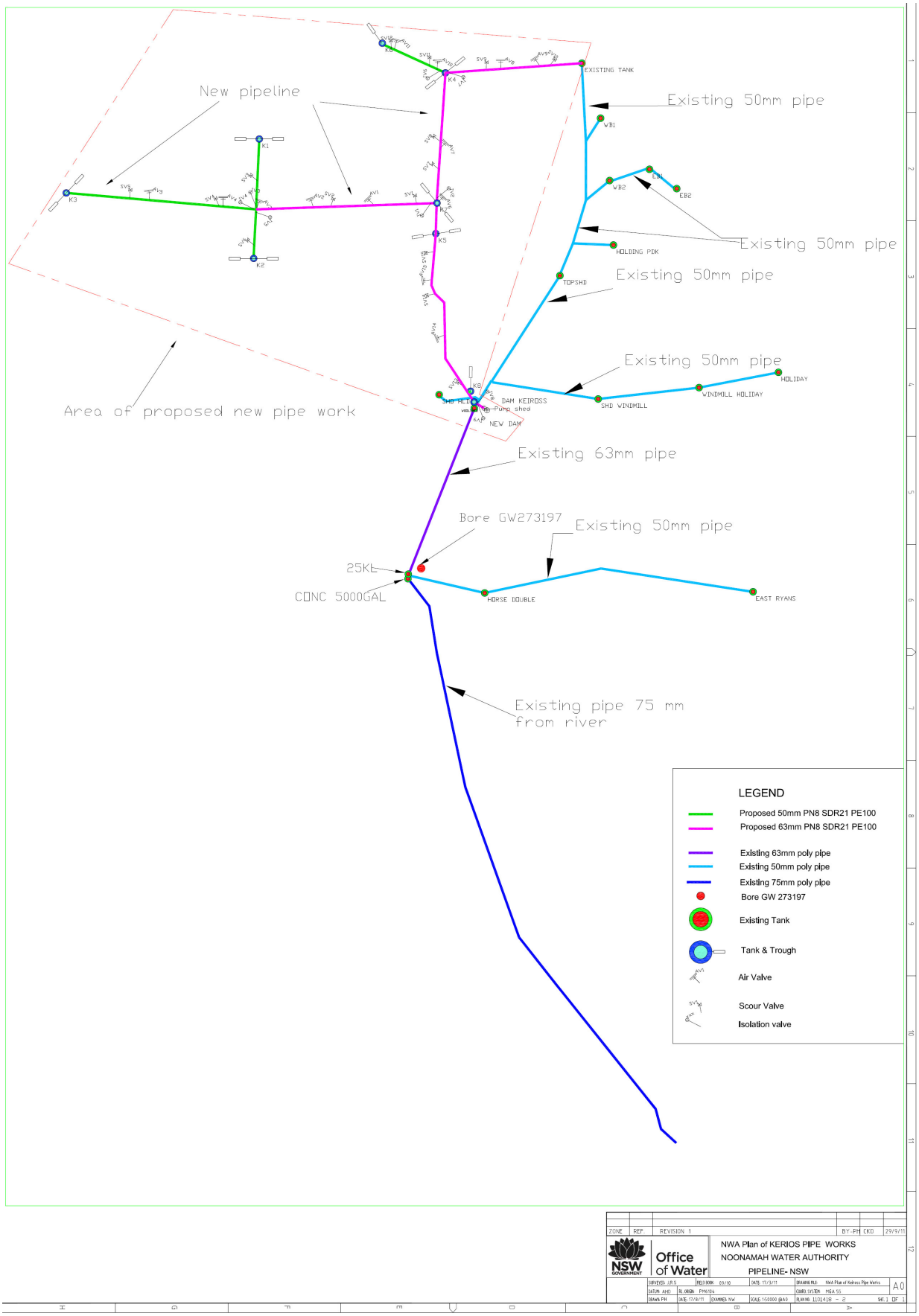
PLAN No. INV0904-PL1 | Sheet Size | A1

3.3 Lower Lachlan Pipeline Project – Final Plans

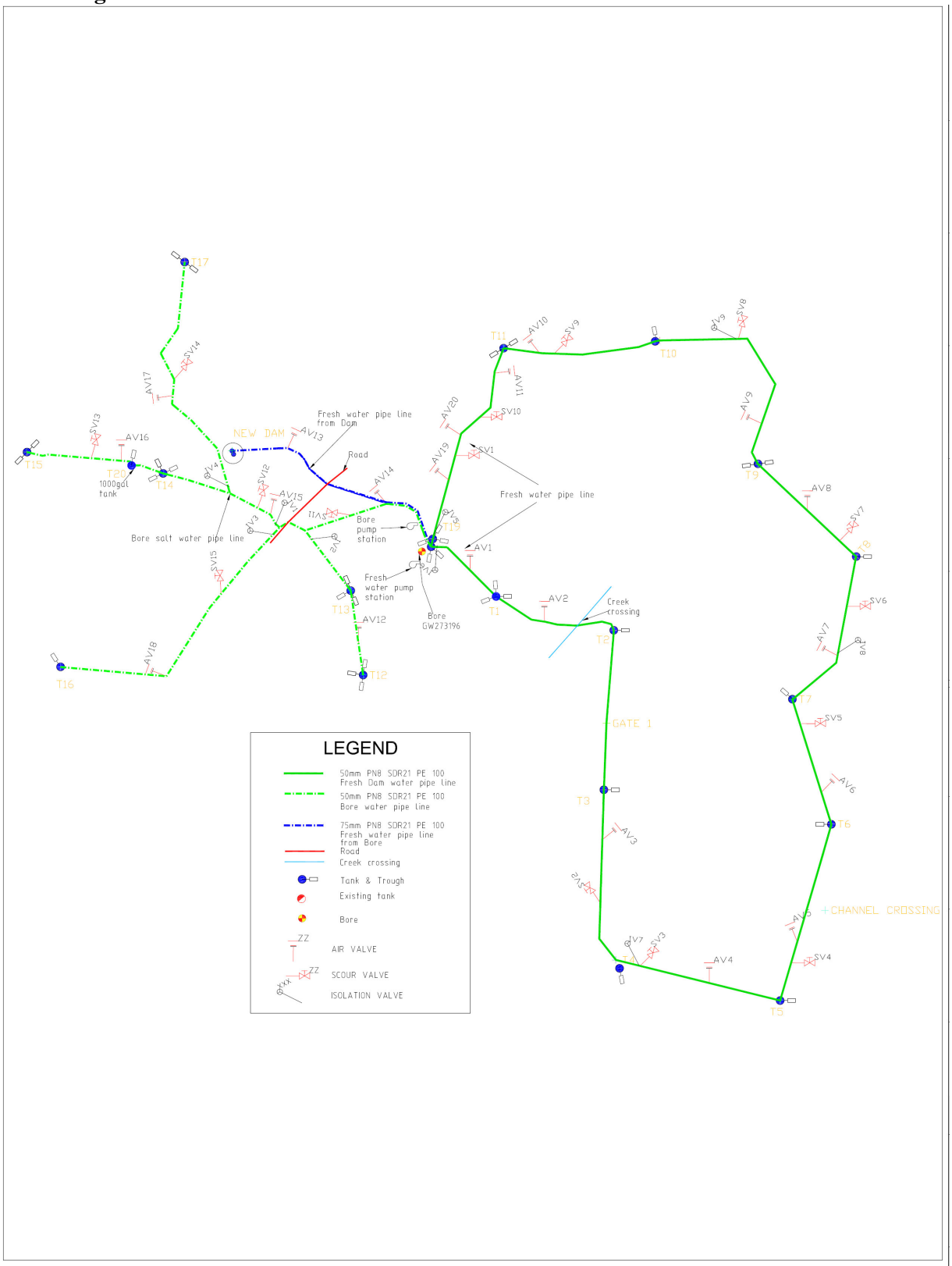
“Noonamah”



“Keiross”


New pipeline
Existing 50mm pipe
Existing 50mm pipe
Existing 50mm pipe
Existing 50mm pipe
Area of proposed new pipe work
Existing 63mm pipe
Bore GW273197
Existing 50mm pipe
25KL
CONC 5000GAL
Existing pipe 75 mm from river
EXISTING TANK
WB1
WB2
EB1
EB2
HOLDING PDK
TOPSHD
SHD HOLIDAY
DAM KEIROSS
Pump shed
NEW DAM
SHD WINDMILL
WINDMILL HOLIDAY
HOLIDAY
HORSE DOUBLE
EAST RYANS
LEGEND
Proposed 50mm PN8 SDR21 PE100
Proposed 63mm PN8 SDR21 PE100
Existing 63mm poly pipe
Existing 50mm poly pipe
Existing 75mm poly pipe
Bore GW 273197
Existing Tank
Tank & Trough
Air Valve
Scour Valve
Isolation valve
NWA Plan of KERIOS PIPE WORKS
NOONAMAH WATER AUTHORITY
PIPELINE- NSW
Office of Water
NSW GOVERNMENT

“Tarwong”



NWA Plan of "Tarwong" Pipe Works
NOONAMAH WATER AUTHORITY
PIPELINE- NSW

Appendix 4 – Funding Milestone Table

Pay -ment No.	Milestone Detail	Date for completion of Milestones	Funding (GST excl)	Revised Payment Order	Payment for		
					Barwon Channels Assoc.	Lower Lachlan (Noonamah)	Lower Gwydir
1	➢ On signing funding deed	1-Jul-09	$ 175,000		Complete	Complete	Complete
2	➢ Appoint a Project Coordinator ➢ Appoint a Project Officer ➢ Establish and hold meeting of the Steering Committee ➢ Scope the proposed GIS Study to be undertaken as identified in item A15(a). ➢ Develop methodologies and processes as prescribed in item A15(b). ➢ Identify potential suitable locations to undertake pipeline Schemes. ➢ Undertake community consultation to promote the Project and raise awareness so to elicit potential Scheme ideas. Advertise where needed for expressions of interest from landholders or relevant authorities to join Project. ➢ Undertake preliminary assessments of potential Schemes based on agreed methodologies. ➢ Prioritise Schemes and, with the Commonwealth's agreement, select the preferred Schemes for further detailed assessment. ➢ Complete a detailed analysis/scoping study of the three Schemes. ➢ Provide a GANTT chart for the Project. ➢ Provision of a satisfactory first Progress Report.	30-Sep-09	$ 200,000		Complete	Complete	Complete
3.(i)	➢ Prepare a survey and engineering design, detailed work plan, obtain approvals and finalise financial contributions for the first (BCA) Scheme. ➢ Undertake a tender process for the works contract for the first Scheme. ➢ Execute a works contract and commence Capital Works for the first Scheme. ➢ Provision of a satisfactory second Progress Report.	20-Jun-11	$ 250,000	3(i)	Complete		
3.(ii)	➢ Prepare a survey and engineering design, detailed work plan, obtain approvals and finalise financial contributions for the second (LG) Scheme. ➢ Undertake a tender process for the works contract for the second Scheme. ➢ Execute a works contract and commence Capital Works for the second Scheme.	8-Aug-11	$ 250,000	3(ii)			Complete
4	➢ Prepare a survey and engineering design, detailed work plan, obtain approvals and finalise financial contributions for the third (LL) Scheme. ➢ Undertake a tender process for the works contract for the third Scheme. ➢ Execute a Construction Contract and commence Capital Works for the third Scheme. ➢ Provision of a satisfactory third Progress Report.	20-Dec-11	$ 250,000			Complete	
5	➢ Complete 30 per cent or more of the Capital Works for the first two (BCA & LG) Schemes. ➢ Provide a report to the Commonwealth on the outcome of the GIS Study. **(Complete)** ➢ Provision of a satisfactory fourth Progress Report. **(Complete)**	13-Mar-12	$ 375,000	5(i)	Complete		
	➢ Complete 10 per cent or more of the Capital Works for the second (LG) Scheme.	30-May-12	$ 125,000	5(ii)			Complete

Pay -ment No.	Milestone Detail	Date for completion of Milestones	Funding (GST excl)	Revised Payment Order	Payment for		
					Barwon Channels Assoc.	Lower Lachlan (Noonamah)	Lower Gwydir
6 (i)	➢ Complete 30 per cent or more of the Capital Works for the third (LL)Scheme.	9-May-12	$ 375,000	6(i)		Complete	
6(ii)	➢ Complete 40 per cent or more of the Capital Works for the first (BCA) Scheme.	30-May-12	$ 200,000	6(ii)	Complete		
6(iii)	➢ Complete 50 per cent or more of the Capital Works for the third (LL) Scheme.	30-May-12	$ 300,000	6(iii)		Complete	
6 (iv)	➢ Provision of a satisfactory fifth Progress Report.	30-Aug-12	$ 75,000	6(iv)		Complete	
	➢ Finalise and **commission** Capital Works for the Third (LL) Scheme, with the Capital Works fully operational.	30-Aug-12				Complete	
6(v)	➢ Complete 30 per cent or more of the Capital Works for the second (LG) Scheme.	30-May-12	$ 250,000				Complete
6 (vi)	➢ Finalise and **commission** Capital Works for the Second Scheme (LG), with the Capital Works fully operational.	30-Dec-12	$ 375,000	6(vi)			Final Claim
	➢ Water Savings resulting from the second and third (LG & LL) Schemes secured and registered to a Water Access Licence with an Adaptive Environmental Water Condition, in accordance with clause 8A.	30-Dec-12				Final Claim	Final Claim
7	➢ Finalise and **commission** Capital Works for the first (BCA) Scheme, with the works fully operational.	31-Mar-13	$ 175,000	7(i)	Final Claim		
	➢ Water Savings resulting from the first (BCA) Scheme secured and registered to a Water Access Licence with an Adaptive Environmental Water Condition, in accordance with clause 8A.	30-Apr-13				Final Claim	
	➢ Completion of a register of Water Savings as a result of the Project in accordance with clause 8A.	30-Apr-13					
	➢ Completion of a report on lessons learnt.	30-Apr-13	$ 125,000	7(ii)	Final Claim		
	➢ Provision of the Final Progress Report to the satisfaction Commonwealth.						
TOTAL			***$ 3,500,000***				

Appendix 5 – Publicity & Promotion Releases

ADVERTISING FEATURE PUMPS AND IRRIGATION

Piped Barwon water savings

By PETER SOMERVILLE

A BARWON River pipeline scheme delivering water for stock and domestic use could make a 90 per cent water saving when compared to the existing open delivery channel, according to its engineers.

Farmers in northern NSW are looking forward to the benefits of the pipeline, which will pump water out of the Barwon River through almost 200 kilometres of pipeline to be used for stock and domestic use.

The project is part of the Pipeline NSW program, which is being funded by the NSW government's River Bank program and the federal government's Water for the Future – Water Smart Australia program.

The NSW government hopes the project will save 1488 megalitres of water a year, while similar projects on the Lower Gwydir and Lower Lachlan rivers could save 2544 and 795ML a year respectively.

Col Payton, "Neur", Brewarrina, is one such farmer, and beleives the system will deliver superior quality water and environmental water savings.

He is also installing a bore to provide backup water, ensuring increased water security.

"(Landholders) pay 20pc of the cost of the initial connection – if farmers want any extra infrastructure put on top of the scheme it comes out of their own pocket," he said.

"We're getting an 80pc grant, and for that we have to return the water saved to the environment.

"The water quality will be superior for sure, and there's going to be a big saving on water for the environment.

"The bore will have really clear water, and the fresh water coming out of the river will be much better – 100pc better."

He explained with river water no longer running through open channels and being contaminated by stock along the way, it would not go stagnant after being stored in tanks for several weeks.

Mr Payton said the original open-channel scheme was built about 1966 and needed intense maintenance after heavy rain and floods.

"Hopefully once this is all set up and going that will all be fixed – we'll have better water and a lot less worries," he said.

"The main advantage is the security of water.

"In the drought we went for years having no water – once it got down to a certain level, authorities just cut our allocation off.

"We are using hardly any water now compared to before."

NSW water commissioner David Harriss said more than 7000km of bore drains in the Great Artesian Basin had been removed and replaced with 11,000km of pipelines, saving more than 50 gigalitres of artesian water a year.

"The Pipeline NSW program aims to build on this success by improving water efficiency on farms that draw their stock and domestic water directly from NSW rivers via open channels," Mr Harriss said.

He explained the old open channel systems would then be decommissioned and save water that was being lost to evaporation and seepage.

Aquawest crews from Dubbo have been busy working on a pipeline to supply landholders with Barwon River water. Work at the southern end of the pipeline has involved digging trenches to carry 125 millimetre pipe.

Dubbo company wins supply tender

KERRY Fields' Dubbo company, Aquawest, has won the tender to supply water pumped from the Barwon River to landholders.

Mr Fields explained the pipeline would use pumping stations which were far more advanced than what was common in agriculture.

The water would be pumped into tanks, with automatic pump stations using automatic monitoring for low flow, high flow, water temperature and levels.

"Currently there are big flood pumps that pump water out of the Barwon and into channels," said Mr Fields, pictured (right) with sales representative Jeff Vandermaal and one of the pumps used in the Barwon scheme.

The new system has booster pump stations along the line, and delivers water for stock and domestic use.

"It delivers up to a 90 per cent saving of water, compared to the old way of doing it," he said.

"The idea is the excess water goes back for environmental use.

"We have got the contract for the Barwon scheme.

"We haven't got the others at this stage but remain reasonably confident we'll win them," he said in early December.

Weather delayed the project late last year, however Mr Fields was hopeful it would be completed by the end of February.

"It's been going for four months now, and we are employing a lot of local people in that area," he said.

"People are pretty happy about it.

"They're going to have fresh water stored in tanks and troughs and not open channels."

Water saving: About 800 megalitres of water will be saved annually now the $1.7 million Lower Lachlan stock and domestic pipeline, running between Booligal and Oxley on the Lachlan River, is complete.

Primary Industries Minister Katrina Hodgkinson said it replaced 150 kilometres of open channel system delivering water to 40 farm dams across about 25,000 hectares.

"A total of 115km of pipeline has been laid and the construction of three new groundwater bores will provide a secure stock and domestic water supply to landholders," she said.

The Land, Sydney
31 Jan 2013

Katrina Hodgkinson MP
Minister for Primary Industries
Minister for Small Business

MEDIA RELEASE

Wednesday 30 January, 2013

LACHLAN WATER SAVING PIPELINE COMPLETE

Construction of the $1.7 million Lower Lachlan stock and domestic pipeline is complete and will save an estimated 800 megalitres of water each year from seepage and evaporation, NSW Minister for Primary Industries, Katrina Hodgkinson, announced today.

Ms Hodgkinson said infrastructure projects like the Lower Lachlan pipeline, which runs between Booligal and Oxley on the Lachlan River, are strongly supported by the NSW Government as they provide significant economic and social benefit without taking water out of production.

“The Lachlan pipeline project replaces 150 kilometres of open channel system that is used to deliver stock and domestic water to 40 farm dams,” Ms Hodgkinson said.

“These properties will now receive their domestic and stock water supply through a pipeline system that will deliver water when and where it is needed, and save an estimated 800 megalitres of water each year,” Ms Hodgkinson said.

“A total of 115 kilometres of pipeline has been laid and the construction of three new groundwater bores will provide a secure stock and domestic water supply to landholders.

“Additionally, two new dams will provide back-up water supplies to help protect the landholders during future droughts.”

Ms Hodgkinson said the scheme will provide a reliable domestic and stock water supply to an area of approximately 25,000 hectares.

John Williams, Member for Murray-Darling, said the Lower Lachlan stock and domestic pipeline will now give assurances to farmers downstream of Condobolin that a reliable water supply will be available in future droughts.

“During the last drought farmers would have been very concerned about a future without a reliable water supply. This pipeline will go a long way in relieving those concerns,” Mr Williams said.

The Lower Lachlan pipeline project was funded through a 50 per cent contribution from the NSW Government via the *NSW Rivers Environmental Restoration Program* and 50 per cent from the Australian Government’s *Water for the Future* initiative.

The construction work was undertaken by Watertight Solutions of Condobolin.

MEDIA: Fiona Dewar 0407 152 873

NSW GOVERNMENT | Office of Water

News release

21 October 2011

National Water Week

Pipeline program to benefit the environment and farmers

NSW Water Commissioner, David Harriss, announced this year's National Water Week theme is 'Healthy Catchments, Healthy Communities'.

National Water Week is hosted by the Australian Water Association.

Mr Tom Mollenkopf, Chief Executive of AWA said that this week is important in raising public awareness and understanding of water issues in Australia, particularly in regards to catchment management.

"The ways in which we live and work with these catchments have an impact on the quality of water that flows into these waterways. Poor management practices on land can lead to deterioration in water quality. Poor water quality is damaging to the natural environment and increases the level of treatment that our water required," said Mr Mollenkopf.

Mr Harriss said the $7 million Pipeline NSW program will deliver dual benefits; saving more water for the environment and providing NSW farmers with a more secure, better quality supply of stock and domestic water.

"Old, inefficient channel water delivery systems in the Lower Gwydir, Lower Barwon and Lower Lachlan will be replaced with piped systems under a new NSW and Australian government program modelled on the successful NSW Cap and Pipe the Bores program."

"The successful $135 million Cap and Pipe the Bores program now jointly funded by the NSW and Australian governments with landholders also contributing, has proven that capping and piping old open channel water delivery systems is an effective way to recover water for the environment and improve security of supply for NSW farmers," Mr Harriss said.

"Over the last 10 years more than 7,000 kilometres of bore drains in the Great Artesian Basin have been removed and replaced with 11,000 kilometres of pipelines, saving over 50 gigalitres of artesian water as well as removing 50,000 tonnes of salt, per year."

"The Pipeline NSW program aims to build on this success by improving water efficiency on farms that draw their stock and domestic water directly from NSW rivers via open channels."

Under the program new pipeline schemes will be built in the Lower Gwydir, Lower Barwon and Lower Lachlan to pump water from the rivers or groundwater sources and deliver it directly to farm storage tanks and stock troughs via a network of underground pipes. The old open channel systems will then be decommissioned and will save a total of 4 - 5 gigalitres of water per year that is currently lost to evaporation and seepage.

"By removing over 380 kilometres of open water channels in these three areas we will save over 80 per cent of the water that is currently diverted from the rivers to deliver stock and domestic water to local landholders," Mr Harriss said.

Media contact: Anne Brook 02 6701 9662 0419 120 527

Our news releases are on the web: www.water.nsw.gov.au
Follow us on Twitter @OfficeofWater

"The water saved will be allocated to environmental water licences held by the NSW and Commonwealth Governments to benefit the local river systems."

The NSW Office of Water will manage the construction of the schemes in partnership with NSW Public Works Department. A contract has been awarded for the Lower Barwon Scheme and tenders have recently closed for the Lower Gwydir Pipeline Scheme and Lower Lachlan Pipeline Scheme, with the program due for completion by June 2012.

The Pipeline NSW program is being funded 50:50 by the NSW Government's River Bank Program, managed by the NSW Office of Environment & Heritage, and the Australian Government's Water for the Future – Water Smart Australia program which is managed by the Commonwealth Department of Sustainability, Environment, Water, Populations and Communities.

Other priority inland stock and domestic delivery channels will be progressively piped under the proposed $137 million Basin Pipe program, which will also be funded by the Australian Government's Water for the Future program.

Ends

Pipe for the Melbourne to Geelong pipeline.

Pipelines – watering a sun-burnt country

BY ARTEMIS WILKINSON AND STEPHANIE CHAN

Despite recent rain and flooding across Australia, water pipelines still play an important role in securing against drought. Here, *The Australian Pipeliner* looks at water pipeline developments over the past year.

Australian Capital Territory

In recent years, the ACT's water supply has suffered from uncertainty. While the past year has seen the territory's drought come to an end and its dam levels reach full supply level, water pipeline action is still required to ensure the security and sustainability of the region's water supply into the future.

One of the major water security infrastructure projects ACTEW is undertaking is the 12 km, 1 m diameter Murrumbidgee to Googong Water Transfer Project, which is currently under construction. Up to 100 ML/d of water will be pumped from the Murrumbidgee River, travelling underground through a 12 km underground pipeline before travelling an additional 13 km along Burra Creek into the Googong Reservoir in New South Wales.

The Bulk Water Alliance – which comprises John Holland, Abigroup and GHD – began construction on the entire project in late January 2011, with construction of the pipeline component beginning in June 2011. As of 1 December 2011, approximately 7.5 km of pipeline had been installed.

The pipeline and its associated infrastructure is expected to reach completion by June 2012.

Victoria

Since 1997, Melbourne has experienced its longest drought on record, according to Melbourne Water. Melbourne Water says that the drought has severely reduced the amount of water flowing in the city's rivers and creeks, and the level of water stored in its water supply reservoirs.

To alleviate the effects of the drought in Melbourne and regional Victoria, a number of water pipelines have been proposed, with many well into construction or recently completed.

The 59 km, 800 mm diameter Melbourne to Geelong pipeline is currently being constructed by Abigroup, with almost 55 km of the 59 km pipeline completed. The pipeline, when completed, will have a capacity of up to 16 GL/a. The project is planned for completion in February 2012.

Mitchell Water began construction of the 40 km, 63–110 mm diameter Mt Hope Stock and Domestic Pipeline Project in Mt Hope, northern Victoria, at the end of 2011. The pipeline, which is scheduled for completion in January 2012, will be constructed using PN8 high density polyethylene (HDPE) pipe.

In Serpentine, northern Victoria, the 148 km, 63–250 mm diameter East Loddon Stock and Domestic Pipeline Project has been designed and installed. The project, which is also being constructed by Mitchell Water, commenced in May 2011. At the time of writing, testing of the PN 9, PN12 PVC and HDPE pipelines had been undertaken and the project was awaiting power provision at the pump station. The planned completion of the project is January 2012.

The 30 km, 100–225 mm diameter Upper Goulburn Regional Water Supply Project reached completion last year and is currently in operation, transporting »

Construction contractor profile – Abigroup Water

With over 20 years' experience in the industry, with an estimated over 1,000 km of water pipeline constructed, Abigroup is a major contributor to Australian water pipeline construction and delivery.

Recent projects:

- Southern Regional Water Pipeline, Queensland
- Melbourne to Geelong Pipeline, Victoria
- Murrumbidgee to Googong Pipeline, Australian Capital Territory.

Construction work on the Northern Pipeline Interconnector.

« 3 ML/d of water from Alexandra to Thornton and Eildon. J&C Reid Earthmoving began construction of the pipeline in April 2009, with completion of the pipeline and commissioning performed by Keogh Contracting Victoria in October 2011.

At the end of October 2011, pipelay of the 84 km, 1.93 m diameter Wonthaggi Desalination transfer pipeline was completed by the Thiess Degrémont Nacap joint venture. Construction of the pipeline began in February 2010, and it is now capable of transporting 200 GL/a of water from the desalination plant to Melbourne and regional water networks.

Western Australia

As one of the driest regions of Australia, WA uses water pipelines as one method to secure future water supply for residential, agricultural and commercial purposes.

The 31 km, 350–900 mm diameter Gascoyne Irrigation Pipeline Project, which began in mid-May 2011, will upgrade existing ageing asbestos cement pipes with PN6.3 and PN8 HDPE pipe, delivering up to 120 ML/d of water to Carnarvon horticulture plantations. The project will receive $7.4 million from the WA Government as part of its *Royalties for Regions* program. The project is well into the construction stage and is expected to be completed by the end of January 2012. At the time of writing, contractor Pipe Fusions Australia was close to completing construction of the mainline, with work progressing on individual property connections.

Rio Tinto has invested approximately $299 million in a coastal water supply project, including a new approximately 90 km, large diameter pipeline to aid in the expansion of its iron ore operations in the Pilbara region of WA. The new borefield and pipeline system is expected to be completed by mid-2013.

An approximately 1,800 km water pipeline has also been proposed to pump water from WA's northwest region into the River Murray system.

Land Access and Management Services (LAMS) Operations Director – National Pipeline Project Management Group Peter Rayner said that the proposal had the potential to deliver up to 8,000 GL/a of water, and that approximately 4,000 GL of this would be introduced in to the Murray Darling System. The balance would be available to secure the long-term water future of South Australia, the Northern Territory and their resource development opportunities.

Construction contractor profile – McConnell Dowell

Since 1960, the pipelines business unit at McConnell Dowell has delivered well over 100 pipelines, both locally and internationally.

Recent major water infrastructure pipelines have ranged up to 1.8 m in diameter, demanding heavy equipment, heavy lifts, welding, deep trenches and tight easements.

McConnell Dowell also has extensive experience in delivering facilities associated with water pipeline facilities such as water storages, balancing tanks, pump stations and treatment facilities.

Recent projects:

» Sydney Water Desalination Pipeline, NSW
» Western Sydney Recycled Water Scheme, NSW.

Pipelay for the Wonthaggi Desalination transfer pipeline.

The project would involve multiple parallel pipelines, associated pumping stations, and a supporting gas pipeline to power the necessary pumping facilities.

The proposal would see a pipeline constructed from the Ord River in WA's Kimberley region across to the Adelaide – Darwin rail line in the NT, then follow the line south into SA before detouring in a south-easterly direction to Murray Darling system.

LAMS has commenced investigatory studies related to water supply to SA, in collaboration with a small group including SA Independent Member for Frome Geoff Brock.

Tasmania

Southern Water is currently undertaking an extensive capital expenditure program, encompassing $500 million worth of investment planned over the next decade, including investment in water pipelines focused mainly on renewals of existing infrastructure.

In addition to this, Tasmanian Irrigation has proposed the 140 km, 200–1,200 mm diameter Midlands Irrigation Scheme Pipeline. At the time of writing, the project was in the final approval and design phase, and construction tenders had been released. The pipeline will be constructed using polyethylene and ductile iron cement-lined or mild steel cement-lined (MSCL) pipe, to transfer 38.5 GL/a of water from Arthurs Lake to the Midlands region. Construction is expected to begin in April 2012 with completion scheduled for April 2014.

Gunns Ltd's Bell Bay Pulp Mill Project is also working towards obtaining financial approval to proceed. Design of the 40 km, 800 mm diameter water supply and 20 km, 800 mm diameter effluent pipeline systems have been developed sufficiently to confirm the route and pipeline construction characteristics and the construction cost.

A commencement date has not yet been determined as a result of the decision being subject to achieving financial close and notice to proceed, however, the pipelines are expected to take approximately 18 months to design and construct following receipt of notice to commence.

The pipelines will have the capacity to transport 68 ML/d, and the water pipeline will be constructed from MSCL pipe with varying wall thickness dependent on pressure requirements, while the effluent pipeline will be constructed using HDPE pipe.

New South Wales

On average, Sydney Water has renewed approximately 110 km of water pipeline per year over the past four years, with a similar length of water pipelines laid in new development areas annually. The company predicts it will renew approximately 90 km of water pipelines per year over the next »

« four years, with more than 80 per cent of these pipelines expected to have a diameter of 150 mm or less.

Part of this renewal process includes the $7 million Pipeline NSW program, which will not only provide farmers with a more efficient and reliable water supply but will also save water for the environment.

The program plans to replace wasteful open channels with efficient pipelines, tanks and troughs to deliver water for stock as well as domestic use.

Funding for this program is part of the Australian Government's $12.9 billion *Water for the Future* initiative. The 50 per cent contribution from the NSW Government comes from the NSW *Rivers Environmental Restoration Program*, specifically the *River Bank Program*.

The NSW Office of Water is responsible for the implementation of the program in partnership with the Federal Department of Sustainability, Environment, Water, Population and Communities.

The completed discharge structure at Burra Creek, part of the Murrumbidgee to Googong Water Transfer Project.

Abigroup moving pipe as part of the Western Pipeline Alliance.

Three projects which make up the program include:

1. The 170 km, 50–125 mm diameter Barwon Channel Pipeline Project which will pump 100 ML/a of stock and domestic water from the Barwon River;
2. The 170 km, 50–110 mm diameter Lower Gwydir Pipeline Scheme which will convert groundwater to domestic water that will be supplied to 38 houses; and,
3. The 115 km, 50–75 mm diameter Lower Lachlan River Noonamah Project, which will obtain 140 ML/a of stock and domestic water from three new groundwater bores to supply 43 tanks and 67 troughs to three properties.

Orange City Council has proposed the 37 km, 375 mm diameter Orange Drought Relief Connection, which will involve a pipeline to transport up to 7 ML/d of water from the Macquarie River to the Orange water treatment plant.

A number of contractors have been consulted for preliminary quotations for the pipe, tanks, pumps and bores to be used in the project including Tyco Water, Permastore Tanks and Silos, KSB and AJ Lucas respectively.

Moving forward, the project proponent is set to determine the final pipeline length and alignment, and the location of the capture pump and station. At the time of writing, the project was set to commence construction at the end of 2011.

Construction is now complete for the pipeline component of the 35 km, 100–300 mm diameter Merri Abba Bore Pipeline Project at Lake Cargelligo, in western NSW.

The rest of the project remains under construction with the latest activity on the project including water treatment, pump station building and concrete reservoir construction. See page 114 for more information on this project.

The Gingham Pipeline Project, located in the Gwydir Wetlands in NSW, has also reached completion. The project involves a 240 km pipeline network that supplies domestic water sourced from the Gwydir Alluvim to 65 water tanks and to an area of approximately 90,000 hectares of farm land.

Stock and domestic water allowance for landholders in the Gingham Watercourse area, at 6 GL/a, was previously delivered by a channel constructed in the late 1970s. The Gingham Pipeline is expected to deliver water to users more efficiently with the benefit of increased environmental flows to the Gingham Watercourse due to water savings.

Supplier profile – PPI Corporation

Since 1979, PPI Corporation has offered HDPE pipe and fittings 16–800 mm in diameter to the water pipelines industry.

Recent projects:

- Kenya Water Treatment Plant, Queensland
- Mine Dewatering Project, Queensland
- Regency Road Water Main Relining, SA.

Construction contractor profile – Mitchell Water

Mitchell Water has engineered, procured and constructed over 11,000 km of pipelines, predominantly in rural and outback Australia.

The company's first involvement in the Australian water pipeline industry was in 1984, and they have since been involved in projects across Australia in NSW, Queensland, SA, Victoria and Tasmania.

Recent projects:

- East Loddon Stock and Domestic Pipeline Project, Victoria
- Merri Abba Bore Pipeline Project, NSW
- Mt Hope Stock and Domestic Pipeline Project, Victoria.

Queensland

According to a spokesperson from the Northern Network Alliance (NNA) – which is comprised of McConnell Dowell, Abigroup and Kellogg, Brown and Root – South East Queensland is one of the fastest growing regions in Australia, with the population set to increase significantly in the next 25 years, meaning that a secure water supply for the future is essential.

Completed in two stages, the 47 km, 750–1,290 mm diameter Northern Pipeline Interconnector (NPI) – Stage 1 was completed in December 2008 to accommodate the reverse-flow capacity installed as part of »

« the nearly complete 48 km, 1,200 mm diameter NPI – Stage 2. The NNA was appointed as the construction contractor for both stages of the NPI.

At the time of writing, completion of Stage 2 was scheduled for end of 2011, with commissioning to take place in the first quarter of 2012. For more information on this project, see page 113.

SunWater is also working on a number of pipeline projects in Queensland. The 133 km, 1.2–1.5 m diameter Connors River Dam to Moranbah Pipeline Project aims to increase the Bowen Basin and surrounding regions' water supply reliability and security by transporting 50 GL/a of water from the proposed Connors River Dam.

The project is currently in an advanced planning and design phase, with John Holland Group selected as the preferred construction tenderer. Environmental impact statement (EIS) and approvals for the project are currently being finalised and are expected to be completed in early 2012. The pipeline is due to commence construction in April 2012 with completion scheduled for early 2014.

The 265 km, 1,150 mm diameter Moranbah to Alpha Pipeline is currently in planning, but has completed preliminary design and has issued an early contractor involvement (ECI) tender. An ECI contract is expected to be issued by February 2012, with the pipeline planned for completion in 2014. The pipeline will transport approximately 25 GL/a of water to the Galilee Basin to meet forecasted demand for water by commercial mining operations and provide a reliable water supply to the town of Alpha.

An Iplex employee at work.

Supplier profile – Tyco Water

Tyco Water has more than 100 years of experience in the continuous manufacturing improvement and supply of one of the most extensive range of pipeline solutions to the Australian water industry.

Tyco Water's development of innovative pipeline solutions for the industry began in 1896 with Tyco's predecessor, Mephan Ferguson, supplying the 560 km Golden Pipeline which was constructed to carry freshwater from Mundaring Weir in WA to arid goldfields 560 km to the east.

Recent projects:

- Sintakote MSCL pipe and fittings supplied to the Wonthaggi Desalination transfer pipeline, Victoria
- Sintakote MSCL pipe and fittings supplied to the North South Interconnection System Project, SA.

The 260 km, 1.2 m diameter Nathan Dam and Pipelines Project will provide approximately 48 GL/a of water from the proposed Nathan Dam through the Surat Basin, potentially extending as far as Dalby. At the time of writing, the EIS was being completed and approval was being sought from the Co-ordinator General of Queensland for release in early 2012. If the project is approved, construction could commence as early as 2016, pending foundation customer commitment. If this occurs, the project could be completed by 2019.

At the time of writing, the 120 km, 1,016 mm diameter Woleebee Creek to Glebe Weir Pipeline Project had just completed the preliminary design phase, with detailed design expected to be finalised in mid-2012. The pipeline, which has a design capacity of 36.5 GL/a of water, will deliver the Dawson region of central Queensland an additional water supply solution based on beneficial use of treated CSG water. Construction is due to commence in mid-2012 and the pipeline is expected to be operational by mid-2013.

South Australia

SA's overall water situation improved in 2010–11 due to the highest River Murray flows for nearly 20 years and the highest amount of natural inflows into Adelaide's reservoirs since 2004–05.

However, despite this improvement, water pipeline infrastructure still plays an important role in securing the state against the possibility of future drought.

SA Water is currently undertaking the $403 million North South Interconnection System Project which consists of a range of works to connect northern and southern water supply networks.

These works will allow SA Water to improve water reliability for Adelaide. Water from the Adelaide Desalination Plant will also be distributed throughout the whole water supply network system from 2012.

Supplier profile – Iplex Pipelines

Iplex Pipelines, established in 1938, markets pipes ranging in size from 16 mm – 3 m in diameter, in a large variety of materials.

Iplex products are used for applications including potable water, gas, stormwater and sewerage, trenchless pipe systems, chemical and slurry pipelines and irrigation systems.

Recent projects:

- Flowtite glass-reinforced pipe supplied to the Western Corridor recycled water pipeline network, Queensland
- Ductile iron pipe supplied to the Cloncurry pipeline, Queensland.

The approximately 32 km pipeline will vary between 762 and 1,016 mm in diameter and consists of a number of components, including the 12.5 km Eastern Pipeline, the 5.7 km Northern Pipeline, the 10.3 km Central Pipeline and the 3.2 km Western Pipeline.

At the time of writing, each of these components were at varying stages of completion: the Eastern Pipeline was finalising construction with commissioning to commence soon; the Northern Pipeline was under construction with approximately 35 per cent of the pipeline completed; the Central Pipeline was finalising construction planning and the final design for later sections; and the Western Pipeline was still in planning, with tenders being evaluated.

The last component of the pipeline to reach completion will be the Central Pipeline, with the commission date scheduled for August 2012. P