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TALLOWA PIPELINE COMPANY
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TALLOWA TO INLAND AUSTRALIA WATER TRANSFER PROJECT

Unsolicited Proposal to
The New South Wales Government
Department of Premier & Cabinet

SCOPING STUDY
PRELIMINARY DESIGN
BUSINESS STRATEGY

ISSUE 2
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'The construction of the iconic Tallowa Pipeline would provide the means to transport up to 100 billion litres of unused Tallowa dam overspill water annually from coastal NSW and transfer it to the mining areas of inland New South Wales providing a valuable asset to the state.

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PROLOGUE

This report titled "Tallowa to Inland Water Transfer Project" [TIWTP] follows the National PPP Guidelines. It is hereby resubmitted to the New South Wales Director General Department of Premier and Cabinet.

The project involves:

- *Construction of a main pipeline 135 kilometres long, between Wingecarribee Reservoir and Gunning.*
- *A branch line to the Yass River at Gundaroo.*
- *A pipeline between Forbes and Goonumbla, which would link the Lachlan and Bogan rivers.*
- *Pumping facilities as required.*

The above infrastructure would transfer valuable overspill water from Tallowa Dam [which normally flows to sea], to inland New South Wales with minimal change to the existing processes followed in managing Shoalhaven water. It can be demonstrated that the water has a commercial value of at least $3500 per megalitre to mining interests.

The financial model requires the NSW Government to agree to transfer a guaranteed 100 gigalitres p.a. to inland New South Wales provided TPC satisfies the Government that the Business Case described in Section 4 is sound. TPC would be paid a fee as determined by IPART for transferring the water to mining interests, regional industries and to local water authorities in NSW.

It would be the responsibility of the NSW Government to pump at least 100 GL per annum from Tallowa Dam to Wingecarribee at its cost. Costs from Wingecarribee to inland NSW would be the responsibility of TPC and others.

From the NSW viewpoint the project would provide the following benefits:

- *Royalties determined by IPART for the NSW Government.*
- *Water for mining and exploration in central, western and south west NSW.*
- *Through-flow of water down 4600 kilometres of NSW inland rivers.*
- *Water security and cessation of water restrictions [beyond Level 1] for all towns on these rivers, which use the river water for the town supply.*
- *After a period of time the pipeline would be transferred to the NSW Government under a BOOT arrangement.*

The TIWTP would see up to 500 megalitres of water conveyed by the main pipeline daily around 200 days in most years and this creates the situation where water can be delivered into the Lachlan, Murrumbidgee, Bogan, Darling and Lower Murray valleys when and where the water is needed.

It appears possible that the Shoalhaven/Tallowa water will not come under the Water Act 2007 as it originates outside the MDB.

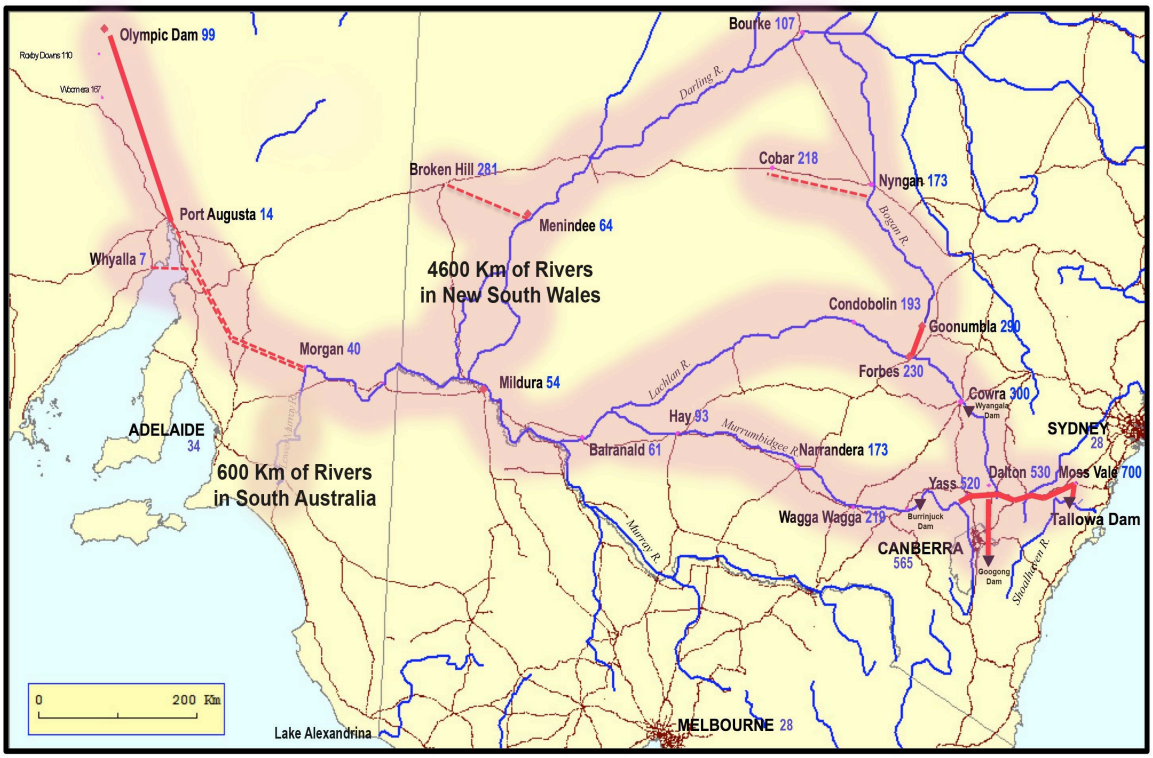


Figure 1 Overview of the Tallowa to Inland Australia Water Transfer Project

This map depicts the proposed pipelines showing the ability to get Tallowa water to Olympic Dam, Broken Hill and Cobar.

LEGEND: Existing Pipelines, New Pipelines, Main Roads, Rivers

NOTE: Numbers following town name represent Australian Height Datum as stated by the Bureau of Meteorology.

1.0 EXECUTIVE SUMMARY

The NSW Department of Infrastructure, Planning and Natural Resources [2004] states “the storage [of Tallowa Dam] often remains at, or close to FSL and spills frequently.” This results in 50% to 70% of inflows becoming overspill. Total storage is 90 GL and it is not unusual for more than 90 GL of inflow to occur in a week. The overspill flows to the sea at Crookhaven Heads and a valuable resource is lost.

Tallowa Pipeline Company has prepared this report to investigate possible uses for the overspill. It is accepted that some water management regulations and practises will need some amendment if the project is to proceed. The main aim is to pipe substantial volumes of water inland, which would constitute historical progress.

Four reports for the project have now been produced.

(i) Tallowa Pipeline Company [TPC] and Rainsaver Pty Limited [RPL] conceived the pipeline and developed the preliminary design between May and November 2008 and produced a report “Tallowa Pipeline Revised report 2008.”

(ii) TPC and Evans and Peck [E&P] in May 2009 collaboratively developed an unsolicited proposal for the “Tallowa to Basin Water Transfer Project [TBWTP]” for consideration by the NSW Dept of Premier and Cabinet [DPC]. The DPC has not responded to the submission.

(iii) Report titled Tallowa to Inland Australia Water Transfer Project dated February 2011. This version of the project assumed 100 gigalitres of Shoalhaven being delivered to customers as far away as mines in South Australia.

(iv) This current report titled the Tallowa to Inland Water Transfer Project [TIWTP]” which assumes a privately financed project. It documents a project which is reduced in scale, but which can deliver water to the Lachlan, Murrumbidgee, Bogan, Darling and Lower Murray valleys, TPC and Evans and Peck now wish to re submit the project as an unsolicited proposal to the NSW Government.

The TIWTP is designed to largely solve town water supply and regional industrial/mining water supply in inland New South Wales.

The financial model is based on the NSW Government transferring/selling 100 GL per annum to regional industries, mines and local water authorities in NSW. TPC would be entitled to a water transfer fee as determined by IPART. Additional water would be available for transfer in average rainfall/inflow years and used as decreed by the NSW Government and the MDBA

The overspill would be transferred from Tallowa Dam to Wingecarribee Reservoir using existing SCA pipelines and pumping facilities which can pump 205 ML per hour [SCA website] which translates to up to 4.92 GL per day.

New pipelines and pumping facilities are envisaged:

- A main pipeline from Wingecarribee to Gunning This pipeline could follow the route of the Highlands Source pipeline to Goulburn and follow the Hume Highway to its intersection with the Old Hume Highway.
- A branch off this main pipeline to Inglewood Bridge near Gunning. From here the water will flow to Wyangala Dam and beyond.
- An extension of the main pipeline to Gundaroo, where an off take allows water to enter the Yass River. From here the water will flow to Burrinjuck Dam. Again refer to Figures 1 and 2.
- A separate pipeline from Forbes to Goonumbla, following existing roads. This water would flow down the Bogan and Darling rivers to the Lower Murray. There are numerous mines and exploration companies operating in this region, and these would be targeted for sales of water

This is a large infrastructure project with complexities relating to approvals, commercial, political, environmental, funding, technical and construction issues, and further progress requires the support of all governments and agencies involved.

In order to progress the project TPC specifically requires letters of support from:

- The Australian Government, Department of Prime Minister and Cabinet.
- The NSW Department of Premier and Cabinet

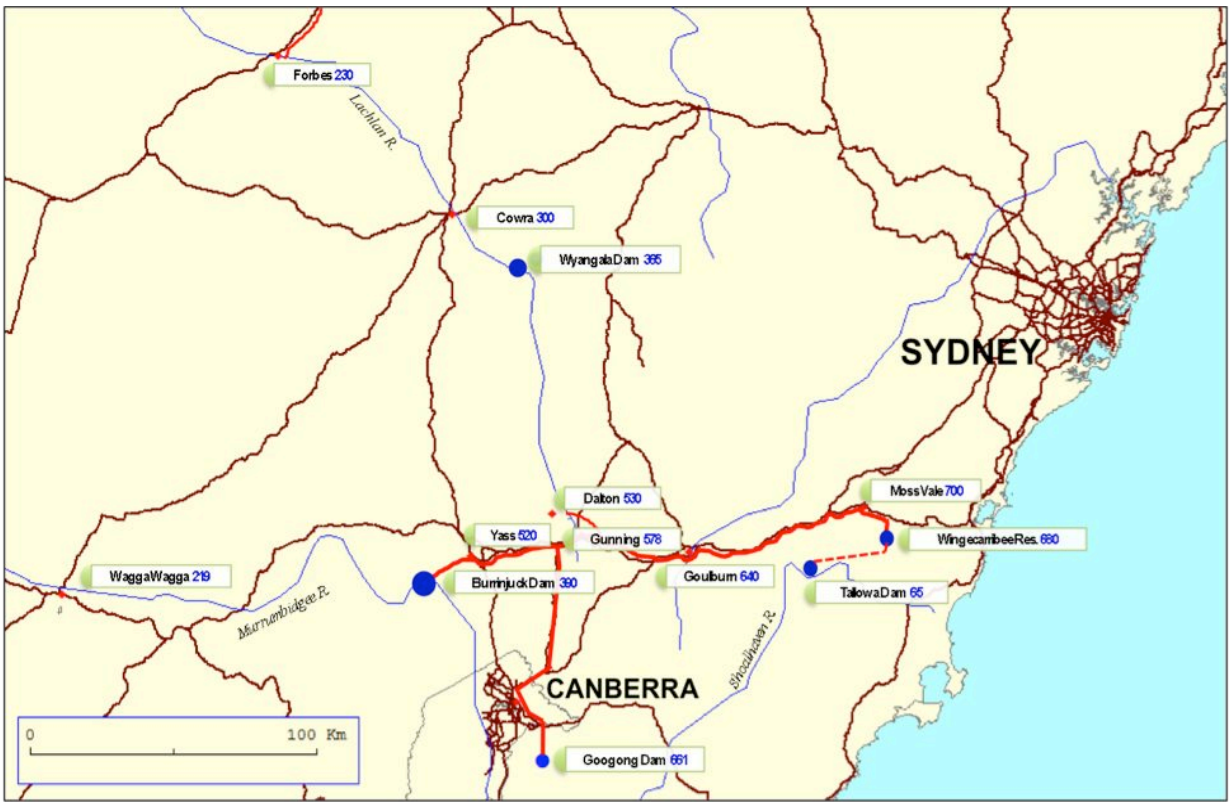


Figure 2 NSW/ACT Context - Tallowa to Inland Australia Water Transfer Project

LEGEND: Existing Pipelines, New Pipelines, Main Roads, Rivers

2.0 INTRODUCTION

Tallowa Dam was completed in 1976 as a back up water supply for Sydney. **The dam is full for much of the year which results in 50% to 70% of inflow overspilling the dam**. In a typical year 400 GL will enter the dam, 114GL will evaporate, be sold, transferred or released as environmental flow, and the remaining **286 GL will overspill the dam**. This overspill is valuable and can be transferred to inland Australia, and in particular to central, western and south western NSW. This report identifies some of the possibilities for the use of the overspill and when necessary [in extreme drought] some high level extractions from the dam.

It is acknowledged that some changes to existing water management practises and regulation may be necessary in order for this project to proceed.

TPC has used its in house resources to carry out substantial investigations for the TBWTP [now TIWTP] as documented in the TPC/Rainsaver report titled "The Tallowa Pipeline Revised Report November 2008." Subsequently TPC and Evans and Peck [E&P] developed the first unsolicited proposal titled "Unsolicited Proposal to NSW Dept of Premier and Cabinet. Business Strategy." This was submitted in June 2009 but to date no response has been received.

TPC and E&P developed the proposal to prove:

- It was aligned with the NSW Government's and agencies' strategic plans.
- It demonstrated the project was the best value means of servicing the water requirements of a large number of NSW regional communities.

This report focused on several success factors to be considered by the NSW Government Strategic Review including:

- Need for the project. [Service delivery].
- Value for money.
- Sustainability.
- Management of the business case preparation.

The remaining three risk factors of Risk Management, Stakeholder Management and Change Management were to be addressed by TPC/E&P at a later stage.

TPC has continued to work on the project from mid 2009 to the present and has produced this revised Unsolicited Proposal for the NSW Department of Premier and Cabinet, which incorporates a further extension to the proposal as described:

> A pipeline between Forbes and Goonumbla linking the Lachlan and Bogan rivers. This pipeline allows Shoalhaven water to be delivered to Parkes, Peak Hill, Brewarrina, Bourke, Wilcannia, Menindee, Broken Hill [via the existing pipeline], Nyngan and Cobar and its mines, [via the existing Nyngan to Cobar pipeline].

The proposed extractions have been reduced down to 100 GL per annum extracted at the rate of around 500 megelitres per day from the Shoalhaven system, and delivered inland into Wyangala and Burrinjuck dams.

Financial Proposal: The original proposal was structured around the proposition that the NSW Government would fund further research to prove up the viability of the project with the view to then calling tenders for a BOOT or similar proposition from pipeline or infrastructure operators.

Recent developments however, have seen the proposal become a TPC submission to the NSW Department of Premier and Cabinet seeking its agreement to transfer 100 gigalitres of Shoalhaven water per annum to inland NSW using the pipelines designed, built and operated by TPC for a transmission fee to be determined by IPART. At some time in the future, ownership of the pipeline would transfer to the then NSW Government under a BOOT arrangement.

Research by TPC indicates that further water should be available in most years, and the use of this additional water would be as decreed by the NSW Government. When the water reaches the Murray Darling Basin at the Yass River or Lachlan River, it is assumed the water would then be jointly managed by the NSW Government and the MDBA. Pipeline and pumping capacity [and the availability ofwater] are the limiting factors constraining the volume able to be transferred inland.

Legal Aspects: TPC has taken the following legal and financial aspects into consideration:

- The water is owned by the people of NSW and administered by the NSW Government.
- At present the Shoalhaven River is unregulated and no sustainable yield has been calculated. TPC wishes to introduce the fact that the overspill water has a commercial value, and can be put to beneficial community use.
- Once the water reaches the Lachlan and Yass rivers, it will be jointly managed by the NSW Government and the MDBA.
- It is possible that the Shoalhaven/Tallowa water will not come under the jurisdiction of the Water Act 2007 as it could be argued this water is not a “basin water resource” having originated outside of the Basin.
- In order to finance the project TPC requires a guaranteed transmission fee as determined by IPART for transferring around 100 gigalitres p.a.
- The water would come from overspill from Tallowa Dam and, in extremely dry years as both overspill/high level extraction and as draw-downs of stored water in Burrinjuck and Wyangala dams.
- The NSW Government would be required to enter into contracts with customers where the Government guaranteed supply.
- The ownership of the NSW pipelines will be transferred to the NSW Government after a period of time under a traditional BOOT arrangement.

The project is now rebadged the Tallowa to Inland Water Transfer Project, TIWTP and this report summarises the project as at March 2012.

3.0 NEED FOR THE TALLOWA TO INLAND WATER TRANSFER PROJECT

This section identifies the need for the TIWTP from a NSW and a national viewpoint. It examines :

- The need to indemnify all communities within the TIWTP footprint against future water restrictions.
- The ongoing requirement to deliver environmental through-flow into waterways in the southern and central MDB in times of serious drought.
- The specific requirement to deliver water on demand into the Lachlan River. This opens up the possibility of expanding the TIWTP footprint to western NSW via the Bogan and Darling rivers and the Cobar and Broken Hill pipelines. This in turn sees the area’s important mining areas securing their water supply requirements.

Refer to Figure 1 for an overview map of the proposed project, and to Figure 2 for additional detail of the main pipeline.

In satisfying these needs it should be possible to create a valuable asset for the NSW Government.

The project aligns with the current NSW Government's priorities and State Plan objectives.

3.1 **Need to Terminate Water Restrictions Within the TIWTP Footprint**

Refer to Figure 1, which maps the TIWTP footprint.

The recent drought saw water restrictions up to Level 6 imposed on communities in the MDB. This saw playing fields become unplayable, parks and gardens dry out and stress in these communities.

Recent work by Sydney Water [Sydney Water website] has established that water restrictions imposed in Sydney delivered the following savings based on total annual sales of 600 gigalitres:

- Level 1 saved 12%, a total saving of 72 GL per annum
- Level 2 saved 16%, a total saving of 96 GL per annum
- Level 3 saved 17%, a total saving of 102 GL per annum

It follows that level 6 restrictions in the MDB would have saved around 20% or 40 litres per day [14,600 litres per annum] for a person consuming 200 litres per day, or 50 litres per day [18,250 litres per annum] for a person consuming 250 litres per day. A town the size of Yass with around 5000 residents, Level 6 restrictions would thus save between 73.0 and 91.25 megalitres per annum [0.073 to 0.091 GL].

The building of a 55 km pipeline from Forbes to Goonumbla creates the opportunity to substantially increase the reach of the TIWTP footprint to the Bogan and Darling valleys. This would, subject to the agreement of all authorities, indemnify Parkes, Peak Hill, Nyngan, Cobar, Bourke, Brewarrina, Wilcannia, Menindee and Broken Hill from future water restrictions.

Figure 3 shows total annual inflows for Tallowa Dam for the past 14 years were an average of 400 gigalitres.

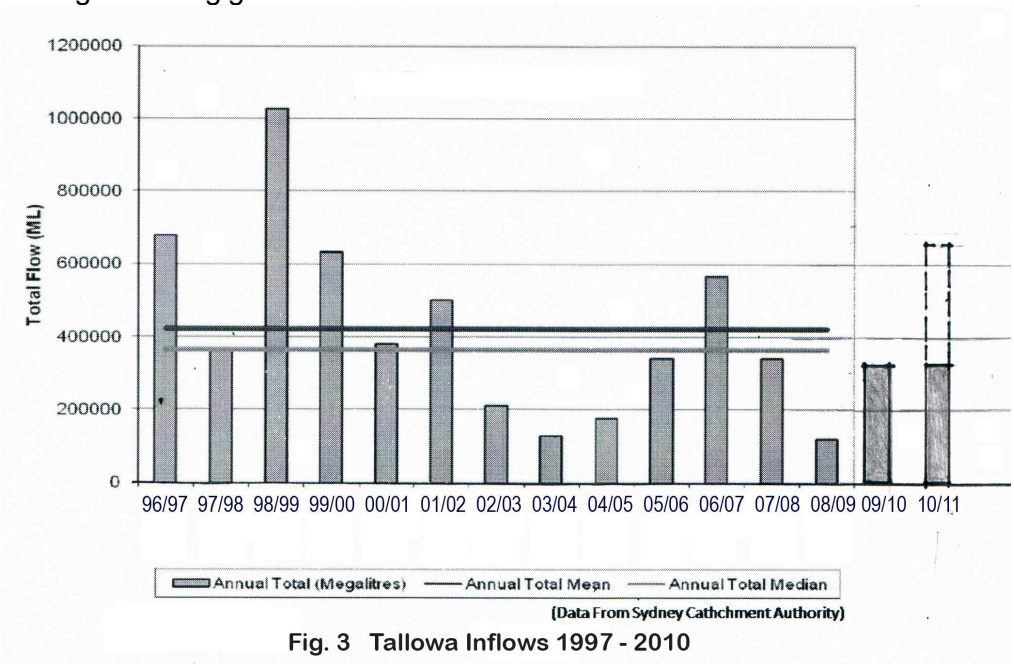


Fig. 3 Tallowa Inflows 1997 - 2010

Note: Inflow for 2009/10 and July to December 2010 have been plotted by TPC. The remainder of 2010/11 is assumed at the same rate of inflow and is hypothetical.

The bottom line is the maximum amount of Shoalhaven water should be piped inland and used or stored in these dams provided no damage is inflicted on the environment. Figure 4 shows the annual inflows for the life of the dam [since 1976] and show that one year in 3 experienced inflows of 1000 GL or more, and 18 years out of 34 experienced inflows of 500 GL or more. By allocating as much water as reasonable to the irrigators, much financial and social stress could be avoided in regional South East Australia. Further work should be carried out to quantify the volumes of Shoalhaven/Tallowa water that could become available for distribution to irrigators. The limiting factor is the capacity of the pipelines.

Note: Graph extended to 2009/10 by TPC.

3.2 **Need for the Project: Environmental Flow into MDB Waterways**

Whilst the current situation [March 2012] sees most MDB dams full and the environmental needs of the basin secure for at least the next two years, the longer term outlook may be fragile. Science tells us that the step change [down] in annual rainfall in eastern Australia and climate change will lead to more frequent droughts. However, the recent drought has shown that the MDB rivers can survive serious drought and historically many MDB rivers have ceased to flow for several years, and recovered. The TIWTP can not deliver the large volumes recommended by scientists, but in better than average rainfall years it can deliver substantial volumes as environmental flows where and when needed. Further work is needed to quantify these volumes.

In addition, it should be recognised that water flowing through the Yass, Lachlan, Murrumbidgee, Bogan, Darling and Lower Murray rivers to regional destinations is environmental flow while it is in the rivers.

3.2.1 **Importance of the MDB to NSW**

The Murray Darling Basin is the catchment for the Murray and Darling rivers and their tributaries. It includes three quarters [around 607,000 sq kilometres] of NSW, all the state's inland river valleys and important groundwater aquifers.

The Basin is Australia's most important agricultural area, producing over one third of our food supply. It is also home to more than two million residents. The basin generates 39% of the national income derived from agricultural production and includes 65% of our irrigated farmland. It produces 53% of Australian cereals grown for grain [including 100% of rice], 95% of oranges, and 54% of apples. The basin supports 28% of the nation's cattle herd, 455 of sheep and 62% of pigs. [MDBA website 2009]

The Murrumbidgee and Lachlan catchments combined cover 16% of the Basin, account for 22% of the Basin's total runoff, and 23% of surface water use.

A number of Basin wetlands are recognised by the RAMSAR Convention on Wetlands of International Importance [MDBA 2009].

3.2.2 **Drought**

Prior to the La Nina event commencing mid 2010, Murray inflows were the lowest in 119 years [MDBA 2009]. The MDBA's total active [usable] storage dropped to 950 gigalitres or 11% of capacity.

September peak inflows have dropped from a long term average of 1600 GL to around 1050 GL between 1997/8 and 2007/8. The lower summer and autumn inflows have dropped from an average around 190 GL to around 100 GL. [MDBA].

3.2.3 **Step Change [Down] in Annual Rainfall in Eastern Australia**

McLeod [2009] has used information from the Bureau of Meteorology to show that there has been a step change down in total annual rainfall in eastern Australia for the period since 1970. This has resulted in a step change, or a reduction in the annual yield of the Murray Darling Basin. The average Basin yield since 1996/7 is 49% of the long term average yield.

3.2.4 **Climate Change**

The CSIRO [2008] MDB Sustainable Yields Project reports on the sustainable yield of surface and ground water systems within the Basin and found that:

- Surface water availability in the Murrumbidgee catchment is 4270 GL p.a. Present surface water use is 53% or 2257 GL p.a. Under best estimates surface water availability would reduce by 9% or 384 GL p.a.
- Surface water availability in the Lachlan catchment is 1139 GL p.a. with present water use 28% or 321 GL p.a. Under best estimates surface water availability would reduce by 11% or 125 GL p.a.
- Surface water availability in the Murray catchment is 11,162 GL p.a.. Present surface water use is 36% or 4045 GL p.a. Under best estimates surface water availability would reduce by 14% or 1560 GL p.a.

3.3 **Need for the Project: Delivery of Water on Demand to the Lachlan, Bogan and Darling Rivers**

The Lachlan River and residents in its catchment suffered most during the past drought. This should not be allowed to occur in the future. A major part of the solution is to deliver water on demand, by the pipeline, to the Lachlan at Inglewood Bridge near Gunning. Water thus delivered would flow downstream to Wyangala Dam where it can then be released for downstream use or warehoused in the dam. Some of this delivered water could be piped and pumped from Forbes to the headwaters of the Bogan near Goonumbla/North Parkes mine. Water thus pumped will travel by gravity to the Barwon/Darling at Brewarrina/Bourke and then travel downstream, with some of this water eventually reaching the Great Australian Bight.

3.3.1 **Broken Hill Town Supply**

Water delivered to the Darling near Bourke/Brewarrina will flow downstream through Menindee where it can be diverted into the Menindee-Broken Hill pipeline and thus contribute to the Broken Hill town supply and mines. This action would see an end to water restrictions in the future for Broken Hill, and could see more mining activity. It could also allow lower storages in the Menindee Lakes, which would result in less evaporation. Work currently being carried out in this are indicates aquifer storage may be feasible which further reduces evaporation of up to 420 gigalitres.
This region contains the northern tenements of the Braemar Iron Alliance which may prove up 50 million tonnes of magnetite p.a.valued at $10 billion subject to water availability.

3.4 **Addressing the Needs: Tallowa to Inland Water Transfer Project**

Tallowa Pipeline Company has conducted substantial investigations which identify that 100 gigalitres of Shoalhaven/Tallowa water should be available in most years and this water could be transferred inland to the Murray Darling Basin. The SCA has graphed historical annual inflows since 1976 when the dam was commissioned and this data is shown on Figure 4. The graph clearly shows the low rainfall years where water was transferred to Sydney, and the excessive overspill that occurred in the years preceding the low rain periods where hundreds of gigalitres could have been pumped inland and warehoused in Burrinjuck and Wyangala dams. This warehousing would ensure that the 100 GL to be guaranteed each year could be

delivered either from Tallowa Dam overspill, or in years of extremely low rainfall/inflow from a combination of overspill, dam extractions and warehoused water. The main limiting factor restricting the transfer of this water is the capacity of the pipelines and pumping capacity.

Computer Modelling: TPC has set up a computer program to create a daily balance for water stored in Tallowa Dam; water evaporated, sold or used; jnflow [if any]; and overspill [if any] for all days since the dam was opened in 1976. By referring to this hydrograph, surplus water [above the 90% full mark] can be identified as being available for transfer to inland Australia [subject to the approval of NSW Government and its agencies]. The program totals volumes available in calendar years 1st January to 31st December. This is currently being adjusted to harmonise with the SCA water balance years.

The bottom line is 100 gigalitres p.a. can be organised [except for periods of extreme drought] for delivery inland, and in most other years higher volumes are available for transfer and warehousing.

The Metropolitan Water Plan is now available and advises the volumes to be delivered to the Lower Shoalhaven. These requirements should be met before pumping commenced to inland Australia except in exceptional circumstances.

The Proposal: Intends to capture 100 GL guaranteed supply of high level storage and overspill from Tallowa Dam. It would also capture, transfer and warehouse larger volumes when the water was available. It would use a combination of existing SCA infrastructure and a new 135 km pipeline from Wingecarribee Reservoir to Gunning as shown in Figure 1. A branch pipeline would deliver water into the Lachlan at Inglewood Bridge. A further extension of the main pipeline would deliver water into the Yass River at Gundaroo. A separate pipeline from Forbes to Goonumbla would deliver water to the Bogan and this water would flow downstream to the Darling.

Thus, in summary, the TIWTP aims to provide:

- 100 GL p.a. guaranteed supply to commercial entities in particular mining and exploration operations in NSW.
- Larger volumes in good rainfall years “banked” in Burrinjuck and Wyangala dams and withdrawn in dry years to meet the miners’ requirements.

In so doing the TIWTP could provide

- Water security for all towns and villages within its footprint, including Cobar and Broken Hill via existing pipelines.
- Water for mining and explorarion.
- Some water for environmental flows as decreed by the NSW Government and the MDBA.
- A lifeline for the Lachlan River.

3.5 Availability of Water at Tallowa Dam

Refer to Figures 3,4,5 and 6, and to Tables 1,2,3 and 4

The availability of water for extraction is the most significant element of the TIWTP. Tallowa Dam is 43 metres high and was constructed in 1976, creating the Lake Yarrunga storage, which holds around 90 GL. With a large catchment area of 5750 sq km the dam regularly fills and spills, with flows down the Shoalhaven River often causing flooding in Nowra, Bomaderry and on the adjacent floodplain.

The Shoalhaven Scheme, of which Tallowa Dam is part, operates as a drought reserve scheme. Pumping to Sydney has occurred three times since it began operating: 1981-1983, 1993-1994 and 2003-2008 as shown in Figure 4 [SCA 2006] which also shows the large volumes of water that regularly overspill the dam.

In November 2008 the NSW Government announced a three year moratorium on the transfer of water to Sydney. In recent times the Government has indicated that the Kurnell desalination plant will be operating 24/7 for the foreseeable future delivering 92 GL annually. These developments result in less Shoalhaven/Tallowa water being needed to top up the Sydney supply and it is assumed that if the Tallowa pipeline is built, then the NSW Government will have an extra 92 GL of water available for sale and transfer to inland NSW and beyond.

3.5.1 **Worst Case Scenario**

The SCA website [Tables 1,2,3 and 4] contains the water balances for 2006/7, 2007/8, 2008/9 and 2009/10. TPC will seek similar information for all previous years back to 1976 when the dam was opened for further analysis. The year 2008/09 saw the equal lowest annual inflow of 157 gigalitres. The only other years with inflows this low were 1979/80, 1981/82 and 2003/04. An analysis of 2008/09 shows that overspill [40.92 GL] and transfers to Sydney [45.922 GL] totalled 86.842 GL.

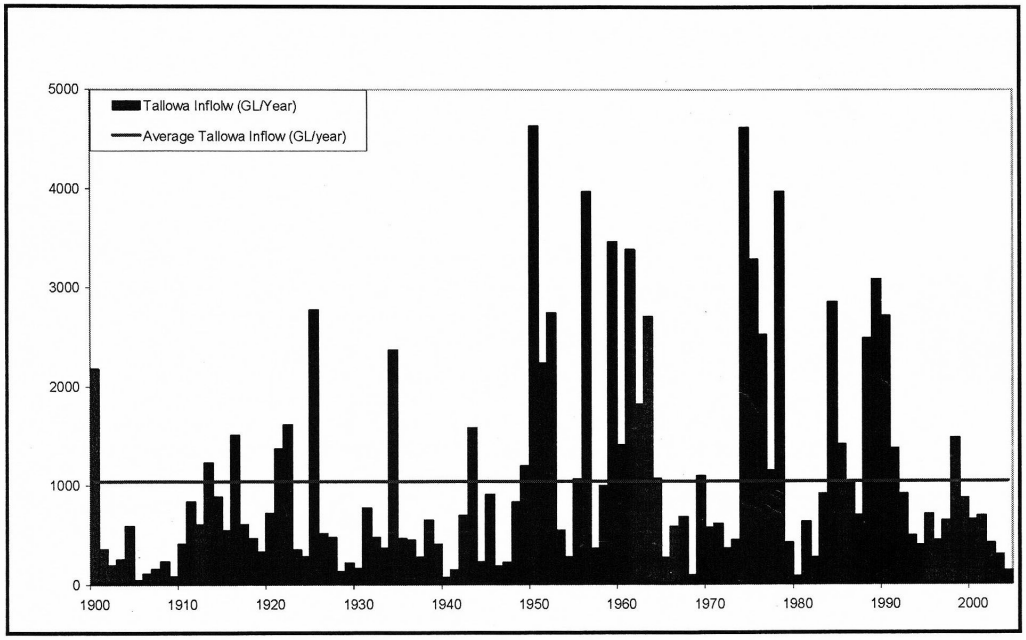


Fig. 5 Historical Tallowa Inflows 1900 - 2005

3.5.2 **Normal Scenario**

Figure 3 shows inflows into Tallowa Dam for the past fourteen years which average around 400 GL per annum.[SCA website]. Tables 1,2,3 and 4 show:

Evaporation	averaging	22,925 GL
Sales	averaging	4,156 GL
Transfers [excl transfers to Warragamba]	averaging	41984 GL
Environmental releases	averaging	44,920 GL
Total		113,985 GL

Thus with inflows averaging 400 GL and outflows averaging 114 GL the average volume of water available is some 286 GL per annum. From the figure a further 150 GL of environmental flow must be deducted, thus leaving on average around 136 gigalitres available. Figures 6 and 7 graph the inflow and overspill into and from the dam for the years 2007/8 and 2008/9. In 2007/08 around 75.2 GL would not have been capturable due to the pumping capacity which is limited to 4.92 GL per day. In the very dry year of 2008/09 all overspill would have been capturable. Further work is needed to more accurately assess volumes of overspill which will become available. Such a study would indicate how much capacity should be built into the pipeline either initially, or as later stages of the project.

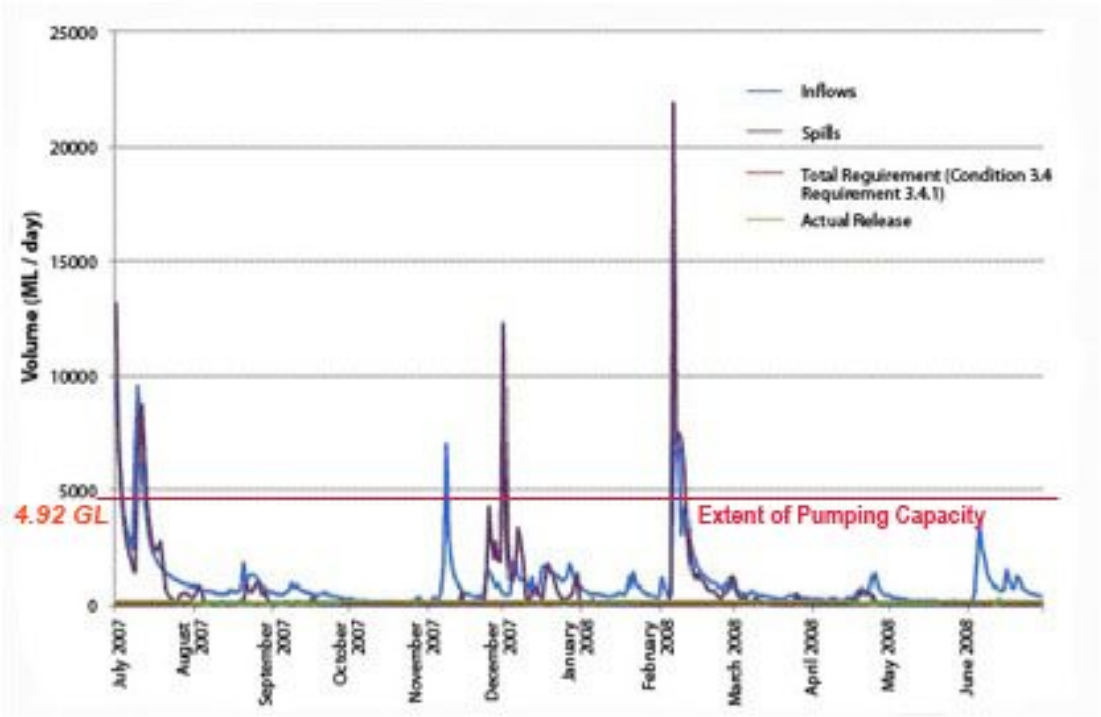
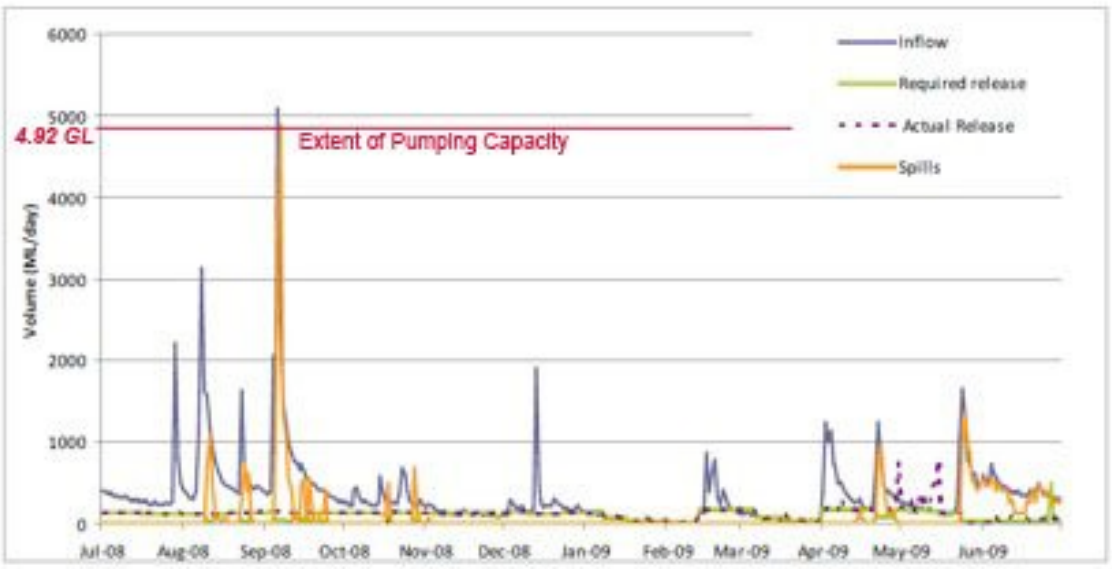


Figure 6 Inflows, Spills and Transfers – Tallowa Dam (2007 – 2008)

Note: Pumping capacity added by TPC

Figure 7 Inflows, Spills and Transfers – Tallowa Dam (2008 – 2009)



Note: Pumping capacity added by TPC

3.5.3 **Wet Year Scenario**

Figure 4 shows the historical inflows into the dam with one year in three more than 1000 GL and 18 years out of 34 showing 500 GL or more into the dam. Several of these years saw damaging flooding in Nowra, Bomaderry and the floodplain.

3.5.4 Flooding

As at March 2112 Burrinjuck and Wyangala dams are full and releases of several gigalitres per day have recently accentuated flooding problems in the Lachlan and Murrumbidgee rivers. Costs will be measured in billions of dollars, with buildings and infrastructure damaged in the towns, and on the land crops and perrenial plantings have been destroyed. Environmentally weeds are now spreading across the floodplains and riparian areas have been washed away.

This has highlighted serious flaws in dam and river management rules which have focussed on the drought situation and seem to ignore the flood situation which is far more serious economically and socially. The CSIRO in Mordialloc state “for the Australian region the CSIRO9 model shows a marked increase in the frequency of heavy rainfall days.”

Neither Burrinjuck or Wyangala Dams can mitigate floods, but can be made more efficient by amending the operating rules to allow appropriate drawdown of storages when flooding is predicted. This has been detailed by GHD in their recent report re the January 2011 flooding of Brisbane and Ipswich.

The TIWTP would propose detailed studies to investigate revised operating rules for Tallowa Dam to increase the dam’s performance in flood mitigation.

SCA WATER BALANCE 2006/2007 for Shoalhaven Supply System

SHOALHAVEN SYSTEM	Sources of water		Distribution of Water	
	Volume (ML)	% of total	Volume (ML)	% of total
Storage Volume				
Volume in storages at start of year			56,820	
Volume in storages at end of year			63,680	
Change in Total Storage			**6,860**	**1%**
Storages net evaporation			**23,120**	**3%**
Inflows				
Tallowa dam **(1)**	699,530	94%		
Fitzroy Falls **(2)**	24,860	3%		
Wingecarribee Dam	14,790	2%		
Sub-total	739,180	**99%**		
Water Supplied to Customers				
Sales to Shoalhaven City Council			77	0%
Sales to Wingecarribee Shire Council			4,221	1%
Sales to Retail Customers			0.3	0%
Sub-total			**4,298**	1%
Transfers to SCA's other supply systems				
Wingecarribee River to Warragamba			98,248	13%
Glenquarry Cut			77,685	10%
Sub-total			**175,933**	**24%**
Water released under Water Management Licence				
Riparian Releases (Wingecarribee)			**183**	**0%**
Environmental Releases				
Tallowa			29,270	4%
Wingecarribee			548	0%
Sub-total			**29,818**	**4%**
Shoalhaven City Council releases from Tallowa			**12,440**	**2%**
Reservoir Spills (3)			492,840	**66%**
Unaccounted difference (4)	**6,311**	1%		
TOTAL	**745,491**	**100.00%**	**745,491**	**100.00%**

(1) The inflow estimate for Tallowa Dam excludes the release from Fitzroy Falls Dam.

TABLE 1

Note: Inflows and overspill highlighted by TPC.

3.5.4 **Effect of Kurnell Desalination Plant**

In 2010 the Kurnell desalination plant was commissioned and can deliver 92 gigalitres p.a. to augment the Sydney supply. Recent statements by the NSW Government indicate that the plant will be working continuously for the foreseeable future. This would indicate that less water from Tallowa Dam, will be needed in future to augment the Sydney supply.

SCA WATER BALANCE 2007/2008 for Shoalhaven Supply System

SHOALHAVEN SYSTEM	Sources of water		Distribution of Water	
	Volume (ML)	% of total	Volume (ML)	% of total
Storage Volume				
Volume in storages at start of year	63,680			
Volume in storages at end of year	58,830			
Change in Total Storage	**4,850**	**1%**		
Storages net evaporation			**23,020**	**4%**
Inflows				
Tallowa Dam (1)	476,040	93%		
Fitzroy Falls Dam (2)	20,530	4%		
Wingecarribee Dam (3)	12,840	2%		
Sub-total	509,410	99%		
Water Supplied to Customers				
Sales to Shoalhaven City Council			76	0%
Sales to Wingecarribee Shire Council			4,042	1%
Sales to Retail Customers			0.4	0%
Sub-total			**4,118**	1%
Transfers to SCA's other supply systems				
Wingecarribee River to Warragamba			151,950	30%
Glenquarry Cut			42,620	8%
Sub-total			**194,570**	**38%**
Water released under Water Management Licence				
Riparian Releases (Wingecarribee)			**243**	**0%**
Environmental Releases				
Tallowa			23,670	5%
Wingecarribee			728	0%
Other release to river (4)			9,270	2%
Sub-total			**33,668**	**7%**
Shoalhaven City Council releases from Tallowa			**15,228**	**3%**
Reservoir Spills (5)			**241,644**	**47%**
Unaccounted difference (6)			**1,769**	
TOTAL	**514,260**	**100%**	**514,260**	**100%**

TABLE 2 *Note: Inflows and overspill highlighted by TPC.*

3.6 **Capacity of Water Transfer Infrastructure**

The TIWTP relies on gaining access to existing pump, pipe and tunnel infrastructure that is currently used for extracting water from Tallowa Dam storage and transferring it to the Sydney storage via the Fitzroy Falls and Wingecarribee reservoirs and thence into the river systems. Currently power stations, part powered by hydroelectric generators, lift water from Tallowa Dam 612 metres to Fitzroy falls and Wingecarribee. Pumping capacity is 205 ML per hour or up to 4.92 GL per day. During the recent drought years up to 7 – 8 GL per week was pumped to the Sydney storage. Thus no problems are foreseen in pumping similar volumes inland.

The SCA submission to IPART [2006] indicated marginal pumping costs at $0.07 per kilolitre or $70.00 per megalitre.

TIWTP water would be accessed at Wingecarribee in similar fashion as that designed for the Highlands Source project.

3.7 **New Pipeline Alignment**

The TIWTP proposes a new main pipeline 135 km long between Wingecarribee Reservoir and Gunning. Water would be pumped into the pipeline at a new pump station adjacent to Wingecarribee Reservoir. The pipeline would then follow the route established for the Highlands Source project as far as Goulburn. From Goulburn it could follow the Hume Highway to its junction with the Old Hume Highway. From this junction an extension would follow the Old Hume Highway to Inglewood Bridge with an offtake into the Lachlan River. A separate extension running south to Gundaroo would be fitted with an offtake into the Yass River. Branch pipelines could service towns along the route.

A second smaller pipeline 55 km long would be built from Forbes to Goonumbla, following secondary road easements, and thus connect the Lachlan and Bogan rivers. This pipeline would secure town supplies for Parkes, Peak Hill, Nyngan, Cobar, Brewarrina, Bourke, Wilcannia, Menindee and Broken Hill. The numerous mines and exploration companies operating in the Bogan and Darling valleys could be supplied with Shoalhaven water.

SCA WATER BALANCE 2008/2009 for Shoalhaven Supply System

SHOALHAVEN SYSTEM	Sources of water		Distribution of Water	
	Volume (ML)	% of total	Volume (ML)	% of total
Storage Volume				
Volume in storages at start of year			58,830	
Volume in storages at end of year			60,770	
Change in Total Storage			**1,940**	**1%**
Storages net evaporation			**22,680**	**14%**
Inflows				
Tallowa Dam (1)	139,640	86%		
Fitzroy Falls Dam (2)	11,410	7%		
Wingecarribee Dam (3)	6,250	4%		
Sub-total	**157,300**	**96%**		
Water Supplied to Customers				
Sales to Shoalhaven City Council			84	0%
Sales to Wingecarribee Shire Council			4,379	3%
Sales to Retail Customers			2.5	0%
Sub-total			**4,466**	3%
Transfers to SCA's other supply systems				
Wingecarribee River to Warragamba			45,922	28%
Glenquarry Cut			950	1%
Sub-total			**46,872**	**29%**
Water released under Water Management Licence				
Riparian Releases (Wingecarribee)			**365**	**0%**
Environmental Releases				
Tallowa			23,755	15%
Wingecarribee			1,095	1%
Other release to river (4)			6,143	4%
Sub-total			**30,993**	**19%**
Shoalhaven City Council releases from Tallowa			**14,820**	**9%**
Reservoir Spills (5)			**40,920**	**25%**
Unaccounted difference (6)	**5,756**	**4%**		
TOTAL	**163,056**	**100%**	**163,056**	**100%**

TABLE 3 *Note: Inflows and overspill highlighted by TPC.*

3.8 **Pipeline Sizing**

TPC's investigations indicate that a pipeline of around 1.2 metres diameter will be needed from Wingecarribee to Gunning delivering 5.8 cubic metres per second.

The two branch lines to Inglewood Bridge and to Gundaroo would be designed to suit the demand from the mining interests in central NSW, the Broken Hill area and the emerging industrial metal exploration in SW New South Wales.

These TPC investigations initially required the development of a surface level profile for the chosen route alignment, followed by a hydraulic assessment in order to match the pipeline length, surface levels, and required flow rates with pipeline diameters and pipe parameters. TPC has carried out the surface level profiles using 1:250,000 contour maps.
Pipeline sizes have been calculated by TPC and its engineers using charts which follow Manning's formula, and the Calctool which follows the Hazen-Williams formula. Roughness co efficient is assumed at 140.

At this early stage no work would be carried out to determine other pipeline infrastructure needed such as air valves, isolation valves or scour valves which will be needed. Financial estimates will be provided in Stage 2 of the Business Case.

SCA WATER BALANCE 2009/2010 for Shoalhaven Supply System

SHOALHAVEN SYSTEM	Sources of water		Distribution of Water	
	Volume (ML)	% of total	Volume (ML)	% of total
Storage Volume				
Volume in storages at start of year			60,770	
Volume in storages at end of year			63,040	
Change in Total Storage			**2,270**	**1%**
Storages net evaporation			**22,880**	**8%**
Inflows				
Tallowa Dam (1)	249,744	92%		
Fitzroy Falls Dam (2)	9,686	4%		
Wingecarribee Dam (3)	5,761	2%		
Sub-total	**265,191**	**98%**		
Water Supplied to Customers				
Sales to Shoalhaven City Council			87	0%
Sales to Wingecarribee Shire Council			3,652	1%
Sales to Retail Customers			3	0%
Sub-total			**3,742**	1%
Transfers to SCA's other supply systems				
Wingecarribee River to Warragamba			4,475	2%
Glenquarry Cut			1,800	1%
Sub-total			**6,275**	**2%**
Water released under Water Management Licence				
Riparian Releases (Wingecarribee)			**365**	**0%**
Environmental Releases				
Tallowa			55,727	20%
Wingecarribee			1,095	0%
Other release to river (4)			13,129	5%
Sub-total			**69,951**	**26%**
Shoalhaven City Council releases from Tallowa			**14,057**	**5%**
Reservoir Spills (5)			**152,400**	**56%**
Unaccounted difference (6)	**6,749**	**2%**		
TOTAL	**271,940**	**100%**	**271,940**	**100%**

TABLE 4 *Note: Inflows and overspill highlighted by TPC*

3.9 **Pumping Infrastructure**

Associated with the pipeline sizing exercise described above, a preliminary hydraulic assessment has established the need for one pumping station to lift the water 20 metres between Wingecarribee and Moss vale. From there 60% of the flow is downhill to Gunning with pumping needed to get the water over several hills along the route. It is estimated that possibly four pumping stations will be needed along the 135 km length.

Forbes to Goonumbla is a 60 metre lift and will require at least one pumping station. However 80% of the electricity needed for this pumping could be regained with a mini hydro power plant between Goonumbla and Nyngan

3.10 **Water Storages**

No new water storages are required except for holding tanks at the pumping stations. Water from the pipeline will be supplied:

- Directly to town storages along the various routes.
- To the Yass River at Gundaroo where it will flow downstream to Burrinjuck Dam.
- To the headwaters of the Lachlan River where it will flow downstream to Wyangala Dam.
- To the headwaters of the Bogan River at Goonumbla.

Some civil earthworks will be necessary to accommodate the induced flow.

Discharge capability of Burrinjuck Dam is 5.2 gigalitres per day and Wyangala is 1.7 gigalitres per day, which allows the transfer of the design volumes.

3.11 **Energy Requirements**

Coombes and Kucera, in a paper prepared for the International Hydrology and Water Resources Symposium in Wollongong [2003] state: “The cost to pump water from the Shoalhaven River to Wingecarribee Reservoir was estimated to range from $62/ML to $84/ML with energy consumption of 1624 kWh/ML. About 0.89 kg of greenhouse gases [CO2] is generated for each kWh of electricity consumption.” These estimated costs are in accord with the SCA submission to IPART stating marginalised costs are $0.07/KL or $70/ML. [SCA submission to IPART September 2008 p40[

This compares favourably with the energy requirement for desalination of 5 kWh/ KL or 5000 kWh/ML. [UNESCO].

3.12 **Generation of Hydro-electricity**

The proposed pipeline would have a fall of around 1:1100 between Moss Vale and Goulburn and 1: 800 between Goulburn and Gunning. These falls present the opportunity of building two mini hydro electricity plants.

The Lachlan River bank falls 1:880 between Inglewood bridge and Wyangala Dam and a further mini hydro electricity plant could possibly be located near the dam.

The Bogan River bank falls approximately 117 metres between Goonumbla and Nyngan and presents another opportunity to locate a mini hydro plant, which could service Nyngan and Cobar.

These hydro opportunities require investigation and TPC has had initial discussions with Hydro Tasmania Consulting on the matters of cost, and feasibility of the plants.

3.13 NSW Government's Objectives and Priorities

The TIWTP is aligned with the current NSW Government's and agencies priorities and objectives:

NSW Government State Plan [2006]

Priority E1: A secure and sustainable water supply for all users

Targets include:

- Meet performance standards for water supply and reliability and quality.
- Restore water extraction from rivers to sustainable levels.

Priority E4: Better outcomes for native vegetation, biodiversity, land, rivers and coastal waterways.

Targets include:

- By 2015 there is an improvement in the condition of riverine ecosystems.
- By 2015 there is an improvement in the condition of important wetlands, and the extent and integrity of those wetlands is maintained.

NSW Government State Infrastructure Strategy 2008-09 to 2017-18 [2008]

The strategy notes that infrastructure to support industry is vital to the prosperity of the NSW economy. Initiatives include:

- Assistance will be provided to Goulburn-Mulwaree Council to construct a water transfer pipeline from Wingecarribb Reservoir to Goulburn. This will provide greater drought security in the region.
- The Government will continue to maintain dam integrity and security of rural water supply.
- Continuation of long-term projects such as Tillegra Dam [since refused planning permission], the country towns Water and Sewerage Scheme and rural dam upgrades will ensure long-term water security.

3.14 Proponents' Proposal

TPC is seeking the support of the NSW Government for this project proposal, specifically to provide:

- Assessment of the merits of the proposal by the Department of productivity and Commerce to determine where it fits in the relative priorities of the Government and its agencies.
- Ready access to relevant NSW Government agencies and the information they hold as input to developing the business case, including access to the SCA for Stage 1.
- An on-going role for TPC and E&P as adviser to the NSW Government for the remaining steps of the TIWTP.

4. INVESTIGATIONS TO DEVELOP THE BUSINESS CASE

At present, the project development has reached the "Scoping Study" stage as defined in the National PPP Guidelines (Refer Fig 8).

TPC proposes a four stage development of the Business Case with each stage referred to the NSW Government for approval before commencing the following stage. The TIAWTP is still confidential at this stage and it is desirable to limit the distribution of project information to parties who must have the information.

- Stage 1: Confirmation by the SCA that the required volume of water is available for the TIAWTP.
- Stage 2: A review of TPC's work to provide the Government with a level of confidence the base technical assumptions are reasonable and that there are no technical "showstoppers" that would prevent the project from proceeding or require significant modification of the project.
- Stage 3: A high level study by Evans and Peck to test the economic viability of the project.
- Stage 4: A suite of studies, listed in Section 3.22 to complete the requirements for the Business Case.

4.1 **Stage 1 of the Business case – Water Availability**

4.1.1 **Availability of Water at Tallowa Dam**

The SCA is responsible for managing the Shoalhaven Catchment and associated water use. Given the fundamental importance of the availability of water to the TIWTP, it is proposed that the SCA determine that the water availability assumptions are reasonable.

TPC has computed a daily balance for all days since the dam was completed in 1976 showing:

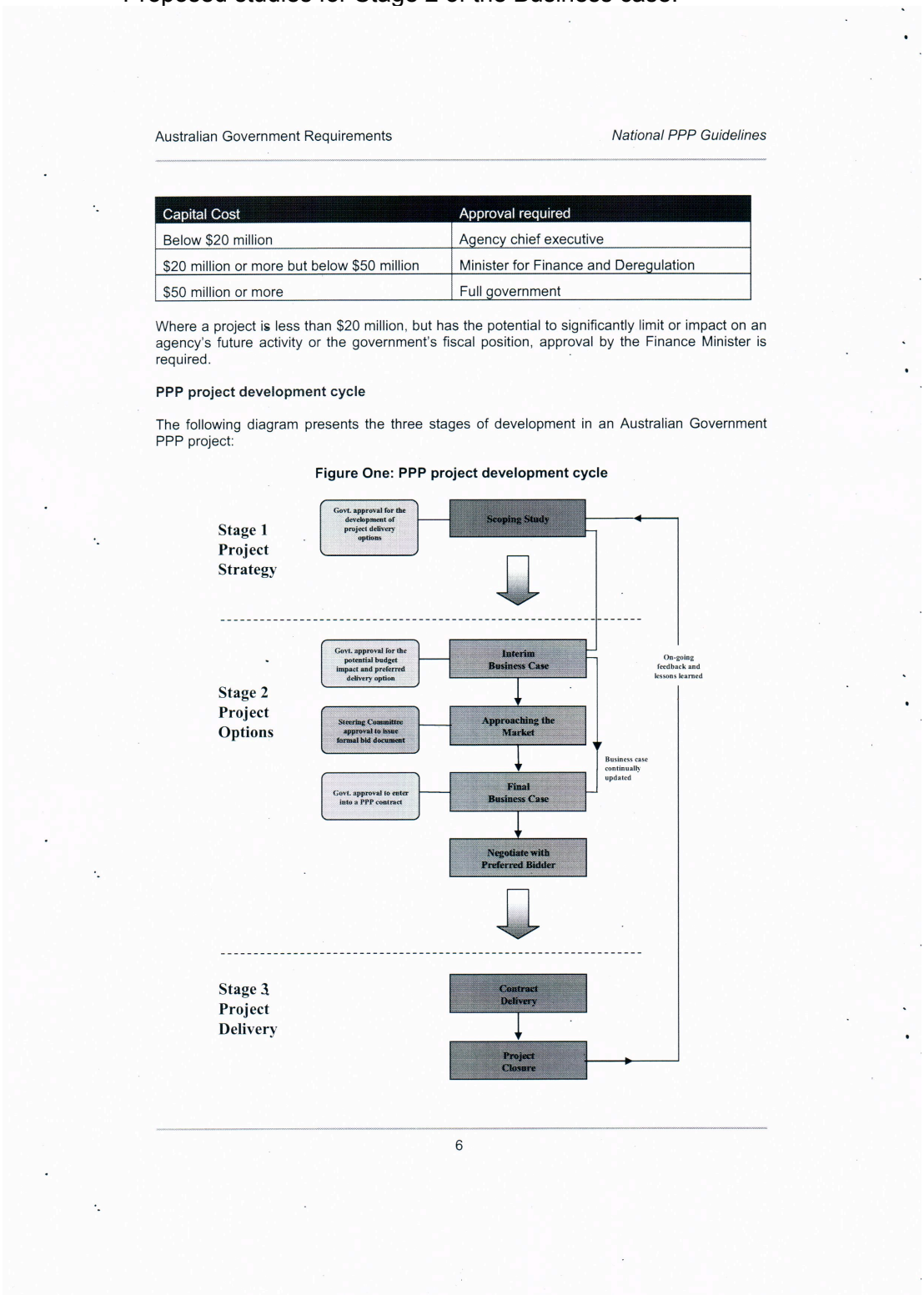
- Amount stored on that day as a volume and as a percentage.
- Amount evaporated, sold or used on that day.
- Inflow into the dam on that day [if any].
- Overspill on that day [if any].
- Volume available for piping inland on that day.

The program adds up the above data in calendar years and has been sanctioned by TPC's internal engineers. It is proposed this information be submitted to the SCA as a separate document for appraisal.

TPC and Evans and Peck would co-ordinate discussions with the SCA and would request the DPC arrange for the appropriate senior personnel be made available to complete these investigations.

4.1.2 **Deliverables for Stage 1 of the Business Case**

- Information gathered to date by TPC as a report.
- Proposed studies for Stage 2 of the Business case.



Australian Government Requirements *National PPP Guidelines*

Capital Cost	Approval required
Below $20 million	Agency chief executive
$20 million or more but below $50 million	Minister for Finance and Deregulation
$50 million or more	Full government

Where a project is less than $20 million, but has the potential to significantly limit or impact on an agency's future activity or the government's fiscal position, approval by the Finance Minister is required.

PPP project development cycle

The following diagram presents the three stages of development in an Australian Government PPP project:

Figure One: PPP project development cycle

6

Fig 8 – Australian Government National PPP Guidelines

4.2 **Stage 2 of the Business Case**

It is proposed the following investigations be carried out to test and confirm the base technical assumptions. This work would be carried out by an independent firm of consulting engineers or by a University at TPC's cost.

4.2.1 **Capacity of the Water Transfer Infrastructure**

TPC and E&P are aware that the operating protocols for transferring water from the Shoalhaven Catchment to the Sydney storage dams are quite complex, including rules relating to the rate of filling and drawing down the levels in Fitzroy Falls Dam and Wingecarribee Reservoir. Increasing the required transfer volumes due to the additional requirements of the TIWTP may add to these complexities, quite apart from the issue of whether or not the physical infrastructure has the capacity to transfer the additional project water. Work carried out on the Highlands Source pipeline to Goulburn would be used and extended to establish the capacity for the TIWTP. The capacity must be satisfactory from both a physical infrastructure and from an operations perspective.

For ease of operation TPC would require the SCA to pump the volumes required by the TIWTP to Fitzroy Falls and Wingecarribee using its existing equipment at its cost. TPC would then extract from the Burrawang Tunnel or Wingecarribee Reservoir and pump this extracted water to Goulburn via the route adopted by the proponents of the Highland Source pipeline project. The pipeline would then follow the Hume Highway and secondary roads as described in clause 3.11.

4.2.2 **New Pipeline Easements**

The pipeline alignment proposed by TPC would follow the Highlands Source easements from Wingecarribee to Goulburn. From Goulburn the pipelines would require road easements with minimal private property acquisitions required. This would help to speed project delivery and would simplify the planning and approval processes. This work will require communication with several stakeholders.

TPC will prepare more detailed concept drawings depicting the proposed alignment and longitudinal sections for the pipelines in CAD format.

4.2.3 **Pipeline Sizing and Pumping Infrastructure**

TPC will employ its consultants to prepare a hydraulic profile which will provide more accurate pipe sizes, pipe pressure ratings and identify the need for the initial and any intermediate pumping stations. This work would supercede preliminary pipe sizing described in clause 3.8.

At this early stage no work would be carried out to determine other pipeline infrastructure such as air valves, isolation valves or scour valves, which will be required. Financial estimates for this work will be provided.

4.2.4 Inputs Required from NSW Government Agencies

TPC's investigations to date include Rainsaver 2008, Rainsaver and E&P 2009 and TPC 2009-2011 and these have largely relied on information that is publicly available. However, it is important that more accurate information now be sourced to support the further investigation now being proposed. Useful and relevant information is likely to be held by Government agencies and this needs to be sourced to assist the further investigations.

Information relating to the project alignment and the associated surface level profile includes:

- Alignment information [horizontal and vertical] for the Hume Highway and secondary roads required, presumably held by the Roads and Traffic Authority.
- Any Environmental Impact Studies carried out within the length of the proposed pipelines in New South Wales, presumably held by the Departments of Water and Energy, Environment and Climate Change and other environmental agencies.

The information should preferably be in a format that facilitates its further use in CAD

4.2.5 Deliverables for Stage 2 of the Business Case

TPC will produce a report for the NSW Government including:

- An independent review of TPC's work, to provide Government with a level of confidence that the project can proceed.
- Information on available water and the capacity of existing infrastructure to transfer the water to the Fitzroy Falls/Wingecarribee plateau.
- CAD drawings depicting the pipeline alignment and long pipeline sections.
- Proposed studies and timing for Stage 3 of the Business Case.

4.3 Stage 3 of the Business Case – Economic Viability

TPC will fund a high level study by E&P to test the economic viability of the project. This will give a level of confidence to the NSW Government that the project will proceed, and will include:

- Developing cost estimates of the capital and operating costs.
- Liaising with the SCA to determine any capital and operating costs that would have to be met by the NSW Government in delivering water from Tallowa Dam to the Fitzroy Falls/Wingecarribee plateau;
- Liasing with the Departments of Planning and Commerce to develop forward projections and costs for urban and industry water supply requirements in the Sydney – Canberra Corridor region, the lower and middle Murray Darling Basin and other localities within the TIAWTP footprint in New South Wales.

TPC would request that the DPC arrange for appropriate senior personnel from SCA, and the Departments of Planning, Commerce and Environment and Climate Change be made available to provide information required for these investigations.

4.3.1 **Deliverables for Stage 3 of the Business Case**

TPC will produce a report for Government including:

- Information proving the economic viability of the project.
- Proposed studies and timing for Stage 4 of the Business Case.

4.4 **Stage 4 of the Business Case**

TPC and E&P propose a staged development of the Business case, with reference back to Government at the completion of each stage. As part of the Stage 3 report we will propose studies and their timing for Stage 4 of the Business Case.

The studies will result in a number of documents for Government including:

- Draft Business Case
- Feasibility/Options study [including the Stage 2 report.
- Value Management Study
- Financial Appraisal
- Economic Appraisal
- Financial Plan
- Asset Strategy
- Project Brief
- Project Cost Estimate
- Environmental Assessment
- Outline Change Management Plan
- Outline Stakeholder Management Plan
- Outline Risk Management Plan

4.5 **Other Options to Meet the Service Need**

The Business Case will identify if there are other options available to transfer 100 gigalitres of physical water into the Murrumbidgee, Lachlan, Bogan, Darling and Lower Murray rivers. To date no other options have been identified.

Options currently being used to provide additional environmental water include purchasing water entitlements and improvements/upgrades of irrigation infrastructure neither of which provides additional physical water, but simply diverts existing supply. The buybacks have been rejected by communities in the irrigation areas, and only produce environmental water when the allocations are available.

The Snowy scheme delivers water from the Snowy catchment to the Murray and Murrumbidgee but has done so for decades, and in future will possibly deliver less.

5. VALUE FOR MONEY

The TIWTP will provide the highest level of value for money. It will cost the NSW taxpayer minimal expenditure beyond the costs on overseeing a project.

Preliminary Financial and Economic Appraisal:

- A comprehensive cost estimate for the TIWTP is to be provided by TPC/E&P in Stage 3 of the Business Case.
- The cost of water for urban use is rising rapidly due to desalination costs being factored into pricing. The benchmark seems to be the holding costs of $570,000,000 p.a. to be paid to the operators of the Melbourne desalination plant by the Victorian Government for 150 GL per annum or $3.80 per kilolitre. Customers in country Victoria are now paying over $2 per kilolitre [$2000 per ML] and this will increase.
- The proposal creates value for money considerations through taking out the requirements of other communities to separately augment their water supply. As an example the Highland Source project cost $60,000,000 and deliver 2 GL per annum @ $30,000 per megalitre to Goulburn. Other water supply upgrades are expected to cost between $8000 and $30,000 per ML within the TIWTP footprint. These requirements could largely be met by the TIWTP.
- Replacement of aging regional water supply components is an expensive process. The Albert Priest Channel upgrade is costed at $25,000,000 in 2008 and will save 3 GL p.a. in evaporation @ $8,333 per ML based on 2008 cost estimates. The beneficiaries of this expenditure are Cobar township and the Cobar mines.
- The TIWTP can deliver the water needed to create through-flow in the Upper Lachlan River. Tallowa water appears to be the only water available for this, and to the economic benefits must be added the value of a major river and its RAMSAR wetlands. Other rivers have been valued by economists at astounding figures.

A detailed economic appraisal of the cost and use of TIWTP water compared with cost and use of urban, industrial and environmental water should be carried out by TPC/E&P in the Stage 3 of the business case.

6. SUSTAINABILITY

The TIWTP aims to meet the needs of cities, towns and industries, and assist the environment throughout the TIWTP footprint. This must be done without compromising the ability of future generations in the Shoalhaven catchment, including Sydney and the Illawarra to meet their needs.

The sustainability benefits outlined below will be better described, assessed and where possible quantified in Stage 3 of the Business Case.

6.1 Social Impacts

Preliminary assessment indicates that the TIWTP will provide greater water security and hence have positive social impacts that will benefit cities, towns and communities throughout the TIWTP foot-print. Spin off benefits are numerous including:

- The saving of the Lachlan River, which has widely acclaimed recreational fishing grounds downstream of Condobolin, and it has the RAMSAR protected wetlands.
- Employment would be expected to grow, in particular in regional industry and mining. This will impact beneficially to communities within the TIWTP footprint.
- Bringing to an end the unpopular water restrictions beyond Level 1, imposed during the recent drought. Level 6 restrictions rendered playing fields unplayable, and saw gardens dry out.

6.2 Economic Impacts

Preliminary assessment indicates that the TIWTP will have major benefits on a regional, state and national scale.

Local communities who make up the regions within the TIWTP footprint including get the security of a guaranteed water supply which is essential for growth and, in some cases for survival.

NSW receives the obvious financial benefits flowing from increased revenues from the mining area royalties.

On a national scale the country benefits from the tax revenue flowing from the mines.

6.3 Environmental Benefits

Preliminary assessment indicates that the TIWTP will provide some water availability to enhance the watering and environmental health in the riverine and wetland environments able to be reached by this project's water. These total around 4,600 kilometres of rivers in New South Wales. All of this introduced water is environmental flow while it is in the rivers.

The saving of the Lachlan River is a major benefit. The CSIRO has referred to the "virtually terminal Lachlan" and other authorities have written it off. By delivering Shoalhaven/Tallowa water into the headwaters of the Lachlan this water flows to Wyangala Dam, where it can be delivered downstream, or piped and pumped to the Bogan River as decreed by the NSW Government and the MDBA.

River evaporation does not increase significantly as the evaporation footprint essentially remains the same.

The bottom line is that the TIWTP can add substantial volumes of environmental water to the Lachlan, Murrumbidgee, Bogan, Darling and Lower Murray rivers.

6.4 **Managing Adverse Environmental Impacts**

Preliminary assessment indicates that the potential adverse environmental impacts of reduced flows in the Lower Shoalhaven River below Tallowa Dam are minimal and can be successfully managed. The Canberra Institute of Economics point out that minimal environmental benefits will occur by excessive releases from the dam, and state in their "Review of Operating Regime for Sydney Water's Desalination Plant", that the most beneficial protection relates primarily to an additional species of fish discovered upstream of the dam.

It is intended to maintain the flows as recommended by the 2010 Metropolitan Water Plan and to only pump dam overspill, or high-level stored water as approved by the NSW Government.

The volumes, which could have been pumped under this regime, can be determined using the TPC software that provides a daily water balance for the dam.

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