Gladstone Area Water Board

Submission to the Queensland Competition Authority

Fitzroy River Contingency Infrastructure

Contents

EXECUTIVE SUMMARY

Background

Gladstone Area Water Board (**GAWB**) is proposing to undertake preparatory expenditure associated with the investigation of a contingent water supply. This submission concerns the approach of GAWB to that expenditure. It proposes that efficient costs of that expenditure will broadly be recovered in its 2010 price reset.

Contingent Source Strategy

The long lead time that is necessary to access new water sources is incompatible with the relatively short period of time required to respond to stepped changes in inflow or demand without the likelihood of supply failure to customers.

The objective of the 'contingent source' strategy proposed by GAWB is to shorten the lead time of the most suitable new water source so that it can most efficiently respond to these changes to address the potential for supply failure.

The present application of the 'contingent supply strategy' by GAWB results in it undertaking works totaling an estimated $23.8 million. These works will be undertaken so that GAWB may have certainty that within 24 months it can access a supply of high reliability water from the Lower Fitzroy that has been reserved for it by Government.

Strategic Water Plan and Source Selection

In 2003 and 2004 GAWB developed a Strategic Water Plan (SWP) in consultation with customers.

The SWP established evaluation criteria following a process of consultation with customers. The final criteria set for options were in two parts:

A threshold requirement, namely:

(a) the quantity of additional water provided; and

(b) the time required between inception of the Lower Fitzroy Option and full availability of water.

Options that passed the threshold requirement were then ranked based on the following weightings:

(a) the reliability of the additional water provided (35%);

(b) the quality of the water (20%);

(c) environmental impacts (10%);

(d) social impacts (10%); and

(e) selling price (25%).

The SWP considered 13 options for the next supply source. Of these 13 options, nine passed the threshold criteria and were ranked as follows:

(a) weir on the Fitzroy River and connecting pipeline to the proposed Aldoga Reservoir supplying 20GL to 30GL (1&2);

(b) weir on Baffle Creek to 25m (3);

(c) raising Awoonga Dam to AHD 45m without incurring rail relocation costs (4);

(d) weir on Baffle Creek to 20m (5);

(e) large desalination plant (6);

(f) Castle Hope Dam to 27m (7);

(g) Castle Hope Dam to 35m (8); and

(h) raising Awoonga Dam to AHD 45m assuming rail relocation costs incurred (9).

That is, the SWP identified the preferred next water source as a pipeline between the Lower Fitzroy River and the proposed Aldoga Reservoir (the **Lower Fitzroy Option**)

GAWB has re-evaluated the SWP supply options retaining the same evaluation weightings but with minor changes to the threshold criteria to reflect requirements of the contingent source strategy. The update has confirmed that a supply from the Fitzroy

River remains the least cost option consistent with obtaining necessary supply characteristics, that is, supply is likely to be available (with reasonable certainty over costs) within 24 months. The second best option is construction of a desalination plant in the Gladstone region.

Proposed Expenditure

By 30 June 2007 GAWB will have spent $2.9m on preparatory work for the Fitzroy River - Gladstone pipeline. In addition GAWB expects to spend approximately $20.9m in 2007/08, which is outlined as follows:

Table 1

Forecast Capital Expenditue ($m)	2006/07	2007/08	Total
Project Management	0.9	2.6	3.5
Approvals	0.9	1.0	1.9
Land Acquisition	0.0	5.1	5.1
Consultation / Communication	0.3	1.3	1.5
Engineering and Investigations	0.9	6.0	6.9
Asset Creation	0.0	5.0	5.0
	2.9	20.9	23.8

Forecast Preparatory Capital Expenditure, Fitzroy River - Gladstone pipeline

For the avoidance of doubt, the above table only comprises preparatory expenditure (as it is relevant to the present QCA investigation). When construction of the pipeline is required, the majority of expenditure will be incurred bringing total expenditure (ie preparatory and construction) to an estimated $345m. GAWB expects that the triggers for commencement of construction and recovery of associated costs will be the subject of other (later) investigations by the QCA.

GAWB also plans to spend in the order of $1m to assess the feasibility of a local desalination plant and provide a more detailed assessment of likely costs associated with its construction and implementation.

Benefits of Proposed Expenditure

Benefits of the contingent source strategy include:

- delaying construction of the next supply source until as late as possible;

- reducing the risk of supply failure inevitably associated with a single catchment and diversify key infrastructure risk (e.g. pump stations); and
- reducing the economic loss associated with periodic imposition of drought-related restrictions.

The economic benefit of delayed construction is significant. For example the least cost 30,00ML p.a. source requires capital expenditure of approximately $350m. Every year that construction of that source is delayed saves customers a considerable increase in the cost of water.

In addition, delay of construction until the latest safe time, ensures that triggers and construction are based on the best possible information (used, for example, to evaluate construction against alternatives and to select the capacity of supply constructed). Traditional approaches involving early triggers are more likely to result in inefficient expenditure.

There is a possibility of supply failure if future inflow sequences are worse than previous droughts. This is so, even though GAWB's water allocation is set to at the Historic No Failure Yield (**HNFY**) of Awoonga Dam. The possibility of failure is increased (over that expected from random rainfall models) if there are long time-scale rainfall fluctuations or underlying climate change not captured in the historical rainfall record. Awoonga Dam inflows in 2005 and 2006 were worse than any two-year sequence recorded during the period from which the HNFY is derived. However, contingent source strategy with a 24 month construction timeframe will significantly reduce the risk of supply failure.

Moreover, the strategy facilitates drought management with less severe restrictions applied less frequently than under traditional single-source management models, because it [potentially] reduces the horizon to which drought management restrictions may apply.

Consistency with Previous Regulatory Decisions and Regional Planning

The contingent source strategy is consistent with GAWB's Drought Management Plan (**DMP**) and the QCA's requirements for managing extraordinary circumstances.

Central Queensland Regional Water Supply Strategy (CQRWSS) reserves an entitlement of up to 30,000ML of reliable water from the lower Fitzroy for GAWB.

High Cost of a Traditional Water Planning Approaches

The traditional approach to managing water supply systems involves:

- holding a significant amount of spare capacity to cope with inflow fluctuations and unexpected demand growth;
- defining source yields conservatively, based on worst case historic inflows; and
- imposing restrictions in unusually severe droughts or other supply emergencies.

This approach is increasingly being recognised as not being ale to provide the supply security required for urban use. Further, higher standards of supply security are required for industrial use, than for other uses. Moreover, the supply and load characteristics of the Gladstone region make the traditional approach inappropriate.

GAWB's demand is largely industrial in nature, being characterised by large increments required within relatively short lead times (18 to 36 months).

The Awoonga catchment exhibits very large inter-year inflow variation. As such, the spare capacity that GAWB should hold to cope with inflow fluctuations, and possible demand growth, is very large (in proportion to current demand levels) compared to other water businesses. Moreover, the cost of holding such spare capacity is very significant: all of the sources examined in the SWP (surface water sources, desalination, air cooling of power stations, etc) which have a cost of supply that far exceeds that of the existing supply. The traditional approach of holding a significant level of spare capacity would lead to the full construction of the next supply source much earlier than would be necessary if the contingent source strategy is adopted, resulting in a high cost to customers.

Until recently approaches to best practice management of yields from water sources have been related to the HNFY (worst case historic inflows) or probabilistic approaches based on historic inflow and rainfall data. However, there is increasing acceptance that the relatively short data sequences may not be representative of future rainfall and inflows. That is, approaches such as HNFY and probabilistic analysis of short rainfall sequences are not reliable predictors and may result in more infrequent supply failure than is acceptable.

Customers' recent experience of drought has led GAWB to re-evaluate the role of restrictions in managing water supply in the region. Low cost demand management opportunities have already been pursued in response to the recent drought and supply restrictions. Remaining demand management options are of limited scale and high cost. GAWB's industrial customer base has a very high cost of non-supply. Despite the likelihood that any new water source will be significantly higher cost than the current supply, consultation during the Strategic Water Plan process highlighted to GAWB that most customers would prefer to pay this higher price than suffer restrictions in excess of 10% of contracted volumes.

Emerging Best Practice in Water Supply Planning

The planning framework surrounding water supplies to urban and industrial centres has developed and matured markedly in Australia over recent years. This has, in part, been in response to severe droughts and concerns over the reliability of supply from existing sources.

Overall, greater emphasis is being given to:

- using a level of service approach to benchmark the reliability of supply to consumers and inform planning assessments of the need for new sources;
- clearly identifying the next water source(s) to meet demand growth and sustain the required level of service;
- diversify the sources of water to reduce drought risks; and
- conduct preparatory work to reduce the lead times for the development of these sources and improve the utilisation of existing sources.

GAWB's proposal is consistent with the supply strategies of South East Queensland, Sydney, Melbourne and Perth.

Regulatory Treatment of Proposed Expenditure

GAWB does not propose to modify prices from 1 July 2007. Instead, the cost of preparatory work for the contingent source strategy will be treated as work in progress and rolled-forward (using a cost of capital of 7.73%) until 1 July 2010. The rolled-forward costs will then be included in prices from 1 July 2010.

GAWB requests that QCA endorses the following principles for the 2010 price review:

- that the contingent supply strategy is appropriate and prudent;
- that preparatory expenditure is prudent;
- that certain specific types of expenditure should be included in GAWB's asset base used to calculate tariffs from 1 July 2010; and
- that preparatory expenditure will not subsequently be optimised out of the asset base without compensation to GAWB.

Price Impact of Proposed Expenditure

The effect of the forecast regulatory expenditure on prices will depend on the demand assumptions used to calculate the 2010/11 to 2015/16 prices. However, our current best estimate, based on demand forecasts used to develop the 2005/06 prices, is an increase in the water reservation and storage price of $51/ML (2010/11 dollars) or 16%. When delivery charges are considered the average price increase to customers in 2010/11 will be approximately 9.1%.

1 Introduction

1.1 Background

In November 2004, the Gladstone Area Water Board (GAWB) released its Strategic Water Plan (SWP) setting out a preferred infrastructure response to growth in water demands, and potential future droughts. This followed more than 12 months of studies of various options and consultation with customers and other stakeholders on the need for such a response, and how options should be evaluated.

Since then, GAWB has advanced investigations into the preferred option – namely sourcing water from the Lower Fitzroy via a pipeline. Moreover, the State Government has confirmed the need for and timing of the development of new storage infrastructure on the Lower Fitzroy which will generate approximately 80,000ML of 'high priority'[1] water allocations.

GAWB has embarked on a project to construct the pipeline to the Lower Fitzroy, and has completed Stage 1 of this process - namely project scoping, route assessment and preliminary design.

GAWB commenced the preparatory work for the Lower Fitzroy Option (Stage 2) in November 2006. It did this, prior to having regulatory certainty around its abilities to incorporate the associated expenditures into its regulatory asset base, cognisant of the rapidly dropping storage in Awoonga Dam and in light of reasonably likely emergent demand.

1.2 Water demands and supplies

A number of new projects for the Gladstone State Development Area that have a reasonable likelihood of proceeding total some $5B in infrastructure investment, which will together require an estimated 20,000ML/annum.[2]

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1 *A water allocation that has relatively high level performance when compared to medium priority water allocations. High priority water allocations are mostly used for urban and industrial purposes, although they are also sometimes used for irrigation, particularly for high value, long lived crops such as fruit trees.* Central Queensland Regional Water Supply Strategy (December 2006) at p 85.

2 Based on advice from the Gladstone Economic and Industry Development Board.

In meeting these demands for water in the Gladstone region, GAWB faces uncertainty on a number of fronts, including:

(a) Demand – these increments in demand are largely dependant on industrial development in the Gladstone region. Whilst many projects may be under investigation at any time, there is little or no certainty of them proceeding until final decisions are made (e.g. financial close for major projects). Conversely, new projects require certainty over their access to water (given its criticality as an input) and hence seek commitments from GAWB that their required volumes can be met, at the required time.

(b) Supplies – flows into Awoonga Dam since 2000 illustrate the difficulty in predicating future water management decisions on historic data. That is, it is becoming increasingly obvious that the past is not a reliable indicator of the future when considering water storage performances. This impacts on the volumes that can be contracted from storages, and the nature of contingency measures to respond to drought.

1.3 Constraints in response

GAWB faces a number of constraints in responding to this uncertainty, including:

(a) Informational – in order for GAWB to respond to these uncertainties, it must procure information on the nature of these risks (e.g. inflow probabilities) and, more importantly, information on the various options to address drought risk and meet the growth needs of the region.

(b) Financial – the cost associated with reducing uncertainty, either through planning, investigations or development of new assets is substantial, relative to GAWB's operations and GAWB is not in a position to incur these costs without arrangements in place for their recovery over time.

(c) Regulatory / commercial– given the likely scale of costs of response, it would not be commercially prudent for GAWB to undertake such expenditure whilst being exposed to an unacceptable level of regulatory risk. These risks are likely to emerge under the current regulatory model given GAWB will need to make decisions amidst an uncertain climatic and demand environment which, with perfect hindsight, may prove to have been sub-optimal.

1.4 Need for new approach

In Australia, water suppliers, regulators and policy makers are revising traditional approaches to water supply planning to better respond to demand and supply uncertainties. These new approaches contain three key features:

(a) conduct planning at reasonable intervals to update and re-assess conditions and ensure measures are in place to adapt to changing conditions;

(b) ensure a diversity of water sources is available to mitigate the risk of drought and optimise conjunctive systems;

(c) clearly identify the next water source and ensure this water source can be employed within the time necessary to respond to drought or demand conditions;

This is consistent with the contingent source strategy proposed by GAWB.

1.5 Nature of the proposal put forward in this submission

1.5.1 Drivers for submission

There are two relevant drivers for GAWB in making this submission:

(a) drought response – providing customers with improved water security through developing a contingent supply strategy.

(b) supply response - ensuring GAWB can meet the growing demands of the region in an efficient and timely manner.

In order to do this, GAWB submits that new sources must be available to the region within two years from trigger.

1.5.2 Preparatory expenditure

GAWB proposes to make a substantial investment in preparatory works on the next water source to achieve the 2-year deployment target. This expenditure involves two projects:

(a) Lower Fitzroy pipeline - expenditure on key, critical path items required pre-construction including environmental approvals, detailed engineering and land acquisition (Stage 2 works). The costs associated with this Stage 2 work are likely to be in the order of $2.9M in the current year, and $20.9M in 2007/08 – a material expenditure in the context of GAWB's revenues; and

(b) Desalination – expenditure to assess the feasibility of a local desalination plant and provide a more detailed assessment of likely costs. This preparatory expenditure is likely to be in the order of $1M.

1.5.3 Recovery of preparatory costs

The effect of the forecast regulatory expenditure on prices will depend on the demand assumptions used to calculate the 2010/11 to 2015/16 prices. However, our current best estimate, based on demand forecasts used to develop the 2005/06 prices, is an increase in the water reservation and storage price of $51/ML (2010/11 dollars) or 16%. When delivery charges are considered the average price increase to customers in 2010/11 will be approximately 9.1%.

1.5.4 Timelines

GAWB is seeking the matters subject to this review by the Authority to be resolved to enable it to trigger supply augmentation, if needed, no later than April 2008.

This timeframe is important for GAWB in order to:

(a) respond to current known increases in demand, which potentially extend beyond the current capacity of Awoonga Dam to supply; and

(b) respond to potential water shortages given the current status of Awoonga Dam and the lead times involved in developing new infrastructure (given only limited preparatory work has been completed).

1.6 Structure of this report

This report has been structured in four parts:

(a) Part A sets out background matters;

(b) Part B examines the prudence of a contingent source strategy;

(c) Part C discusses the basis for the Lower Fitzroy option as the preferred response; and

(d) Part D examines the above costs and the proposed price treatments.

PART A – BACKGROUND MATTERS

This Part A to the submission sets out background matters of significance to GAWB's proposals, namely:

(a) an overview of GAWB's role, functions, responsibilities and supply relationships;

(b) the nature of drought management planning, and the activities and plans undertaken to date;

(c) issues surrounding water supply planning and benchmark standards for planning that are emerging nationally; and

(d) a summary of GAWB's Strategic Water Plan.

2 Gladstone Area Water Board

2.1 Background

The Gladstone Area Water Board is a registered water authority under the *Water Act 2000* (the ***Act***). GAWB is also a category 1 water authority[3] under the *Act*, with a series of operational and governance obligations to the Minister for Natural Resources and Water (the **Minister**).

As a category 1 authority, the Board's role is to carry out the functions decided by it within its area of operation, and carry out activities outside its area provided this does not disadvantage its customers and is consistent with the authority's performance plan.[4]

GAWB's role and functions are set out below.

2.2 Role and functions

GAWB's mission is to ensure the long and short-term water needs of current and future customers are met in ways which are environmentally, socially and commercially sustainable.

GAWB has four corporate goals related to this mission:

(a) meeting water needs – to understand, facilitate and satisfy the water requirements of current and future customers;

(b) commercial results – to ensure GAWB's profitability and build the value of the business;

(c) corporate citizenship – to be regarded as a responsible corporate citizen; and

(d) capability – to ensure the organisation has the ability to carry out its mission.

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3 s1084(2) of the Act.

4 s569 of the *Act*.

2.3 Responsibilities

2.3.1 Breakdown of responsibilities

GAWB's responsibilities can be described in terms of:

(a) statutory responsibilities;

(b) contractual and common law responsibilities; and

(c) governance responsibilities.

2.3.2 Statutory responsibilities

GAWB's responsibilities in relation to water supply largely fall within the provisions of the *Water Act 2000*. These include the following obligations:

(a) as a registered water service provider, including the preparation of and compliance with a Strategic Asset Management Plan (**SAMP**) and Drought Management Plan (**DMP**); [5]

(b) as the owner of Awoonga Dam, including compliance with the Boyne River Basin Resource Operations Plan (**ROP**)[6], as set out in the terms of GAWB's Resource Operations License; and

(c) as the owner of a water entitlement from Awoonga Dam as set out in the ROP,. The terms of that entitlement form the basis for supply to GAWB's customers.

2.3.3 Contractual and common law responsibilities

GAWB supplies raw water to 19 customer connections, and treated water to some 26 customer connections.

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[5] s408and Ch 3, Pt 3, Div 2A of the *Act*.

[6] *Boyne River Basin Resource Operations Plan commencing* July 2006, found at http://www.nrw.qld.gov.au/wrp/pdf/boyne/boyne_rop_july06.pdf

GAWB operates under a contractual relationship with its customers. Those contracts contain the terms of the supply arrangement including price, volume and term of supply. As such, GAWB has related obligations and responsibilities at common law and under the *Trade Practices Act 1974*. Prices are set in accordance with the pricing principles derived from the recommendations made by the QCA, to the extent these were accepted or amended by the QCA Ministers', being the Premier & Treasurer.

2.3.4 Governance responsibilities

As a category 1 water authority[7] GAWB is required to operate on a commercial basis in a competitive environment, to the extent that this is practicable.[8] Key objectives of a category 1 water authority are to be *commercially successful in carrying on its activities*[9] and to be *efficient and effective in delivering its service*.[10] These objectives place emphasis upon meeting customer's requirements, as opposed to traditional asset operation. Implicit in them, is the requirement for effective planning.

GAWB is accountable for its performance to the Minister.[11] As the basis for this accountability, GAWB must submit a *performance plan*[12] to the Minister setting out the objectives for the organisation for the following financial year, and a *corporate plan*[13] setting out the objectives for the following five years. The Minister effectively performs a shareholder function in approving and monitoring strategic and operational aspects of GAWB[14].

The governance framework between the Minister and GAWB includes:

(a) development of corporate plans setting out strategic goals and initiatives over a five-year horizon;[15]

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7 s1084 of the *Act*.

8 s637 of the *Act*.

9 s640(1) (a) of the *Act*.

10 s640(1)(b) of the *Act*.

11 s638(4)(a) of the Act.

12 s652 of the *Act*.

13 s645 of the *Act*.

14 s649, 656 of the *Act*.

15 Ch4, Pt 5, Div 3 Corporate Plan for Category 1 Water Authorities.

(b) development of regular performance plans with performance targets;[16]

(c) quarterly reports setting out actual performance against the performance plan; and

(d) annual reporting of operations and outcomes for the year.

GAWB has obligations under the *Act* to meet the performance targets set in its performance plan[17] which includes water supply planning discussed in section 4 below.

2.4 Supply relationships

2.4.1 Customer contractual relations

GAWB's supply relationships are set out in various contracts with its customers. GAWB has recently revised and refined its product offering to customers, which has been reflected in new standard contracts, namely:

(a) **Storage contract** - detailing the terms and conditions to provide agreed quantities of water; and

(b) **Transportation contract** - for the delivery of water through pipeline networks to a supply point.

GAWB is seeking to transition all customers from their existing agreements to these new contracts. Where required through commercial negotiation the terms of the agreements may be tailored to reflect specific customer requirements.

The key elements to GAWB's standard product offering (as reflected in the new contracts) include:

(a) GAWB currently supplies its customers exclusively with water from Awoonga Dam, although the contract provides that "Source' means ***Awoonga Dam*** and, at GAWB's discretion, one or more additional sources of water of comparable quality;

[16] Ch4, Pt 5, Div 4 Performance Plan for Category 1 Water Authorities of the *Act*.

[17] s638(4) of the *Act*.

(b) the maximum supply volume to customers is set by a Reservation Volume. This reservation volume also forms the basis of fixed charges payable by customers. Customers can reduce their Reservation Volume in accordance with mechanisms contained within the agreement;

(c) customers can trade water that is not required within their Reservation Volume (subject to the reasonable consent of GAWB);

(d) GAWB must act as a reasonable and prudent operator in providing services under its contracts;

(e) customers ultimately bear the economic risk of supply shortage caused by falling levels of water storage arising from drought, and GAWB has certain obligations and rights both under the contract and the Act[18] to restrict supply in such events.

2.4.2 Water Act requirements

The Act does not provide any relief from liability for water service providers where they have been negligent. The Act does provide relief for a water authority where matters occurred outside its control, and refers to the following as being inclusive of such events as:

(a) the escape of water from works;

(b) upstream or downstream flooding; and

(c) contamination of, or the quality of, water flowing or released from infrastructure.[19]

The *Act* does not provide an explicit release from liability arising from drought events, although in certain circumstances water shortages caused by drought may be outside the control of the water service provider.

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18 Ch 3, Pt 2, Div 3 Power to restrict water supply of the *Act*

19 s395 of the *Act*.

2.4.3 The prudence of contingency planning

GAWB submits that drought events can be mitigated through prudent contingency planning, including the development of preparatory works to augment supply when faced with severe shortages. Moreover, this practice is emerging as an industry standard (refer section 5.6) which a reasonable and prudent operator would be expected to apply. However, GAWB does not believe that it is reasonable for it to carry out such practices to mitigate the impact of drought, without charges to customers set to recover these costs.

2.5 Water supplies and demands in the region

2.5.1 Existing water supplies

GAWB and its customers rely upon Awoonga Dam, on the Boyne River, as the sole source of water. A number of other alternative water source are also used by GAWB's customers.

2.5.2 Awoonga Dam

Awoonga Dam is owned by GAWB, and has a storage capacity of 770,000ML. GAWB completed the raising of Awoonga Dam to 40m AHD in June 2002.

Until the Dam first overtops, the notional HNFY at 36.94m AHD has been estimated as 70,000 ML pa. It is understood that the HNFY at higher water levels will increase by approximately 2,500 ML pa for every metre increase in the maximum water level recorded up to the current 40m AHD spillway height.

The ROP, and the Resource Operations Licence (ROL) issued to GAWB restrict the amount GAWB can take from Awoonga Dam to 78,000 ML pa, the assessed HNFY of the 40m Dam.

which provides for a three-part allocation of this entitlement:

(a) a base entitlement of 63,000ML, which GAWB is able to deal with in its discretion;

(b) a second tranche entitlement of 15,000ML relating to the 10m raising of Awoonga Dam to 40m AHD (completed 2002). GAWB can only access this entitlement upon Awoonga Dam filling to the raised level of the dam[20] - to date the dam has only reached a level that has triggered 7,000ML of this 15,000ML to become available. That is, GAWB's total water allocation is now 70,000ML; and

(c) a potential third tranche entitlement of 19,000ML should GAWB raise Awoonga Dam to 45m AHD. GAWB can access this entitlement upon Awoonga Dam filling to the limit of this next raising.

In March 2004 Awoonga Dam peaked at 36.94m AHD (587,540ML) or 75% of its full storage capacity. Since then, inflows into the dam have been worse than any two-year series recorded to date. This is illustrated in figure 1 & 2.

[20] It is acknowledged that this is a simplified representation of the provisions of the ROP with respect to the access to this 15,000ML and the level to which Awoonga has filled. For precise details, refer to Section 3.4 of the ROP at p13.

Figure 1

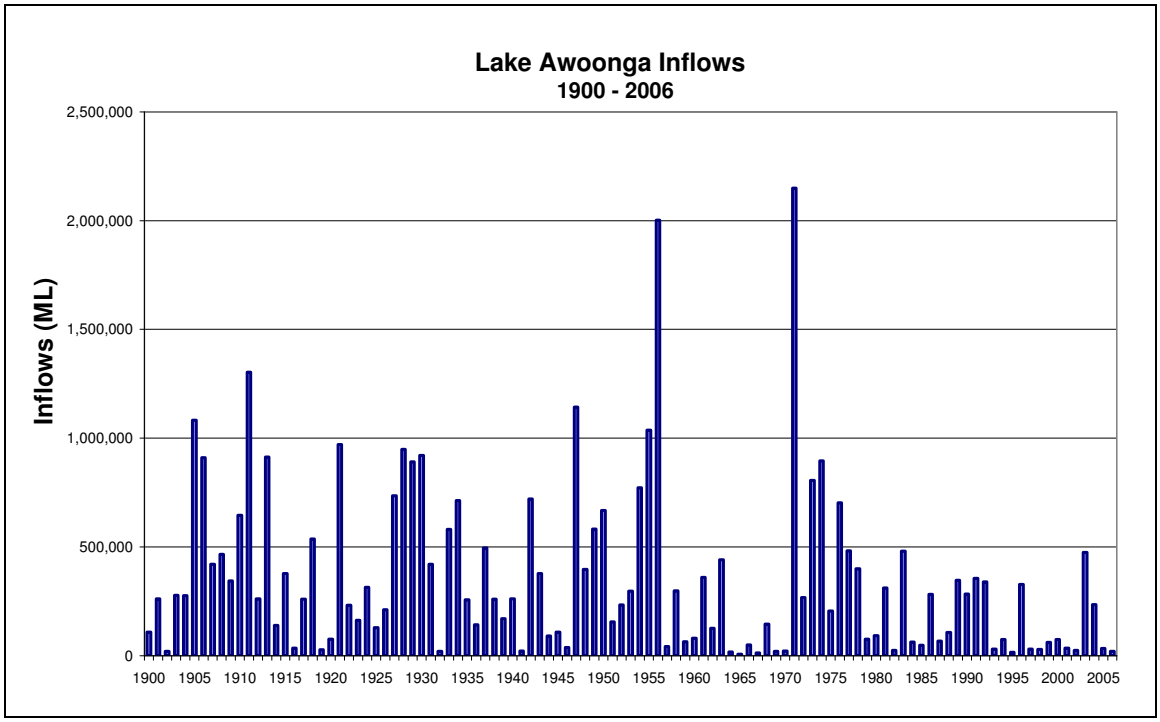
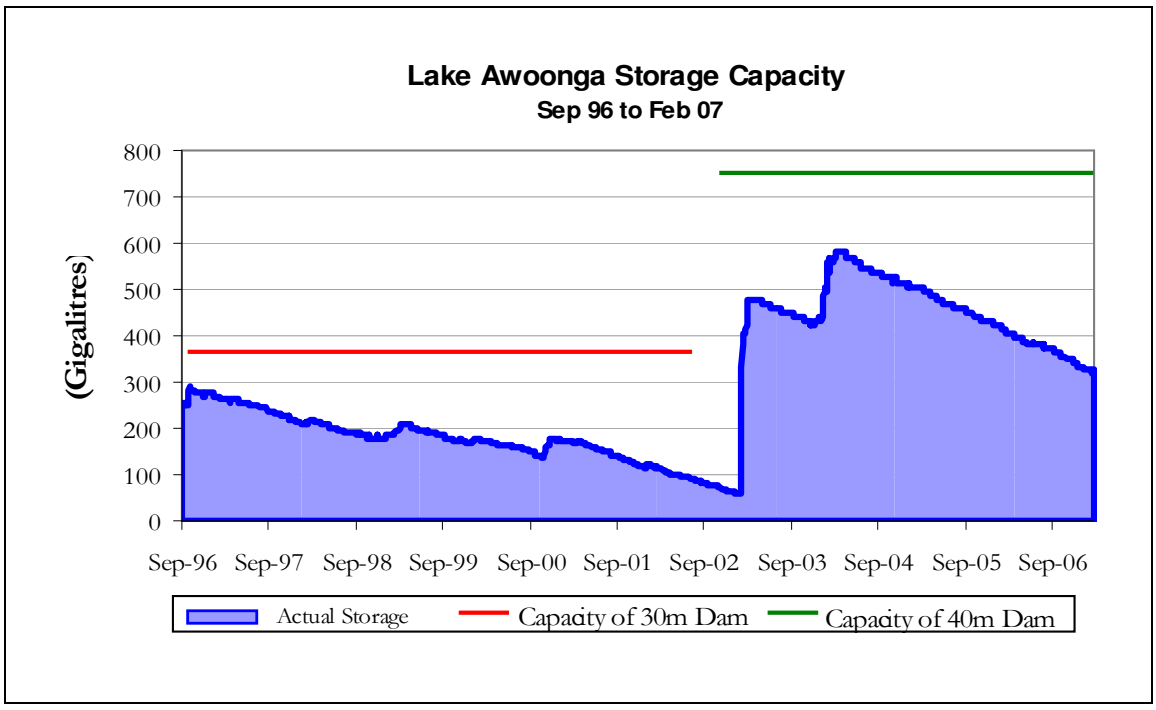


Figure 2



At early March 2007 Awoonga Dam was storing approximately 41% capacity – some 321,000ML.

2.5.3 Other water supplies

A number of alternative water supplies are being utilised by major industrial water users in the region, including:

(a) recycled effluent from the City of Gladstone. These supplies are believed to be fully committed, with users including QAL and NRG's Gladstone Power Station;

(b) approximately 90% of recycled effluent from Calliope Shire Council for parkland irrigation and road construction;

(c) salt water for cooling at the Gladstone Power Station; and

(d) other water storages such as Callide Dam which augments supplies to CS Energy's Callide Power Station.

2.5.4 Water demands in the region

GAWB is currently obliged to supply some 55,000ML per annum. Unlike most regions in Australia, this water is largely required to service major industry.

Supplies to power stations in the Callide Valley comprise some 40% of total demand from Awoonga Dam.

Industrial users within the Gladstone City and Calliope shires (including Rio Tinto Aluminium (formerly Comalco), Gladstone Power Station, Orica, QAL and BSL) account for a further 40%. Both raw and treated water are supplied to this customer segment.

In addition, the above local governments themselves account for approximately 20% of total demand to service residential and commercial customers.

Gladstone is a burgeoning industrial centre of national significance due the availability of a number of key resources and infrastructure including port, energy, rail and water. It is expected that growth in industrial demand will continue into the future, with a number of major industrial developments currently being considered by various proponents.

3 Drought management planning

3.1 Background

Drought management is a central consideration to all contingent supply strategies. This section summarises the nature of drought risk, GAWB's actions and learning's arising from the drought which broke in 2003, and details GAWB's drought management plan.

3.2 Drought risk – entitlements vs contractual supply framework

GAWB supplies its customers under a pure contractual rights framework, because as the water supplier GAWB holds the water entitlement(s) from storages. In this way, GAWB can enter into specific arrangements for management of drought events.

This contrasts to a service provider supplying water to customers who hold entitlements. These providers have no responsibilities with regard to supply planning to meet growing demand. Moreover, customers who hold entitlements utilise trading or other mechanisms to source water to meet their growth in demand. This method of obtaining water relies upon efficient and deep markets, and failing this, infrastructure options for new entrants to develop their own sources.

Due to these limitations, a water supply framework is usually adopted in an urban and industrial setting. However, a dedicated water supplier is more effective in planning for, and investing in new water sources (given their lumpy nature). This should not prevent trading in secondary markets as occurs in many other infrastructure industries.

3.3 Previous drought

Inflows to Awoonga Dam leading up to February 2003 were the lowest ever recorded at that time over a ten (10) year period. By November 2002, Stage 2 restrictions were introduced when Awoonga Dam fell to 23.6m AHD.[21] These restrictions required local governments to reduce water use by 50%, and industrial customers 25%.

[21] These restrictions were applied under the DMP applicable at the time, which also included Stage 1 restrictions of 35% reduction by local governments and 10% by industry. These were applied in April 2002 when Awoonga Dam reached EL 24.6. These restriction arrangements have since been updated in a new DMP.

As the 2002-03 summer unfolded without further inflows, a proposal to fast-track construction of a pipeline from the Lower Fitzroy River to Gladstone was examined. However the proposal was not pursued when, in February 2003, rainfall resulting from Cyclone Beni led to substantial inflows into Awoonga Dam, raising the dam from 23.6m to 34.96m AHD (or approximately 62% capacity).

A number of significant implications and lessons emerged from the 2002-03 drought including:

(a) evidence of the uncertainty of inflows – particularly for storages relying on major flood events to provide reliable supplies (such as Awoonga Dam);

(b) the risks associated with single-storage systems. For example, water was available in neighbouring catchments such as the Fitzroy despite record drought and low inflows from the Boyne catchment to Awoonga Dam;

(c) a revision of the reliability of water supplies from the dam, given the drought represented the new critical period for inflows. This resulted in a reduction to the allocatable yield from the Dam from 88,000ML to the 78,000ML[22] (based on the "HNFY of the storage) subsequently set in the ROP;

(d) the inadequacy of restriction-based responses to drought, as this relied upon the capacity of industry and local governments to curtail use;

(e) a general view that restrictions were employed too late into the process, and that action should have been taken earlier to manage drought;

(f) customers expected GAWB to take an active, leadership role in managing drought into the future;

[22] Modeling suggested that if the previous yield of 87,900ML had been fully utilised, Awoonga Dam would have failed by mid-2002. Actual use up to this time was in the order of 55,000ML, which served to prolong supplies during the drought.

(g) customer responses to this drought resulted in the implementation of improved water efficiency practices among GAWB customers (due to embedded investments in process infrastructure) and it is understood that these customers, in general, now have a limited capacity to achieve further reductions in water use without substantial impacts on productivity; and

(h) the lack of contingent source planning, and the undesirable outcomes associated with fast-tracked responses, including:

(i) cost inefficiencies in seeking works and materials to be fast-tracked;

(ii) lack of time to conduct prudent investigations into various options to assess cost and time-effectiveness;

(iii) the need to circumvent normal development processes and apply more extreme measures such as compulsory acquisition of land and mandated planning approvals ;

(iv) the lack of time to properly consult customers and satisfy them on the prudence and need for the response; and

(v) uncertainty over the regulatory treatment of investment in contingency infrastructure, and the ability of GAWB to commit to investment in this environment.

3.4 Drought management plan

3.4.1 Introduction

GAWB has published an updated version of its registered[23] DMP[24] setting out how it will respond to drought and meet the various requirements of the *Act*. This DMP is integral to the proposal for developing a contingency supply.

In preparing the DMP, GAWB consulted with customers and considered a number of matters including:

[23] Confirmation of registration contained in letter to GAWB dated 14 February 2007.

[24] *DMP*. Gladstone Area Water Board, September 2006.

(a) the needs of customers and their contractual rights;

(b) the likely future requirements for water; and

(c) the availability and proposed use of water, (including sources intended to be used only in an emergency).

GAWB plans to undertake an annual review of the contents of its DMP at the conclusion of each year's wet season to evaluate the effectiveness of its inflow assumptions and success of the plan in achieving its outcomes.

The inadequacy of restrictions-based responses for GAWB customers is central to the DMP, with the key principles for this plan including:

(a) GAWB's acceptance of customer representations that they have limited (albeit different) capacity to operate with water supply restrictions as they have already employed measures to improve water use efficiency and cut demands;[25]

(b) the alignment of Customer Reservation volumes with use, thereby removing buffers at an individual level to manage drought risk;

(c) A primary focus on supply augmentation, not demand restrictions, for drought management planning;

(d) a restriction regime to be established to cater for circumstances where augmented supply is not available; and

(e) continued trading of Reservation Volumes between customers to facilitate the use of water to its greatest potential, particularly during times of restricted supply.

[25] Supported by a commercial framework of fully cost reflective pricing and a predominantly commercial focused customer base.

Chapter 5 of the drought management plan requires GAWB to review the appropriateness of inflow assumptions at the end of each year's wet season (30 April). This assumption has a material impact upon the assessment of the time period to supply failure. In addition, at the end of the 2007 wet season, GAWB will have further regard to customers' submissions received prior to the registration of the current plan as well as additional information that it will seek to obtain.

For completeness, Chapter 10 of the plan requires GAWB to review its contents as is necessary having regard to a range of objective factors and, further, the regulator requires a review to be completed by 1 October 2009.[26]

The restriction regime in the DMP sets out a three-stage process, and is described below. These stages were developed based on a hydrologic model, and on a defined set of assumptions (including inflows, demands and losses) that are described in the DMP.

3.4.2 Stage 1. Low supply alert (5 years from supply failure)

When modelling indicates there is five years until Awoonga Dam reaches dead storage (based on contracted demand and assumed inflows and losses). This Low Supply Alert notice is provided to customers:

(a) seeking their voluntary adoption of additional demand management strategies; and

(b) providing them with comprehensive details of GAWB's plans to access the supplementary water source including the associated cost and estimated time for completion of the works.

The DMP notes that the supplementary water source is not definitively available at the date of publishing (September 2006). Obtaining greater regulatory certainty over the pricing treatment for the costs of the supplementary watersources strategy (including its execution) are the central reasons for this regulatory process and this submission.

[26] s429H of the *Act*

3.4.3 Stage 2. Supply restrictions (4 years from supply failure)

Using the same assumptions as above, where modelling indicates a supply failure at 4 years, the DMP requires GAWB to:

(a) set restrictions for customers at 10% of their reservation volume;

(b) provide customers with details of ongoing action that GAWB is taking to monitor water levels; and

(c) provide customers with updated estimates of the timing for completion of works allowing access to additional supplies of water.

This approach has been adopted to extend the expected failure date by some six months, whilst seeking customers to adopt a relatively small (10%) reduction in use which GAWB believes is generally within customer tolerances. However, GAWB accepts representations by a number of customers that they do not have the capacity to achieve any further material reduction in demand than that achieved in the 2002-03 drought).

3.4.4 Stage 3. Emergency Restrictions (6 months from failure date)

The following restrictions would be applied under the DMP where modelling (using the assumptions noted at 3.4.1) indicated a supply failure would occur within 6 months:

(a) Municipal[27] customers will be restricted to 50% of their reservation volume; and

(b) Non-municipal customers will cease to be supplied with water.[28]

[27] Municipal customers are the local governments supplied by GAWB.

[28] Given the ramifications of such severe restrictions it is questionable whether GAWB would be "permitted" to allow this eventuality to occur. That is, it is likely that "government" may intervene in advance, in response to such a threatened crisis and be required to fast track measures to prevent the occurrence of such a disaster, as is happening in SE Queensland currently.

4 Water supply planning

4.1 Introduction

This submission (and the resulting considerations by the Authority) is centrally concerned with water supply planning and the prudence of expenditures associated with planning activities and the resulting investments arising from planning. Hence the water supply and demand environment facing GAWB and its customers is particularly relevant.

This section examines:

(a) GAWB's demand and supply environment;

(b) emerging demands;

(c) GAWB's supply profile;

(d) relevant observations of the Exports and Infrastructure Task Force;

(e) the interaction between water infrastructure investment and industrial development in the region; and

(f) the emerging models for water supply planning and infrastructure responses in Australia.

4.2 GAWB's demand and supply environment

4.2.1 Summary

GAWB's customer base is comprised of industrial demand (approximately 80%) and residential/commercial demand for local government supplies (approximately 20%).

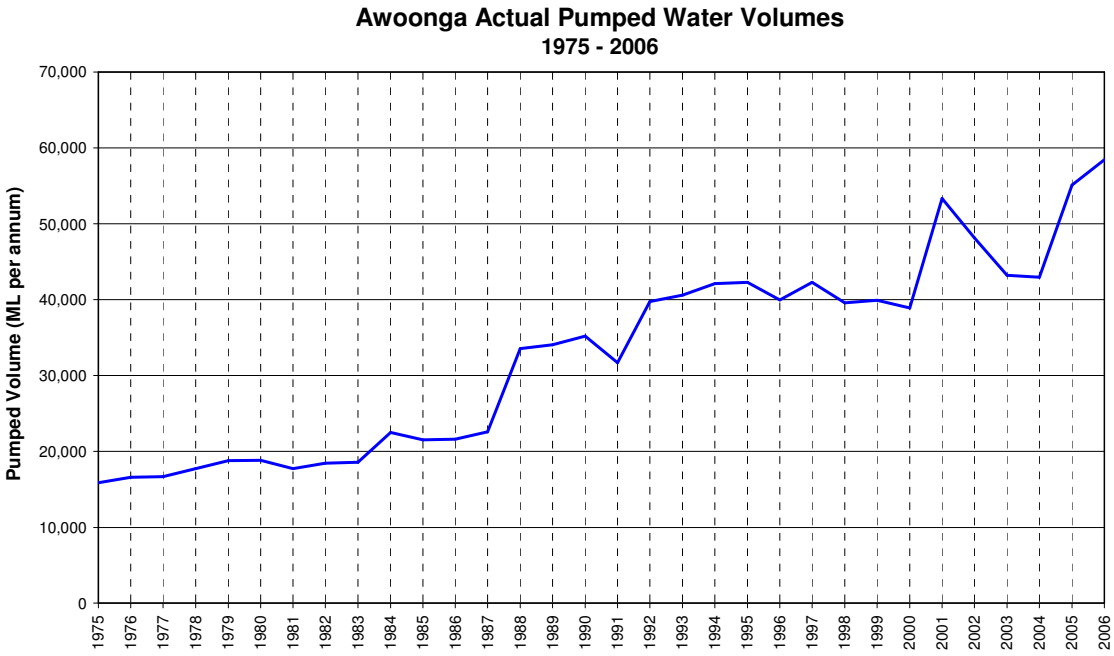
Hence GAWB is unusual as a bulk water provider in so far as its customer base is heavily skewed towards major industry, rather than local governments/ retailers, or irrigators.

4.2.2 Historic demand profile

Given the composition of GAWB's customer base, it is not surprising that the growth in demand over time has occurred in large increments based on major new industrial water users commencing operations in the region. This would be best demonstrated in terms of

the increments in new commitments faced by GAWB in the past, as these commitments (e.g. to supply up to a maximum volume) drive augmentation decisions. Such data is not available, in part due to the nature of early contracts, however the following graph sets out historic deliveries and illustrates this point.

Figure 3



This lumpy pattern of increases in demand is likely to continue into the future.

4.2.3 Comparisons with urban demand profiles

The demand environment facing GAWB is markedly different from that faced by metropolitan water suppliers servicing mostly residential and smaller-scale commercial demands. The most important point of difference is the relative predictability and "straight line" characteristics of urban water demands as they are largely a function of two variables which can be predicted and change slowly over time:

(a) changes in population, housing density and type; and

(b) changes in per-capita consumption, for example from demand management. [29]

[29] Refer also to the factors identified by McLennan Magasanik in their review of water use projections of urban water businesses for the Independent Pricing and Regulatory Tribunal in *"Sydney Water Corporation, Hunter Water*

This is reflected in numerous demand forecasts for a number of urban water businesses servicing metropolitan centres in Australia.[30]

4.2.4 Levels of Service

Levels of service are emerging as industry standard to describe the source reliability of water supplies to commercial and residential users, measured in terms of the severity, frequency and duration of restrictions.

Based on its dealings with its customers, including consultation through the processes of developing the strategic water plan and drought management plan, GAWB has observed that the needs of its customers in terms of levels of service can be categorised in terms of industry and residential/local government.

4.2.5 Characteristics of Industry Demand

The Gladstone based industrial customers require water as key input to their production process which usually run on a 24 hour, seven day a week, basis. Accordingly, these industrial users have little tolerance to restrictions of either a significant volume or duration. This aspect of GAWB's customer base is where the majority of growth is expected to occur over the next five years and beyond.

Submissions in response to the DMP from the Callide power stations indicated some lesser emphasis upon reliability, suggesting these stations have the ability to 'scale down' generation in response to water restrictions of limited volume.

Hence these power stations' key requirement from a level of service is likely to relate to the duration of restrictions, being the period power stations would be running at less than capacity, rather than the frequency and perhaps the severity.

In summary, the preferences for restriction regimes will differ between customers based on their role of water as an input to their processes. However, it is clear that industry is

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Corporation and Sydney Catchment Authority. Pricing of Water Supply, Wastewater and Stormwater Services". June 2005". P27.

[30] For examples refer to Essential Services Commission - *"Summary of Metropolitan and Regional Businesses' Water Plans"*. October 2004 (pp41-42), Economic Regulatory Authority - *"Final Report: Inquiry on Urban Water and Wastewater Pricing"*. November 2005. p63 and Queensland Department of Natural Resources and Mines – *"South East Queensland Regional Water Supply Strategy - Stage 2 Interim Report."* November 2005 (p12).

severely impacted from severe restrictions if they are frequent, extensive, or of long duration.

4.2.6 Local Government

Notwithstanding strong and steady growth in population, GAWB's local government customers have a lower water demand in 2007 than before the imposition of restrictions in 2002. Further, as consequence of earlier pricing investigations, GAWB understands that users within councils' retail coverage have been transitioned to a structure of full cost reflective pricing. A combination of both of these factors has resulted in their collective communities valuing water as a scarce resource, having a much reduced ability to assimilate restrictions without hardship - with corresponding advice being received by GAWB from its customers, the local governments, that supply these communities.

4.3 Emerging demands

4.3.1 Background

Given the lumpy nature of increases in demand over time, and the uncertainty surrounding major industrial projects that are in the feasibility stage, it is not possible to forecast demand with adequate levels of certainty. Moreover, previous forecasts based largely on subjective assessments of the likelihood of these projects proceeding, and the period and volumes of water they ultimately require, have not corresponded with actual demand.

A prudent water supplier should have in place plans to supply reasonably expected demand growth. In the context of GAWB's uncertain, yet lumpy, demand environment this involves either holding more spare capacity than would be prudent in a slow growing urban environment or having contingent supply plans in place to cope with large demand increments.

An important feature of this demand environment is the high likelihood of new industry being established in the region, requiring substantial volumes of water from GAWB.

4.3.2 Gladstone State Development Area (GSDA)

The GSDA was established in 1993 to facilitate large-scale industrial development in the region. The area has been expanded numerous times from its original 6,800ha base at

Yarwun, growing to a 21,000ha master planned industrial area. The GSDA includes some major industrial facilities, including:

(a) Rio Tinto Aluminum Yarwun Refinery

(b) Orica chemical manufacturing complex;

(c) Cement Australia cement plant; and

(d) Transpacific Industries waste management and recycling facility.

and is set to increase as more industrial projects come on-line.

4.3.3 Current project proposals

The Gladstone Economic and Industry Development Board has advised that a number of developers are investigating a wide range of potential projects totalling over $5B in investment. The forecast requirements from these projects is a highly reliable water supply in excess of 20,000ML/annum.

4.4 GAWB's supply profile

To date, GAWB's supply has been determined by hydrologic assessments of the sustainable yield from Awoonga Dam. GAWB is unable to commit to obligations to supply water that will result in it exceeding its water allocation from Awoonga Dam. The *Water Resource (Boyne River Basin) Plan (**WRP**)* set a benchmark performance for this allocation based on the HNFY of Awoonga Dam. The subsequent ROP approved and implemented by DNRW determined GAWB's water entitlements accordingly.

This HNFY is dependent upon volumes that could be supplied to sustain the worst period of inflows into Awoonga Dam, taken over a historic sequence of storage inflows (the **critical period**). The HNFY will reduce upon the occurrence of a new critical period (that is a series of inflows that is worse than that previously believed to have occurred). This risk is asymmetric, that is, HNFY will never increase as a result of changes to inflow profile given the critical period is the determining parameter. Indeed, a number of downward revisions have already been made since the early 1990's.

If HNFY continues as the benchmark reliability standard, the volumes available from Awoonga Dam will reduce upon a new critical period occurring. This occurred in 1993-2003, resulting in a yield re-assessment down from 87,900ML to 78,000ML. This was enshrined in the Resource Operations Plan relating to Awoonga Dam.

Secondly, GAWB can only access the entirety of its second tranche entitlement of some 15,000ML once Awoonga Dam fills to the raised level of the dam.[31] To date the dam has only reached a level that has triggered 7,000ML of this 15,000ML to become available. That is, GAWB's total water allocation is now 70,000ML.

In summary, supply variability (and uncertainty) presents itself to GAWB in a number of ways:

(a) through the potential "downgrading" of the HNFY as new critical periods occur; and

(b) through the provisions of the ROP, which limits GAWB's ability to supply the additional 8,000ML of water from the 40m raising until such time as Awoonga Dam fills to requisite levels. Given the maximum storage level since the raising, GAWB has an allocation available to it of only 70,000ML of the total 78,000ML potentially available.

4.5 Regulation, planning and infrastructure investment

There has been substantial attention by policy makers, regulators, industry and infrastructure owners on the apparent difficulties in infrastructure businesses responding to rapid growth in the world demand for exports.

The Exports and Infrastructure Taskforce provided a report[32] to the Prime Minister on infrastructure bottlenecks and the lack of timely investment to enable exporters to respond to rapid changes to global market conditions.

The Task Force examined the nature of supply-side responses to increased demand, noting that new or augmented infrastructure investment:

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31 It is acknowledged that this is a simplified representation of the provisions of the ROP with respect to the access to this 15,000ML and the level to which Awoonga has filled. For precise details, refer to Section 3.4 of the ROP (p13).

32 *Australia's Export Infrastructure* – Report to the Prime Minister by the Exports and Infrastructure Taskforce. May 2005

(a) requires long lead times;

(b) can usually only be provided in large units (difficult to scale to match demand);

(c) is long-lived and involves substantial stranding risk;

(d) usually impacts multiple users with different expectations and needs;

(e) is linked to users' investment decisions and requires substantial coordination between infrastructure providers and user(s); and

(f) usually involves some lag in the response to changes in the supply-demand balance (this being both inevitable and desirable from a prudent investment perspective). [33]

These themes are particularly relevant when considering the issues facing GAWB in responding to changes in demand and supply conditions in the region.

Further, the report highlighted the regulatory issues impacting on such investment decisions. Whilst the context of this report was set amidst bottlenecks in transport infrastructure meeting the rapid growth in minerals and coal exports, the observations of the Task Force in terms of a preferred future direction are particularly of general relevance:

> *'... Infrastructure assets are by their nature long lived and involve lumpy investment. Just as there will be periods when assets that have been built ahead of demand are underutilised, so will there be periods of rapid growth in demand that strain the supply/demand balance. That a lengthy period of domestic economic growth, combined with a sharp increase in export demand, has placed pressure on capacity should not in and of itself be a cause for concern.*
>
> *What is concerning, however, are the difficulties that have been encountered in responding to those pressures by investors in some parts of our infrastructure. If our problem in earlier years was at time profligate investment by government owned monopolies, the risk today is that efficient, commercial investment will be delayed or even deterred by inappropriate policy settings. Simpler, more transparent, predictable and accountable regulation is of key importance in this respect...'* [34]

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[33] *ibid* at *p16-17*.

[34] *ibid*supra no.28 at p6

The policy and regulatory settings surrounding GAWB's investment in new water infrastructure are central to this submission and the broader regulatory process being undertaken by the Authority.

In short, it is critical that appropriate regulatory and commercial arrangements are in place to enable GAWB to make timely investment decisions. However, this of itself will not guarantee GAWB can respond to surges in demand given the lead times for development. Hence, the timely delivery of infrastructure may also preparatory planning and investigation to for specific new sources to meet the timeframes likely to be required by new industry.

4.6 New project investment – Gladstone region

Proponents of new projects require certainty of access to water supplies in order to make a financial commitment. GAWB, in turn, requires certainty over the conditions for developing any additional infrastructure to meet the demands associated with these projects.

GAWB's capacity to provide these project proponents with certainty of water availability is substantially enhanced if the next water source is identified in advance as this provides scope for GAWB to inform project proponents (and make prudent commitments) on matters such as:

(a) when supply will be available;

(b) pricing arrangements;

(c) likely water quality; and

(d) any specific conditions precedent.

However, for GAWB to be able to respond to project proponents, the timing for bringing new water sources on line becomes a critical factor. Proponents of projects will strongly favour locations where they have certainty about the timing and availability of inputs. Moreover, water is often a critical input at the commissioning stages of industrial projects, and hence is potentially on the critical path for development.

Experience to date would indicate that most new projects would typically require water (e.g. at commissioning/testing stage) within two to three years from financial close. This is evidenced by the construction lead times for various new projects proposed for the region. The GEIDB has advised that these projects' lead time to construction is in the order of 18 to 30 months. Hence the window from the time when a new customer can commit unconditionally to GAWB (thereby potentially triggering supply augmentation), and when that customer requires water, is limited to a relatively short period.

A failure to provide proponents of new projects with confidence of the availability of water in this period will have a significant adverse impact on the attractiveness of the region for industrial investment and would detract from Gladstone's international competitiveness as a location.[35] This risk increases as GAWB approaches the limit of Awoonga Dam's capacity to service new customers.

Conversely, it would be imprudent for GAWB to trigger an augmentation on the basis of a potential industrial development, and in the event that such a project did not proceed substantial costs would be existing customers, or GAWB would bear this cost should that investment be subject to ex-post optimisation.

4.7 Emerging water supply and planning models in Australia

4.7.1 Trends in planning models

The planning framework surrounding water supplies to urban and industrial centres has developed and matured markedly in Australia over recent years. This has, in part, been in response to severe droughts and concerns over the reliability of supply from existing sources.

Overall, greater emphasis is being given to:

(a) using a level of service approach to benchmark the reliability of supply to consumers and inform planning assessments of the need for new sources;

(b) clearly identifying the next water source(s) to meet demand growth and sustain the required level of service;

[35] Noting that most major projects contemplated for Gladstone involve international equity interests who are examining potential locations on a global scale. This is equally true for past investments in the region.

(c) diversifying the sources of water to reduce supply risks (such as those caused by drought); and

(d) conducting preparatory work to reduce the lead times for the development of these sources and improve the utilisation of existing sources.

The following sections highlight these features as they are being implemented in major cities.

4.7.2 Sydney

The NSW Government has recently prepared an updated Metropolitan Water Plan that sets out strategies to secure Sydney's water needs to 2015 and beyond.

The plan identifies measures to:

(a) meet Sydney's normal water needs as it grows over time - "growth needs"; and

(b) secure Sydney's water supplies in the face of drought (and, in the longer term, potential climate change impacts) – "security needs". [36]

This plan proposes a number of supply and demand initiatives, but importantly identifies the need to conduct preparatory work on contingent sources that could be deployed in the event of severe drought. These contingency measures include:

(a) drilling to assess the groundwater resources at a number of locations, leading to an assessment of preferred groundwater sources and bore locations. This assessment work is accompanied by environmental studies and community consultation; and

(b) investment of some $120M in preparatory work for a desalination plant, including land acquisition, planning approvals, pilot testing, and detailed design. Groundwater extractions and planning and design for a desalination plant to enable these sources to be brought on line in the event that Sydney's water sources fall below defined trigger points.[37]

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[36] Government of NSW. "*2006 Metropolitan Water Plan*". April, 2006. p10.

[37] *ibid*. p92.

The plan notes the benefits arising from the $120M preparatory work and deferral of construction of the desalination plant as being:

(a) deferral of capital expenditure on the plant (some $1.3B) until such time it is absolutely necessary (e.g. from drought triggers) – an estimated benefit of $100M;

(b) capture of technology improvements during the period of deferral; and

(c) provision of a window for the benefits of *demand-side management* to be realised, along with initiatives such as recycled water, thereby reducing overall demand from existing sources and further delaying the need for the plant.

Finally, the plan notes the benefits of having these sources in a state of readiness extend beyond simply reducing drought risk to improving the utilisation of existing supply sources. The plan states:

> *'… While rain-fed storages will continue to supply the bulk of Sydney's water needs by volume, non-rainfall dependant options such as groundwater and desalination have an important role to play because they can produce guaranteed water when storages are low. By providing assurance that Sydney's water needs in deep drought can be met, they increase the amount of water that can safely be drawn from the storages on an annual basis. This is because they free up water which historically has been held in reserve in order to deal with the risk of deep and prolonged drought...'*[38]

4.7.3 Perth

The Water Corporation of Perth has developed a water source plan to address demand-supply issues for Perth and regional centres from 2005 to 2050.[39] This plan addresses the apparent long-term decline in inflows to storages, future demands, and infrastructure and demand management responses.

Importantly, this plan sets out a short and long-term source development program over the 45-year time horizon. This plan includes a number of key features of relevance to this investigation, including:

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[38] *ibid*. p11.

[39] Water Corporation. *"Integrated Water Supply Scheme Source Development Plan 2005 – 2050."* April 2005.

(a) setting a level of service standards for supply – which was proposed as limiting the frequency of sprinkler bans to a 1 in 200 year event;

(b) adopting a "Security through Diversity" initiative as a strategic priority, resulting in a broad range of water sources (including desalination and trading from irrigation districts) being used to reduce impact of drought;

(c) developing *"a suite of proven sources available from which to select the next source development for the expansion of the Integrated Water Supply Scheme"*;[40] and

(d) conducting planning, investigation and approvals for long-term options beyond 2015 to enable them to be progressed well ahead of the time they are required, particularly given *"the substantial lead times associated with the development of new sources of water supply, as a result of both the increasingly complex approval requirements and processes."*[41]

In correspondence to GAWB concerning the present submissions, the Water Corporation advise:

> *We are firmly of the belief that it is good management to ensure projects are ready for delivery in advance of the construction trigger to ensure delivery can be achieved when required. The alternative is "fast tracking" projects and while this option is available, our experience with fast tracking is that it is more expensive and delivers assets that often require significant rectification works after commissioning.*[42]

The Economic Regulatory Authority (**ERA**) reviewed the Corporation's long-term source development program and concluded that it appeared sound, although it had concerns relating to the service standard adopted and need for buffers to achieve that service level.[43]

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40 *ibid* at p3.

41 *ibid*. p6.

42 Letter dated 16 March 2007.

43 Economic Regulatory Authority. *"Final Report on the Inquiry on Urban Water and Wastewater Pricing"*. November 2005. p67.

The ERA also noted the Water Corporation's adoption of a certainty rating in assessing options based on complexity and the degree to which planning, investigation and approval has been advanced.[44]

4.7.4 South East Queensland

The Queensland Government is currently developing the SEQ Water Grid in response to the extreme drought conditions faced by the region. This is accompanied by planning processes managed by the Queensland Water Commission, namely:

(a) the finalisation of the South East Queensland Water Supply Strategy;[45] and

(b) the development of a System Operating Plan to determine the optimal use of source assets and related matters.

The Queensland Water Commission's responsibilities also include setting levels of service for water supplies in the region, which will relate to the frequency, duration and severity of restrictions. These service levels inform its planning activities and the outcomes sought from the System Operating Plan.

The various projects related to water supply planning and development include:

(a) developing a pipeline water grid to link water storages and transport water to where it is needed;

(b) developing alternative water supplies, such as desalination and groundwater;

(c) recycling water for a range of uses, such as industrial, irrigation and commercial purposes;

(d) establishing additional water storages, such as building new dams and raising existing weirs and dams;

(e) retrofitting homes with water saving devices;

(f) reducing pressure and leaks in mains and water pipes; and

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44 *ibid* at page 67

45 Queensland Department of Natural Resources and Mines. *"South East Queensland Regional Water Supply Strategy – Stage 2 Interim Report"*. November 2005.

(g) efficiently operating water storages.[46]

4.7.5 Melbourne

The Victorian Government has published a water supply strategy for Melbourne and the surrounding region. The document sets out the key elements for the strategy, namely:

(a) determining the resource outlook over a 50 year planning horizon;

(b) identifying options to address the resource outlook;

(c) establishing an implementation plan

(d) monitoring the resource outlook and adapting to actual conditions; and

(e) achieving a state of preparedness, to enable supply responses to be made within a "buffer" window of seven years supply, and continually update knowledge and the various options. [47]

The adopted strategy in the plan seeks to augment current supplies whilst also developing alternative sources, increasing the inter-connectedness of various sources, and reducing water demands.[48]

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[46] taken from the Queensland Water Commission website at http://www.qwc.qld.gov.au/Projects.

[47] Government of Victoria. "*Draft Central Regional Sustainable Water Supply Strategy*". (undated) at p11.

[48] *ibid* p9.

5 Strategic Water Plan

5.1 Background

GAWB formally commenced the process of developing its present water supply strategy in June 2003, with the public announcement of a 12-month process to develop a SWP to meet the immediate and long-term water needs of the Gladstone region. The development of the plan incorporated consultation with GAWB's customers, and culminated in a final strategy being released in November 2004. The following sections provide an overview of the development process and key findings of this plan.

5.2 Project initialisation

Prior to the 1993-2003 drought, hydrologic analysis suggested that the HNFY of Awoonga Dam was 88,000ML. This reduced to 78,000ML following incorporation of the new 'critical period' that the 1993-2003 drought represented.

This caused GAWB to revisit its forecasts for meeting demand growth. GAWB wished to take active steps to manage future droughts through prudent planning. Hence, there was a need to build upon earlier planning efforts and publish a robust water supply strategy to enable GAWB to respond to supply-demand issues and future drought events.

The Lower Fitzroy Option formally commenced in June 2003 via public announcement and letters to GAWB customers.

5.3 Consultation

The SWP was developed with a clear and transparent consultation process with key stakeholders, including customers.

A project advisory committee was formed to review proposals and provide input and advice to GAWB in the development of the plan. This committee included a number of major GAWB customers, including representatives from CS Energy, Comalco (now Rio Tinto Aluminium), QAL, and Gladstone City Council.

Individual customer meetings were held throughout the process, along with various workshops and presentations on the plan and the emerging strategy and options. Briefings were also held with all customers on various occasions to update on progress and discuss issues and processes for moving forward to complete the strategy.

All customers were asked to comment upon their views on water supply risk, project evaluation criteria and various weightings adopted to assess various options via a formal survey.

A copy of the final SWP was sent to all GAWB customers in November 2004 and was made available publicly upon request to GAWB.

5.4 Key findings of the strategy

The key findings and actions arising from the strategy were:

(a) *water balance* – Awoonga Dam could provide the anticipated demand for water (as assessed in 2004) provided a number of assumptions regarding future demand, storage inflows and performance, and alignment of Reservation Volumes with expected usage (i.e. removal of individual buffers for drought or demand growth);

(b) *adequacy of current reliability* – most customers indicated a strong desire to improve the reliability of their water supply at a reasonable cost; and

(c) *source augmentation* – the preferred option for the next water source was a pipeline between the Fitzroy Barrage and the proposed Aldoga Reservoir, including the development of additional storage infrastructure to the Lower Fitzroy (together referenced as the **Lower Fitzroy Option**). This was to be actioned by first securing a water entitlement from the Lower Fitzroy of up to 30,000ML from the new infrastructure and completing investigations for the pipeline.

5.5 Current status

GAWB developed a three-stage implementation plan for the Lower Fitzroy Option and actions under this plan are now well advanced.

Stage 1 - involved preliminary design, route selection and other project scoping activities. This is largely completed and now, based on the outcomes of the Central Queensland Water Supply Strategy, GAWB has comfort that 30,000ML will be made available from new water storages on the Lower Fitzroy.

Stage 2 - involves work to advance the development of the pipeline, including detailed design, investigations, land acquisition and securing the various approvals.

Stage 3 - involves the actual construction of the inter-connecting pipeline and associated infrastructure.

5.6 Regional water supply planning – Central Queensland

The Queensland Government recently released the Central Queensland Regional Water Supply Strategy (**CQRWSS**) setting out regional water demands and supply responses. This strategy was initiated in response to recent droughts in the region, and to establish a whole-of-government approach to water supply challenges. The aims of the strategy address the following key issues:

(a) continued urban growth and industrial development, particularly in the Lower Fitzroy and Gladstone areas and mining demands in the Bowen Basin;

(b) entitlements in some water supply schemes approaching full usage;

(c) some water supply schemes performing below users' expectations; and

(d) potential supply shortfalls based on projected regional demands between 2005 and 2020. [49]

The strategy identifies supply responses by sub-region, including the Lower Fitzroy and Gladstone regions.

5.6.1 CQRWSS Outcomes – Lower Fitzroy

The strategy concluded the following in relation to the Lower Fitzroy:

[49] DNRW *CQRWSS*. (December 2006).

'…The Lower Fitzroy river system will be the next main source of supply for the urban and industrial needs of the Rockhampton, Fitzroy and Livingstone council areas and the Gladstone Area Water Board.

To reliably meet the needs of these areas, which are mainly for high priority water, further infrastructure will be required on the Lower Fitzroy River. Appropriate pipeline infrastructure would also be required to deliver water to the desired locations…

The timing of the onset of the demands from these different areas may vary considerably, and are likely to have an effect on the preferred staging of the developments...'[50]

The strategy sets out the short to medium-term supply measures to be adopted – namely the development of Rookwood Weir and raising of Eden Bann Weir by the end of 2011 (subject to final investigation and approval processes being secured).

5.6.2 CQWSS Findings – Gladstone Region

After considering the demand-supply issues for Gladstone, the strategy concluded that:

'…It is expected that the majority of the area's additional urban and industrial demands in the longer term will be met from the Lower-Mackenzie-Fitzroy River system via a pump station pipeline system linking the Fitzroy Barrage storage to the Gladstone Area Water Board's reticulation system. The possible timing of these developments would be a matter for the board to consider...' [51]

Importantly, the CQRWSS expressly provides for the Fitzroy Resource Operations Plan to be amended to reserve up to 30,000Ml pa of reliable water from the Lower Fitzroy for urban and industrial purposes for GAWB, or other entity that may arise from a review of the institutional arrangements.[52]

Access to this additional water supply, linking it to GAWB's existing reticulation system, is assessed as a matter for GAWB to consider[53]with it being nominated as the lead agency (or other entity if agreed through a review of institutional arrangements) for the construction of the pipeline.[54]

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50 *ibid*. at p50.

51 *ibid*. at p53.

52 *ibid*. atp68

53 *ibid*. at p53

54 *ibid*. at p75

5.6.3 Performance of the Lower Fitzroy system

In developing the CQRWSS, an assessment was made of the reliability of supply from the Lower Fitzroy in the absence of new weir developments. Sensitivity analysis was performed on critical flow periods, and among the conclusions was that:

> *'…Diversification of supply in critical shortfall periods from potential upstream storages (Nathan, Connors or Fairbairn) or external by pipeline (Awoonga) need to be considered in an overall integrated operation of the weirs and dams for a better overall outcome of the system…'* [55]

The final CQRWSS went on to contemplate the potential for the Lower Fitzroy and Awoonga Dam to be operated conjunctively via the proposed pipeline linking the two sources.[56] For the purposes of this submission, GAWB has assumed that the pipeline will initially operate one-way (Fitzroy to Gladstone).

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[55] DNRM *Performance of Supplemented Water Supply in the Lower Fitzroy Basin. Information Paper No* 9. Central Queensland Water Supply Strategy., December 2005 (p8-9).

[56] *ibid*. p51

6 Previous regulatory investigations and outcomes

6.1 Previous decisions

The Authority (**QCA**) has previously considered pricing matters relating to GAWB in two separate reports dated September 2002[57] (**2002 Report**) and March 2005[58] (**2005 Report**). The QCA also published a draft report on pricing principles to apply during exceptional circumstances[59] (**EC Report**) which is also referenced.

These previous reports into GAWB's pricing practices addressed the broader issue of pricing, and particularly considered matters related to supply augmentation, demand growth and responses to drought. The EC Report was also used to inform the Authority's updated 2005 Report particularly with respect to expenditure related to exceptional circumstances (such as drought).

6.2 Supply augmentation - demand response

Both the 2005 and 2002 reports examined the demand-supply framework for GAWB and the related issues for pricing and asset valuation.

6.2.1 Asset valuation and optimisation for excess capacity

The Authority's 2002 Report allowed the current capacity of Awoonga Dam (40m AHD) into the regulatory asset base for pricing purposes but "optimised out" assets relating to a further raising to 45m AHD given the uncertainty of future demand.[60]

This contrasts to some extent to the approach suggested in this submission (at least in principle) - namely that expenditures of future water sources can be legitimately made to enable prudent response to changes in supply or demand conditions. However, GAWB is not proposing to revisit existing asset valuations in this process, particularly given the raising of Awoonga Dam to AHD 45m no longer presents as the preferred immediate augmentation option.

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[57] QCA Final Report: *Gladstone Area Water Board: Investigation of Pricing Practices* (September 2002)

[58] QCA Final Report: *Gladstone Area Water Board: Investigation of Pricing Practices* (March 2005)

[59] QCA Draft Report: *General Pricing Principles for Infrastructure Investments made in Response to Extraordinary Circumstances* (March 2004)

6.2.2 Commercial framework for supply augmentations

The 2005 Report's recommendations on the allocation and management of risk between GAWB and customers were that:

(a) demand risk is best managed by relevant customers;[61]

(b) planning and infrastructure risks are best managed by GAWB, as owner and manager of infrastructure; and

(c) hydrology risk (the risk of changes to long-term supply reliability and estimate of HNFY) is not manageable by any party and the cost of changes should be to the account of customers.[62]

6.3 Drought response

6.3.1 Introduction

The Authority has previously considered the prudence of measures taken both in advance of, and in response to, events such as exceptional droughts. The key elements from these reviews are set out below.

6.3.2 Options for responding to exceptional droughts

In the 2002 Report, the Authority recommended that GAWB examine options for dealing with drought including *"volumetric charging, trading of customers' allocations, alternative sources of supply, different supply reliability products and a permanent safe yield buffer in consultation with customers and the Authority, and with results to be incorporated into prices as appropriate"*.[63]

6.3.3 Responses to drought and pricing implications

The 2005 Report made recommendations with respect to pricing for exceptional circumstances (including drought), namely that prices should incorporate the costs of investment, operational and managerial responses where:

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[61] The QCA noted various steps that customers could take, including alternate sources (eg recycling or sea-water cooling) and technology-led reductions to demand. (at p21).

[62] *supra no* 53 at p23.

[63] *ibid at* p 3 and pp 30-32.

(a) the risk is commercially relevant;

(b) GAWB has acted prudently and could not have acted any earlier to address the risk at lower cost;

(c) GAWB is the most appropriate party to bear the risk; and

(d) the response is cost effective.[64]

The 2005 Report drew from the EC Report on these matters, with the EC Report providing a more detailed assessment of requirements and issues to be addressed.[65]

6.3.4 Risk allocation for drought

In the 2005 Report, the Authority concluded that *"drought risk is best managed by GAWB, and GAWB is entitled to pass on the cost of managing this risk to customers. Until GAWB releases its Drought Management Plan, no provision should be made in prices"*. [66]

GAWB has since released the DMP and proposes this contingent source strategy as an appropriate method for mitigating drought risk and the need to apply restrictions.

6.4 Ex-post optimisation

6.4.1 Background

The position adopted in the draft EC Report regarding ex-post assessments of contingency contemplated scope for future optimisation of such past expenditure:

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64 *ibid at* p 75.

65 *ibid* at pp 94-98.

66 *Supra No.* 62 at, p 36, where the QCA considered only the issue of prices under scarcity conditions, where scarcity values could be charged in times of short-term restrictions and rebated when supply-demand balance/surplus resumed.

'…In considering existing investments made in response to extraordinary circumstances, a forward-looking approach generally remains appropriate. It is proposed that, where past investments have been undertaken in response to previously anticipated Events, these should remain in the asset base and attract a commercial return for the service provider where they form the optimal response to commercially relevant future risks. Where the risk posed by an extraordinary circumstance is no longer commercially relevant or a more cost-effective response is available, the regulatory asset base may need to be reduced accordingly...'[67]

This is a matter of concern as GAWB seeks to secure certainty over the recovery of costs associated with drought responses in order to make such investments.

GAWB acknowledges that it is not possible to state certainly that the contingencies for which the forward planning is being conducted will reoccur, but it submits that the likelihood of reduced inflows or increased demand occurring is sufficiently high to make investigation of the strategy of this stage prudent. Further, the benefits (in lead time saved and cost avoided) of the forward planning work is such that GAWB should not be penalised if the contingency does not arise.

6.5 Implications for this review

6.5.1 Purpose of section

These previous regulatory processes highlight a number of matters of relevance for this submission, which are considered below.

6.5.2 Drought contingency

GAWB has examined and implemented a range of approaches to provide drought contingency which arose from the earlier QCA reviews. For example, volumetric charging and secondary trading have been introduced.

However, none of these alternatives address the risk associated with a single storage system, and a contingent water source strategy has been adopted.

The previous work by the Authority to determine criteria for the inclusion of expenditure on this contingent source should be acknowledged and utilised for this review; this has been adopted in Section 8.

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[67] *Supra No.* 63 at p 137.

6.5.3 Supply planning

GAWB has continued its role as the lead agency in water supply planning – consistent with the QCA's previous recommendations about the assignment roles between customers and GAWB.

The approach for forecasting future demand has matured since the QCA's past investigations, and while it is clear that GAWB's demand is increasing over time, the precise timing of demand increments is difficult to forecast.

Finally, water supply planning has now also matured beyond that contemplated in earlier processes. The development of the SWP has seen better options emerge to meet demand growth than the 45m raising of Awoonga Dam.

These issues associated with supply planning are set out in Section 9.

6.5.4 Hydrology risk

There is now a greater understanding associated with hydrology risk than was generally accepted at the time of earlier reviews. Moreover, strategies are now available to mitigate against the risk of fundamental changes to hydrology.

Section 10 examines how the GAWB's contingent supply strategy addresses this risk.

6.5.5 Regulatory certainty

The lumpy nature of water infrastructure exposes GAWB to substantial regulatory risk in making investments to respond to drought and demands. Past positions on ex-post optimisation of expenditures, particularly in response to extraordinary circumstances, warrant revisiting in this context.

GAWB has proposed a way forward to deal with this uncertainty whilst ensuring such expenditure is prudent in Part D of this report.

PART B – PRUDENCE OF A CONTINGENT SOURCE STRATEGY

This part of the submission specifically addresses the need for a contingent supply strategy, and subsequently the allowance of reasonable expenditures associated with developing and implementing this strategy. This includes the need for preparatory expenditure to enable contingent sources to be deployed in the required timeframes.

There are three key platforms supporting the need for GAWB to undertake detailed augmentation planning and investigations and associated preparatory expenditure:

(a) as a drought response and contingency measure;

(b) in order to meet the spikes in demand associated with new industrial developments in the region; and

(c) to respond to changes in expectations of the performance of Awoonga Dam in supplying the water allocations related to it, which has impacts both in terms of drought and demand responses.

These are examined in the following sections.

7 Drought contingency

7.1 The need for preparatory expenditure

A key element of this submission is the need for preparatory expenditure that enables a contingent water source to be expeditiously employed to mitigate drought risks.

The following sections highlight the key issues relating to drought contingency for GAWB, and address the criteria for assessing drought-response expenditures.

7.2 Relevance for GAWB

GAWB's charter is centred on the provision of water to support the industrial and residential needs of the Gladstone region. Moreover, the previous drought in the region highlighted the expectations among major water users for GAWB to adopt a pro-active approach and a leadership role in responding to emerging water shortages.

The drought risks facing GAWB and its customers are highlighted by the reliance on a single-storage system – Awoonga Dam - and assumptions that rely on the premise that the future will mimic (or at least be no worse than) the past.

7.2.1 Reliance on single storage systems

Recent droughts in Australia have highlighted the supply risks associated with rainfall-reliant and single-source systems to supply water to major urban centres. This has been addressed through diversifying sources by catchment, and source type (refer earlier sections).

This contrasts with GAWB's current position where it relies solely upon inflows into Awoonga Dam.

7.2.2 Reliance on past events as indicators of the future

Determining the "reliable" yield from a storage is limited to the information available on the inflows to that storage, and future conditions mimicking the past.

This is supported by analysis undertaken by Ken Day of DNRW and commissioned by GAWB. [68] This analysis commented on the methodology used to derive yield (or in this case HNFY). This analysis concluded that:

> *'…Using HNFY to determine the appropriate yield has limitations for supply management. Firstly, the methodology by its nature deals only with past rainfall sequences and provides little information about future supply performance, particularly if the climate is changing or fluctuates over long timescales. Secondly the historic record is quite short, giving little comfort that a new record drought will not occur in the next few decades. Finally, there is some evidence that recent climate (form the current rainfall record used to calculate HNFY) may be been wetter than average.*
>
> *… the recently observed worse case sequence on record (1992-2003) is unlikely to represent the historical worse case nor the future worst case sequence. That is, if GAWB attempted to supply at the HNFY level we would expect a supply failure in the future.*
>
> *A stochastic approach has theoretic advantages over HNFY. However, there is evidence to suggest that inter-decadal fluctuations in climate affect rainfall on the Central Queensland coast. These inter-decadal fluctuations may not be captured in the stochastic analysis, resulting in an under-estimate of the probability of future drought conditions. Moreover, any ongoing climate change associated with greenhouse gas emissions, stratospheric ozone depletion, increased sulphate aerosols over Asia and land-cover change will not be captured.* Modelling *studies in general, currently tend to point to drier rather than wetter conditions in the future. If there is an underlying drying effect on the Central Queensland coast, a stochastic approach will under-estimate of the probability of future drought conditions...'* [69]

This raises issues of how to best manage for drought, which is examined in the following section.

7.3 Drought management

7.3.1 Available strategies

In managing for drought, a number of measures are available to GAWB:

[68] Principal Scientist, Climate Impacts and Natural Resource Systems.

[69] Assessment of the historical and projected rainfall and climate regime of the Lake Awoonga catchment. Day, Ken, David Ahrens and John Carter (March 2007).

(a) reducing risk of shortage by limiting the annual volumes contracted from Awoonga Dam, thereby providing greater storage reserve;

(b) implementing restrictions in times of imminent shortage to ration scarce supplies and reduce the risk of a total supply failure ; and

(c) augmenting supplies to increase volumes available in a timely fashion, thereby reducing or removing the need for restrictions.

7.3.2 Reduced contracted volumes

GAWB is limited in the annual volumes it can supply by its water entitlement from Awoonga Dam. GAWB could, of its own volition, choose to contract only a portion of this water entitlement as a measure to reduce the risks associated with record drought.[70] This approach is both problematic in the sense that any assumed reduction to contracted volumes will be arbitrary

Secondly, this approach brings forward the next increment of supply earlier than necessary. The economic effect is significant: prices for water in the Gladstone region will increase substantially when the next supply source is triggered. It would be imprudent for this to occur based on an assumption about possible future droughts that was overly conservative.

7.3.3 Restrictions

Restrictions are an essential element of forward drought planning, however, are not of themselves, a solution or positive management strategy. Restriction regimes rely upon reductions in demand that will preserve supplies until the end of the drought period. This requires judgement as to the length of this period which can only be informed by previous history.

Conservative restriction regimes can also lead to inefficient utilisation of storages.[71] For example, most restrictions will be imposed when they would otherwise have not been required - e.g. extreme events are not the most likely events.

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[70] This is effectively a reserve buffer over and above that required to achieve HNFY for the storage.

[71] Restrictions are another form of reserve buffer, as they require reductions in demand based on a "period to failure" assessment, based on water stored, adjusted for inflows and losses.

7.3.4 Contingency supplies

GAWB's preferred approach is to respond to drought situations, as and when they arise, through contingent supply measures.

Whilst restrictions will have a role in this approach (as described in the DMP), a contingent supply reduces the severity and/or frequency of the restriction regime as measures can be deferred in the knowledge that supply augmentation can occur within a set window.

Secondly, a contingent source can improve the utilisation of the storage, as potentially greater volumes can be supplied with lower risk of failure (given the availability to deploy reserves).

Finally, a contingent source response is event based, rather than relying solely of forecasts of the future. That is, a contingent source is not triggered until certain conditions occur. This contrasts with other approaches which assume such an event will occur, and set contracted volumes and/or restrictions based on this assumption.

The level of preparation in developing contingent source options and forward implementation bears a direct relationship on these benefits.

In the absence of any detailed planning or preparatory work, contingent source options are likely to take at least four to five years to develop and implement. This timeframe would drive the restriction regime in the DMP.

For example:

(a) if no contingent source was identified in the DMP, there would be a sole reliance upon preserving stored water for as long as practical, balancing the period of restrictions against their severity (i.e. applying mild restrictions at an early trigger point, or more severe restrictions when storage levels fall to critical);

(b) if a contingent source was identified but no preparatory work was undertaken to reduce timeframes, a decision would be required approximately five years out from the forecast failure point to trigger expenditure to implement this option. Because critical-path activities such as environmental approvals and land acquisition were not undertaken in advance, there would also be uncertainty as to whether the option could be built on time, and indeed at all; and

(c) if preparatory work on a preferred contingent source was undertaken such that it could be developed in a shorter window, the trigger points for restrictions under the DMP can be deferred (or restrictions lessened) given the certainty that a contingent source can be developed within the required timeframe.

7.4 Regional economic significance

The impact of restrictions on GAWB's customers is significant given the measures already taken to improve the efficiency and management of water use from the last drought (see Part A). Hence any restrictions come at a cost to these users, and the region's economy.

GAWB's customers quite reasonably require certainty in the provision of supply inputs upon which their operations (and underpinning billon dollar infrastructure) rely.

Whilst this submission does not quantify the economic cost of restrictions, the impacts of reduced water availability to GAWB's customers is clearly significant in terms of the capacity to continue production.

A failure of water supplies to the major industries in Gladstone will also have implications for attracting new investment to the region and fulfilling the potential development of the GSDA. Such a failure will have direct implications at a state and national level given proponents of projects usually attracted to Gladstone consider locations on a national and global basis. This is supported by advice from the Gladstone Economic and Industry Development Board to GAWB, who noted that investors in major projects perceive water supply as a risk to further developments in the region. (Source)

An environment where restrictions are applied, or likely to be applied, is likely to be a major deterrent when compared to other locations. This has flow-on implications for the

optimal utilisation of existing capacity for other infrastructure in the region such as port, rail and electricity.

7.5 Criteria for assessing drought-response expenditure

7.5.1 Background

As described in Part A, the Authority has already contemplated criteria to consider the allowance of preparatory and investment expenditures – namely that prices should incorporate the costs of investment, operational and managerial responses where:

(a) the risk is commercially relevant;

(b) GAWB has acted prudently and could not have acted any earlier to address the risk at lower cost;

(c) GAWB is the most appropriate party to bear the risk; and

(d) the response is cost effective.

These are examined below.

7.5.2 Commercial relevance

Expenditures relating to drought risk must be relevant in the context of the commercial supply relationship between GAWB and its customers. This issue has been considered using the categorisation suggested by the Authority in its draft EC Report,[72] namely:

(a) existing governance arrangements and regulatory requirements;

(b) industry practice and benchmarks;

(c) user demand;

(d) materiality and ability for the event to be pre-empted;

(e) availability of meaningful responses; an

(f) relevance to the region and the provision of service.

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72 *Supra No. 63* at pp 94-95.

7.5.3 Existing governance arrangements and regulatory requirements:

GAWB's regulatory requirements in terms of drought are limited to developing and implementing DMPs.

Recent amendments to the *Act*, including the potential requirement for service providers to meet mandated levels of service (which generally relate to the frequency, duration and severity of restrictions) provide a framework for such regulation to be applied.[73] Moreover, levels of service are being developed for Southeast Queensland as part of broader institutional reform in the region.

GAWB's function and purpose includes the provision of water to the Gladstone region to support economic activity – it clearly has the governance and leadership function in securing these supplies and taking active steps to manage drought risks to the region.

7.5.4 Industry practice and benchmarks

Part A set out the new benchmarks and industry approaches to water supply planning and drought management in Australia's major cities. This clearly aligns with GAWB's proposed approach.

7.5.5 User demand for GAWB to develop suitable responses

As a consequence of embedded water savings from the imposition of restrictions in 2002, GAWB's industrial customers as a whole have little capacity to sustain restrictions to their water use. As such, drought responses that purely involve restrictions are sub-optimal, particularly given GAWB's contractual framework that seeks to align customers' water use and reservation volumes.[74]

GAWB's customers have expressed an expectation that advance measures should be adopted to manage drought risk and that GAWB take a leadership role in implementing these measures – this emerged following discussions after the 2002-03 restrictions.

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[73] s360J(1)(b) of the *Act*.

[74] Whilst this framework is prudent in terms of optimum utilisation of infrastructure and timing of capacity upgrades, it limits customers' ability to manage drought risk. For example, customers have little scope to contract to a buffer volume to be used during drought. Moreover, hydrologic and statutory constraints prevent customers (or GAWB) from "water banking" and building up a contingent reserve.

As a result, GAWB believes that its customers' require drought management planning to focus on prudent infrastructure responses in preference to restriction-based responses. The issue then becomes one of the most prudent infrastructure response.

7.5.6 Materiality of a severe drought, and whether it is able to be pre-empted

Given the size of Awoonga Dam relative to its annual supplies, severe water shortages take a number of years to emerge, enabling a window to make a suitable response – in fact the DMP sets an early warning trigger when Awoonga Dam reaches five years to failure.

However, development of alternate sources involves substantial lead times and, accordingly, action is required in advance of the critical situation actually occurring.

The impact of drought on Gladstone and industrial water users are material in terms of the consequences to industry and the regional (and State) economy. A severe water shortage, manifest by the restriction regime specified in the DMP, would severely curtail production at numerous industrial facilities without the provision of contingent supplies.

7.5.7 Meaningful responses are available

The SWP process highlighted that a number of options exist to respond to drought events and mitigate against severe water shortages. These involve infrastructure developments, however, all involve long lead times and substantial cost.

7.5.8 Relevance of drought to the region and provision of services.

The application of severe water restrictions is of central relevance to the service of providing water to industry and residential uses, and sustaining the regional economy

7.5.9 GAWB is the most appropriate party to bear the risk.

The distinction between bearing risk, and managing risk and mitigating the effects, is relevant to this submission. The precise allocation of risk is a matter set out in contractual arrangements between GAWB and its customers.

Whilst clearly GAWB cannot control the flow of water into Awoonga Dam (and nor should it be expected to), GAWB is best placed to manage drought risk for customers given:

(a) not all customers will have access to contingent supplies;

(b) the scale economies in developing regional infrastructure;

(c) there are a limited (and relatively easily defined) set of alternatives, and inefficiencies would arise from several entities performing their own investigations and preparatory work for the same or similar options. In fact, conflict may arise between customers seeking to advance similar or competing options – these conflicts would be unlikely to result in efficient outcomes when compared to a dedicated water supplier developing a preferred regional response.

This supports the Authority's previous recommendations that *"drought risk is best managed by GAWB and GAWB is entitled to pass on the cost of managing this risk to customers"*[75], noting that the Authority recommended that these costs should not be incorporated into prices until a DMP was released (which has subsequently occurred).

Finally, in some situations, customers may have their own alternatives and preferences for managing this risk. In this case, customers have the option to pursue these alternatives and reduce their access to water from GAWB (e.g. through reducing their reservation volumes or via trading) as permitted by their long term supply agreements with GAWB.

7.5.10 GAWB has acted prudently and could not reasonably have acted any earlier to address the risk at lower cost

The process of contingent supply planning is in fact the prudent measure to ensure a timely response and identify the least-cost (highest benefit) solution. In fact, GAWB faces substantial regulatory risk if it did not undertake planning activities (such as the SWP) and identify preparatory work required to make a timely response, as suggested by this criteria. The work that is the subject of this submission could not have been undertaken until the conclusion of the SWP.

[75] *Supra No.* 62 at, p 36.

7.5.11 Cost effective response

This criterion would appear to suggest that the response should achieve the desired outcome at minimum cost. This is, of course, desirable however the characterisation of costs and benefits should be considered.

(a) GAWB submits that, in determining cost effectiveness, the economic costs of restrictions (and supply failure) are a relevant consideration, as are the economic benefits that arise from contingent source planning.

For example, water restrictions from industrial users of water have collateral impacts on suppliers to those industries and their workforce. Secondly, a deterioration of perceptions among project proponents of Gladstone is likely, leading to reduced investment.

As set out above, contingency measures are superior when compared with other drought responses when considered in the context of GAWB's customers. First, there is a utilisation benefit from knowing a contingent source can be brought on line. This has been acknowledged in the Sydney Metropolitan Water Plan:

> *'…By investing in being ready to access groundwater and desalinated seawater in severe and extreme drought – even if such drought does not occur – more water can now be drawn from the dams without affecting the security of supply; for this reason the calculated water availability figure (or existing sources) has increased even without accessing these sources…'*[76]

This is the converse to the cost associated with limiting contracted volumes for storages to cater for uncertainty, namely the brining forward of major capital expenditure.

(b) A second benefit is the deferral of drought-response expenditure given the certainty that a contingent source is available and can be developed within a set timeline (given preparatory investigation and other work has been completed).

(c) The third benefit is the reduction in frequency and/or severity of restrictions given the trigger point for restrictions can be delayed in the knowledge that supply augmentation can be delivered by a given time.

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[76] *ibid*. p15.

(d) A fourth benefit is the avoidance of the heightened delay risks and increased costs associated with fast-tracking major infrastructure projects.

(e) Finally, a contingent source strategy manages actual events and conditions as they present – it does no rely on a conservative (and somewhat arbitrary) assumption on drought risk to be embedded into decision making.

However, these benefits can only be realised if a contingent source can be employed within the timeframe required to avoid restrictions to supply, or at least largely reduce their severity and duration.

7.6 Relevance to the Authority's review

The restriction measures contemplated in the DMP are clearly mitigated by the development of a contingent source. For example, it is expected a supplementary source would come on-line at some time following the Stage 2 supply restrictions, thereby negating the basis upon which Stage 3 Emergency restrictions would require imposition.

The timing of such augmentation is a matter of further consideration by the Authority under the terms of this review, and therefore has not been addressed in detail in this submission. GAWB will provide a further submission to the Authority on this matter if so required.

However, the shorter the timeframe for the development of a contingent source, the greater the benefit in terms of reducing or removing the need for restrictions and potentially increasing the utilisation of existing sources.

A target timeframe of two years has been adopted to guide this preparatory expenditure. This timeframe has been selected having regard to:

(a) what is possible – a two year period is the likely procurement, construction and commissioning period for various options – providing the boundary for what may be achievable without committing to major capital;

(b) the erosion of benefit of a contingent supply strategy if sufficient preparatory work has not been completed such that GAWB and customers have confidence the source can be delivered on time. This is difficult to achieve in the absence of

long lead-time, critical path items being resolved (such as land acquisition, approvals, procurement of critical materials and detailed design; and

(c) an assessment that a longer period would fail to meet the requirements for source developed in response to a demand trigger (see below).

In terms of the DMP, once the Authority has concluded its review (relating to all terms of reference), it is expected the DMP will be revised against the Authority's recommendations. In the event that GAWB has sufficient certainty over the pricing treatment of supply augmentation and preparatory expenditure, the DMP may be updated to incorporate more specific arrangements to develop a contingent source for action.

In the event that the outcomes of this process do not support sufficient ex-ante arrangements for preparatory expenditure, the DMP will require revision with GAWB's ability to deliver its contingent supply strategy seriously impaired and the imposition of restrictions upon contracted demand being the key medium reasonably open to GAWB to prolong the period from which it can supply water from Awoonga Dam.

8 Demand growth

8.1 Introduction

Gladstone's attractiveness as a location for large-scale industrial development will continue to result in growing water demands in the region. As described in Part A, this growth is lumpy and difficult to forecast given it is influenced by large-scale projects that are at various stages of investigation.

This section of the submission builds upon the matters raised in Part A, and sets out the rationale for GAWB to undertake supply planning to meet demand growth and develop suitable supply-side responses.

8.2 Relevance for GAWB

GAWB's function includes the planning for future supply provision. These costs need to be funded. Water supply planning to accommodate growth is a standard feature of water supply entities operating under a supply model – as is GAWB.

8.3 Environment for water demands

As described in Part A, GAWB faces a unique demand environment given its industrial customer base and the lumpy nature of new demands.

The Authority's 2002 Report allowed the current capacity of Awoonga Dam (40m AHD) into the regulatory asset base for pricing purposes but "optimised out" assets relating to a further raising to 45m AHD given the uncertainty of future demand.[77]

Whilst accepting that forecasting exact timing and quantum of new demand is problematic, it is reasonably certain is that demand will exceed the capacity of Awoonga Dam at some point into the future. This is evidenced:

(a) in a historic context, whereby demand growth occurred over time as Gladstone developed and attracted new industry thereby increasing its critical mass of services, infrastructure and workforce; and

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[77] *Supra No.* 61 at p 50.

(b) in a forward-looking sense, given the range of projects currently under investigation for the region and the attractiveness of the region to proponents of new projects.

Moreover, this increase in demand could occur at or before 2011, based on current projects under advanced consideration for the region.

GAWB has not provided a demand forecast for the same reasons that a contingent supply strategy is required – growth in demand is certain however the timing and scale is not.

As set out in Part A, proponents of new projects would expect GAWB to commit to supply within a two-three year window from the formal commencement of major developments. This is required to give proponents certainty they can proceed to a "financial close" for that project knowing that water will be available at the required date (e.g. commissioning).

8.4 Responding to increases in demand

GAWB can currently contract up to approximately 70,000ML/annum based on its existing water allocations. This compares to contracted demand of around 55,000ML/annum.

The relatively recent raising of Awoonga Dam to AHD 40m notionally makes available a further 8,000ML, which suggests an available supply from the Dam of some 23,000ML. However this is only available once the dam fills to pre-defined trigger points.

The compares with the estimated demand of 20,000ML from projects considered to have a reasonable likelihood of proceeding. These demands could emerge as early as 2011.

This balance is summarised below:

(a) Supply availability:

- currently available: 15,000ML
- potentially available: 23,000ML (depending on inflows)

(b) Demand: up to 20,000ML -

A number of scenarios could unfold over the coming years with respect to supply availability and demand. However, GAWB faces a reasonable prospect that it will be required to supply an additional 20,000ML in 2011, but then at that time may not hold the required water entitlements to underpin supply to these new demands – for example if the 40m AHD Awoonga Dam does not fill over this period.

It is prudent for GAWB to plan for this scenario given the impacts on the Gladstone region if it fails to do so, and viable projects do not proceed as a result. Moreover, it is reasonable to expect that GAWB will face a supply augmentation at some point in the medium term future as industry continues to develop in the GSDA.

8.5 Assessing demand-response expenditure

8.5.1 Introduction

The criteria for assessing the prudence of expenditures related to planning to meet demand growth are effectively similar to those applied for drought contingency. These have been adapted as follows:

(a) the risk of failure to meet demand growth is commercially relevant;

(b) GAWB has acted prudently and could not have acted any earlier to address potential demand shortfalls at lower cost;

(c) GAWB is the most appropriate party to manage the provision of water for new demands; and

(d) the response is cost effective.

8.5.2 Meeting demand growth is commercially relevant

GAWB's obligation to efficiently service the requirements of its customers and prospective customers incorporates the responsibility to plan for the provision of water to meet the future needs of the Gladstone region. This has previously been the subject of consideration by the QCA and is discussed at section 14.2 (Cost Allocation for Phase 2 Costs).

Secondly, project proponents typically look to GAWB as the region's water supplier to secure their water supplies in a timely fashion.

8.5.3 GAWB has acted prudently and could not have acted any earlier to address potential demand shortfalls

As stated in the previous section, the purpose of this strategy is to take a prudent approach and respond to GAWB's uncertain future demand environment through robust planning and preparatory expenditures to enable supply responses to be developed to meet the timing needs of new projects.

8.5.4 GAWB is the most appropriate party to manage the provision of water for new demands

Water supply planning is central to GAWB's charter.

Having said this, all new water users have options to bypass GAWB's infrastructure and develop alternate solutions. However, these opportunities are usually local in nature and many opportunities have already been exhausted (e.g. recycled water from Gladstone).

8.5.5 The response is cost-effective

The discussion in the previous section is also applicable in the context of demand-side planning.

The impacts on the regional and state economy of failing to provide proponents of new projects in the region with a degree of certainty that water supplies would be available, on time, for their development are reasonably obvious. Given the international nature of many new projects, Gladstone would be less able to compete for such developments.

Finally, the comments from the Infrastructure and Exports Task Force on regulatory practice (relevant at the time) is relevant when considering the relationship between infrastructure investment and major export projects:

> *'…The manner in which regulators have approached their task has compounded the difficulties (associated with regulation of investment in monopoly infrastructure). A quest for 'first best' solutions, combined with a focus on removing monopoly rents, has distracted from what should be the regulatory task: which is not to determine whether what has been proposed by way of access conditions is optimal, but whether it is reasonable. The search for*

optimality and precision in regulatory decision making has not only made the regulatory process less predictable than it should be, but has also added greatly to regulatory delay, hindering investment in infrastructure used by export industries.

Australia's exporters operate in competitive global markets. They are reliant on infrastructure investment that is undertaken in a timely way, not a time frame dictated by regulatory processes…'[78]

8.6 Relevance to the Authority's review

The Authority has been asked to consider matters relating to GAWB's contingent source strategy, including the prudence of preparatory expenditure and the selection of a particular option (the Fitzroy) as the preferred source.

This planning and associated preparatory expenditure has equal implications for demand responses as for drought response measures, given the nature of GAWB's demands and the short lead time sought by project proponents.

The Authority had previously removed past expenditures on source augmentation from GAWB's asset base (related to the AHD 45m raising) on the basis that future demand was uncertain. Whilst this may have been prudent on the basis that the further Awoonga Dam raising may not have presented the best solution, there is clearly a case to allow expenditures on preparatory work (including planning and investigation work) to identify the next water source and ensure its timely delivery.

Finally, there is a need for the Authority to establish a regime whereby GAWB can make commitments to new users (including project proponents) that give them certainty over water availability. This cannot be achieved where options are under constant review and uncertainty prevails.

Rather, a regime needs to be established that recognises the constraints of time, resources and information in making decisions and responding to changing demand conditions.

[78] *ibid*. at p3.

9 Hydrology changes

9.1 Background

In the absence of a better approach, expectations as to future water availability, must be informed from past events (through hydrologic analysis) given the variability of climatic conditions and rainfall.

This section briefly examines matters that have been previously considered by the Authority in its earlier investigations, which are relevant in the context of the matter now before it.

9.2 Uncertainty of long-term performance

As set out in Part A, the expected performance of Awoonga Dam (as for all storages) is continuously assessed as time goes on and the available time series of inflow data extends.

The incidence of inflows at lower rates than previously anticipated has two related impacts:

(a) drought events may be worse than previously contemplated, giving rise to:

  (i) accelerated development of contingent supplies; and/or

  (ii) applying more onerous restriction regimes (in terms of trigger points, severity and duration); and

(b) there may be a revision of the volumes that can be supplied from Awoonga Dam each year with an acceptable (albeit very low) risk of failure, resulting a lesser volume being contracted from the storage and consequently the bring-forward of the next capacity increment.

9.3 Implications for water supply planning

There are two approaches to dealing with potential shifts in hydrology and the expectations of future inflows and storage performance):

(a) provide buffers in the *demand-supply balance* - e.g. development of additional sources and/or reducing demands from existing sources (Awoonga Dam); or

(b) provide a *contingency responses* – e.g. take a probabilistic approach to the potential severity of drought events, (including those more severe than history would suggest) and developing contingency responses that have regard to the costs and benefits.

The contingency response approach is considered more prudent as it:

(a) is focussed upon actual events rather than estimates of future events: predictions are subject to bias and, by their nature, highly unlikely to eventuate in reality; and

(b) enables better utilisation of existing sources (Awoonga Dam) in the knowledge that contingent sources are available in the event a severe drought emerges.

9.4 Relevance to this review

The Authority's 2005 Report acknowledged that hydrology risk (namely the risk of changes to long-term supply reliability and estimate of prudent yield such as HNFY) is not manageable by any party and the cost of changes should be to the account of customers.[79]

In its 2002 Report, the Authority stated that there was "*a risk in assuming that a further raising of Awoonga Dam is the most cost effective option for storage augmentation in the future as the safe yield for such an augmentation remains subject to revision*".[80]

This in fact proved true given the yield reassessment that followed the extended drought period leading up to 2003.

There are clearly shortcomings and uncertainties associated with predicting future storage performance based on past events. In the absence of a better and more robust forecasting tool, there is a need to be prepared for events that fall outside the historic range.

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[79] *Supra No.* 62 at p23.

[80] *Supra No.* 61 at p 50.

However, the availability of a firm contingent source can potentially reduce the impact of changes to hydrology, and particularly the volumes that can be contracted from Awoonga Dam. For example, if HNFY was revised downward (due to a new critical period emerging), it may still be prudent for GAWB to contract up to its full water allocations given it can respond to drought events through supply augmentation.[81] That is, the significance of HNFY reduces over time where GAWB has confidence that it can manage supply shortage through contingency measures.

This highlights the need to:

(a) establish clear strategies and responses to deal with such possible events (a contingent source strategy); and

(b) ensure these responses have a defined set of characteristics that allow their deployment should an event occurs that has not been contemplated (through preparatory expenditure).

[81] On the assumption that its Resource Operators License (ROL) to extract water from Awoonga is not be reduced commensurate with the reduction in HNFY.

PART C – APPROPRIATE CONTINGENT SOURCE

This section sets out the case for the Lower Fitzroy option as the preferred contingent source, based on and the substantial planning and option assessment process established for the 2004 SWP, and subsequent updates to key information and criteria.

The following sections in this Part C:

(a) examine the potential responses for a contingent source examined in the SWP process;

(b) describe the basis for selecting the Lower Fitzroy option as the preferred contingency source; and

(c) set out the case for including preparatory expenditure on the Lower Fitzroy into user charges.

10 Option selection and evaluation

10.1 Introduction

The SWP examined a number of options and evaluated these options in arriving at its recommendations.

This section:

(a) examines the evaluation criteria applied in the SWP process;

(b) describes the options considered in the SWP and the preferred approach;

(c) updates the SWP in terms of these information and criteria.

10.2 Evaluation criteria

The SWP established evaluation criteria following a process of consultation with customers. The final criteria set for options were in two parts:

A threshold requirement, namely:

(a) the quantity of additional water provided; and

(b) the time required between inception of the Lower Fitzroy Option and full availability of water.

Options that passed this threshold requirement were then ranked based the following weightings:

(a) the reliability of the additional water provided (35%);

(b) the quality of the water (20%);

(c) environmental impacts (10%);

(d) social impacts (10%); and

(e) selling price (25%).

These threshold criteria were set in the absence of more specific information, particularly regarding the timeframes required to respond to changes in water supply (drought) and demand. The timing criterion was also developed before the current DMP was finalised. Hence these criteria have been updated for this submission and are discussed in later sections.

10.3 Project development and effective decision making

The planning and investigation phase is important for informing decisions on final project selection and configuration.

Due to the high cost associated with undertaking detailed planning, it is not an efficient expenditure for all options to be fully considered. Effective decision making requires the identification, albeit upon reasonable and transparent grounds, of those options that justify further examination.

To do otherwise results in inefficiencies in terms of both time and expenditure.

10.4 Options considered in the Strategic Water Plan

Eleven surface water options were considered, and two desalination options. Of these 13 options, nine passed the threshold criteria and were ranked as follows:

(a) weir on the Fitzroy River and connecting pipeline to the proposed Aldoga Reservoir supplying 20-30GL (1&2);

(b) weir on Baffle Creek to 25m (3);

(c) Awoonga Dam raising to AHD 45m without incurring rail relocation costs (4);

(d) weir on Baffle Creek to 20m (5);

(e) large desalination plant (6);

(f) Castle Hope Dam to 27 m (7);

(g) Castle Hope Dam to 35m (8); and

(h) Awoonga Dam to AHD 45m assuming rail relocation costs incurred (9).

The SWP sets out the considerations leading up to these rankings, which have not been repeated in this submission.

A number of important updates have been applied since the 2004 SWP.

This updated information continues to support the Lower Fitzroy as the preferred option, it is also worthy to examine the nature of the updated information and the implications for the ranking of less-favoured options.

10.5 Updates to the Strategic Water Plan information

10.5.1 Background

Since 2004, GAWB has conducted more detailed work on the preferred Lower Fitzroy option to progress matters and implement the SWP findings. This process has resulted in better information being generated for the Lower Fitzroy option as more detailed studies and costings are performed through Stage 1 work. [82]

This further assessment process led to an increase in the estimated cost of the Lower Fitzroy option from that in the 2004 SWP report. This caused GAWB to re-examine other options that had contingency characteristics such as delivery time and effectiveness – namely desalination and air-cooling – to ensure that cost parity remained between the options considered in 2004.

The findings of this assessment continue to support the Lower Fitzroy as the preferred option.

Secondly, the DMP has been updated since the release of the SWP, highlighting the need for a contingent source to be available within a reasonable timeframe in order to avoid or reduce restrictions. As discussed in earlier sections, a target timeframe of two years has been adopted when considering contingent source planning for both drought and demand response purposes. Hence the threshold criteria relating to time must change to reflect this requirement.

[82] Part D of this submission discusses the nature of work and expenditures incurred to date.

Finally, there are specific drivers at present that mean GAWB must plan to be able to meet a supply shortfall due to either or both drought and demand increases, which might become critical as soon as 2011.

These matters are discussed below.

10.5.2 Amending the threshold criteria

The threshold criteria in the SWP relating to the time within which contingent supplies must generally be available has been amended as follows:

> *'...With relatively limited expenditure upon preparatory works, the project must be capable of delivery with certainty of supply within two years....'*

Without the introduction of an additional water source there is a possibility of supply failure in early 2011 due to one or both of drought and demand spikes from new investment in the region.

As a result of the SWP process, GAWB has conducted more detailed work on the preferred Lower Fitzroy option to progress matters and implement the SWP findings.[83]

At this juncture, the fastest reasonable implementation of the Lower Fitzroy option is considered to be by the middle to late 2010.

The option will require an Environmental Impact Statement (**EIS**), as it may trigger the *Commonwealth Environmental Protection and Biodiversity Conservation Act*, aside from any State Government requirements. The approvals process provides the early critical path, and will not be completed before mid 2008. This in turn dictates the construction start date, as this environmental approval is a pre-requisite.

Construction of the water treatment plant will provide the later critical path, and is unlikely to be constructed in significantly less than 2 years, leading to a programmed completion around the middle to late 2010. A high level indicative programme for the Fitzroy River option is provided below.

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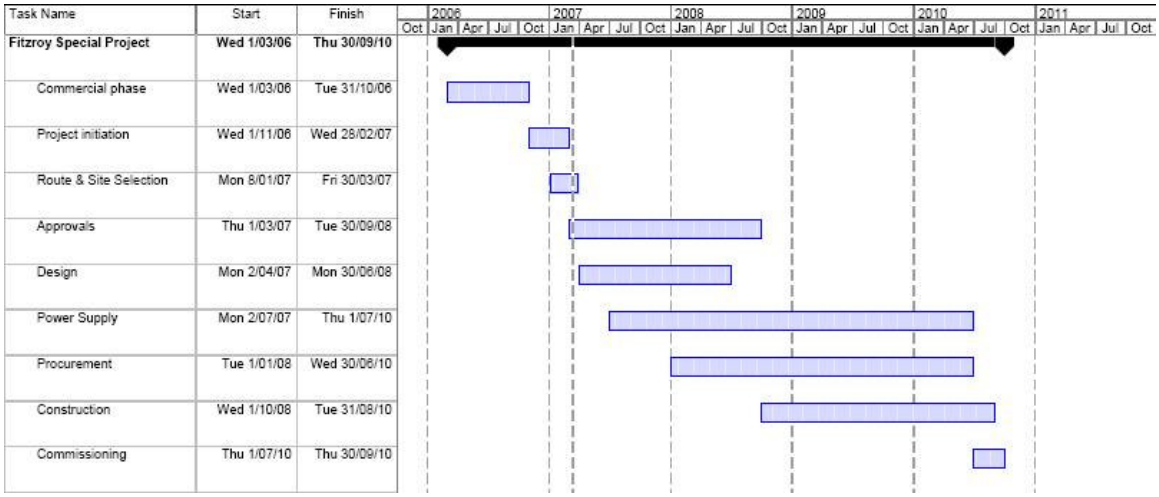
[83] Part D of this submission discusses the nature of work and expenditures incurred to date.

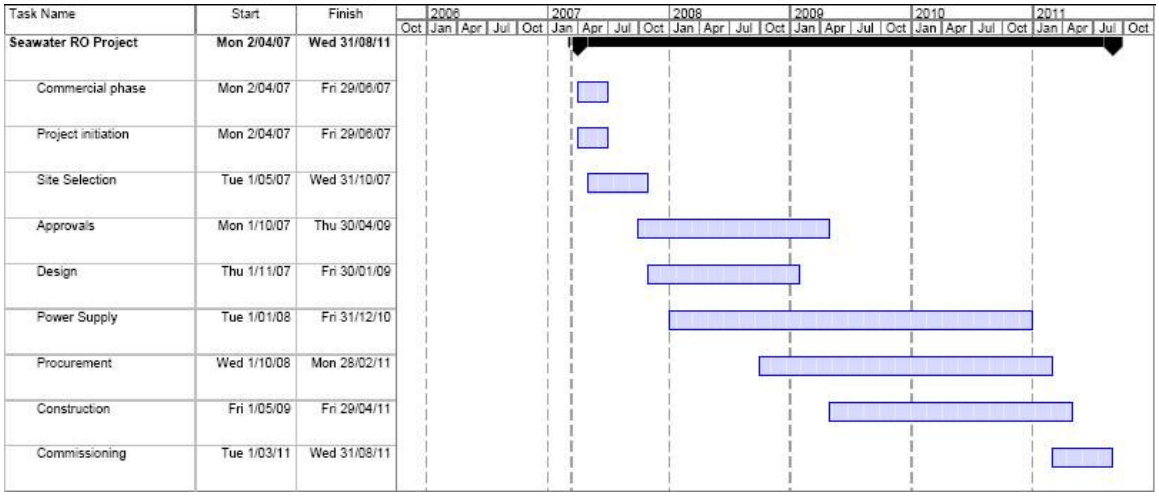
Figure 4.



Task Name	Start	Finish
Fitzroy Special Project	**Wed 1/03/06**	**Thu 30/09/10**
Commercial phase	Wed 1/03/06	Tue 31/10/06
Project initiation	Wed 1/11/06	Wed 28/02/07
Route & Site Selection	Mon 8/01/07	Fri 30/03/07
Approvals	Thu 1/03/07	Tue 30/09/08
Design	Mon 2/04/07	Mon 30/06/08
Power Supply	Mon 2/07/07	Thu 1/07/10
Procurement	Tue 1/01/08	Wed 30/06/10
Construction	Wed 1/10/08	Tue 31/08/10
Commissioning	Thu 1/07/10	Thu 30/09/10

By comparison, seawater desalination could not be delivered until 2011, which may not be soon enough under the current 'worst case' scenarios regarding supply shortfall. A high level indicative program illustrating this, benchmarked against the fast-tracked delivery of the Gold Coast desalination plant, is provided below for comparison.

Figure 5.



Task Name	Start	Finish
Seawater RO Project	**Mon 2/04/07**	**Wed 31/08/11**
Commercial phase	Mon 2/04/07	Fri 29/06/07
Project initiation	Mon 2/04/07	Fri 29/06/07
Site Selection	Tue 1/05/07	Wed 31/10/07
Approvals	Mon 1/10/07	Thu 30/04/09
Design	Thu 1/11/07	Fri 30/01/09
Power Supply	Tue 1/01/08	Fri 31/12/10
Procurement	Wed 1/10/08	Mon 28/02/11
Construction	Fri 1/05/09	Fri 29/04/11
Commissioning	Tue 1/03/11	Wed 31/08/11

10.5.3 Updating cost information from 2004

After the 2004 SWP, GAWB conducted further investigations into the Lower Fitzroy option. Additional information which became available during these investigations, and increases in construction costs, have together resulted in a substantial increase to the estimated cost of this option. Accordingly, GAWB undertook a review of desalination (being the only other option that could be delivered in the timeframe required for a contingency source) as a check against whether the Lower Fitzroy, at the higher cost, was still preferred.

In addition, in a joint exercise undertaken with both CS Energy and Callide Power Management, GAWB also reviewed the costs associated with retro-fitting power stations to air cooling to gauge whether this could be implemented at a materially lower cost, although GAWB recognises it cannot control this option without some form of commercial agreement with the relevant power stations.

The conclusions from this process are that Lower Fitzroy remains the preferred option as discussed in later sections.

The details of the updates to this information are described below.

10.5.4 Lower Fitzroy Option – updated cost estimate

The estimate for the pipeline and associated infrastructure (excluding storage on the Lower Fitzroy) has increased to $317M. Reasons for the increase include:

(a) allowances being made for water treatment and up-front contribution to augmenting the electricity network;

(b) a large increase in construction costs, due to changes in market conditions, benchmarked against similar projects; and

(c) an increased allowance for contingency for the pipeline and associated infrastructure (from 5% to 25% of capital cost).

The capital cost of the new weirs on the Fitzroy River, and GAWB's share of these costs, has also been updated based on the draft CQRWSS.[84] This has been assumed at $28M based on the cost and yield data set out in 2005 in the draft strategy. [85]

The total estimated capital cost of the Lower Fitzroy option is now $345M.

10.5.5 Desalination

Despite desalination's lower ranking in the 2004 SWP, it is the only other option (over which GAWB has control) which can be delivered in the required timeframes.

Hence, it was considered prudent to re-assess the costs of the desalination option as a check against whether the decision to proceed with the Lower Fitzroy option should be revisited.

The outcome of this review was an estimated capital cost for a 30,000ML/annum desalination plant of between $314M to $361M (including 25% contingency) in $2006. For the purposes of this document the mid-point, $338M has been adopted as the estimate. This compared with the SWP estimate for a 20,000ML plant of $117M (in $2002).

The reasons for this increase include:

(a) an increase in capacity of the desalination plant to compare with the 30,000ML Fitzroy Option;

(b) a change in the assumed process requirements from thermal to reverse osmosis; and

(c) updates to construction cost estimates, benchmarked against new desalination projects.

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[84] *Draft Study Report – Central Queensland Water Supply Strategy*. Department of Natural Resources and Water. (December 2005). p 179. Note – this information was not updated in the final report.

[85] This cost has been calculated as the highest of two options. As a 30,000ML share of the 30,300ML raising of Eden Bann Weir ($27,M), and as a 30,000ML share of the 86,300ML from the raising of the weir and development of Rookwood Weir to Stage 2 ($28M).

Whilst this is comparable to the updated capital cost for the Lower Fitzroy ($345M), desalination has far higher operating costs due to the energy costs associated with processing seawater through the plant.

It is also important to note that there is considerably greater confidence in the estimate for the Fitzroy Option due to the work performed to date. Conversely, the desalination estimate has greater scope for error given its purpose was to provide a check against the direction set in 2004, rather than as a detailed comparison.

10.5.6 Retrofitting air-cooling technology

Further data was also gathered for the option of power stations retrofitting air-cooling to reduce water demands to negligible volumes. This information was obtained in the interests of remaining apprised of the comparison between the cost of GAWB's next supply augmentation and how this compares against substitutes available to large customers.

10.5.7 Applying evaluation criteria to updated information

For the purposes of completeness, an updated assessment has been performed of the various options based on more precise threshold criteria regarding time, and updated cost information.

The adoption of the updated timing criteria has the effect of ruling out several options as they could not be delivered with the required timeframes to respond to drought or demand increases.

The capacity for GAWB to control the Lower Fitzroy Option's inception and delivery was also applied as a filter, given the need to make decisions now and move forward rather than relying on a negotiated outcome with a third party as the contingent water source. The outcomes from this are set in the table below.

Figure 6.

	Threshold	AD 45m (inc Rail)	Castle Hope 27m	Castle Hope 35m	Baffle Creek 20m	Baffle Creek 25m	Fitzroy 20-30GL pa	Desal 30GL pa	Seawater cooling - refinery	Air cooling - 60% B+C @ Callide
Volume (Mlpa)		19000	21500	44000	22000	55000	20000-30000	30000	4500	14000
Shortest period (years) to become operational from construction start (*general contingency merit*)	2	10	8.6	12	6.8	7.5	2 [1]	2 [2]	2	1.5
Soonest year to deliver water (*specific contingency merit*)	2010	2019	2018	2021	2016	2017	2010 [1]	2011	2010	2010
Meets general threshold?		No	No	No	No	No	Yes	Yes	Yes	Yes
Meets specific threshold?		No	No	No	No	No	Yes	No	Yes	Yes
GAWB can control? [3]	Yes						Yes [4]	Yes	No	No
Wider regional benefit? [5]							Yes	No	No	No
Diversification benefit? [6]	Yes						Yes	Yes	No	No
CapEx ($m)							252-345	338	85	151
Fixed OpEx ($m p.a.)							3.2-3.8	7.3	?	0.0
Variable OpEx ($m p.a.)							4.7-6.4	9.2	?	4.8
Annualised [7] (total) $/ML (6.3% WACC [8])							1259-1127	1383 *	1520 + ?	1210 **
Risk - to cost [9]							Low	V.High	High	Med
Risk - to time							Med	Med	Med	Med
Risk - reliability							Med	Low	Low	Low
Environmental Impact (SWP 2004)							Some adverse	Min adverse	Min adverse	Min adverse
Social Impact (SWP 2004)							Net benefit	Net benefit	Net benefit	Net benefit
Revised SWP score (approx)		993	1076	1003	1161	1139	1231-1204	1200	-	-
Ranked preference							1	2		

Notes:
1. Assumes water allocations can be traded to GAWB if weirs are not in place.
2. Assumes some significant funds have been committed to procurement of long lead items.
3. GAWB requires certainty of control over inception and delivery, rather than negotiated outcomes, for contingent sources
4. With the exception of the Fitzroy weirs, which have been announced and funding committed.
5. Some options provide or facilitate a potential benefit to Central Queensland that extends beyond the benefit to GAWB and its customers
6. A second source reduces the dependence on a single catchment's hydrology and supply infrastructure. While demand management options can defer another source and improve system drought performance (until load growth erodes the demand reduction), the system is still single source.
7. The cost (real dollars) of water produced over the life of the supply, operating at full capacity over its entire life (calculation including a residual value).
8. 6.3% is real pre-tax and corresponds to a post-tax nominal rate of 8.46%
9. Qualitatively indicates the risk to cost estimates as a combination of level of investigation and the potential impact of changes to assumptions, e.g. no siting or feasibility study has been made for desalination, and both plant and marine costs could rise sharply under different assumptions.
* Full-project estimates of seawater reverse osmosis for *potable production* typically range near $2000/ML
** The report for GAWB & CSE/CPM estimated the cost of water to be around $1500/ML.

In summary, this updated assessment does not provide an imperative to alter the current course of action – to pursue the Lower Fitzroy Option. More specifically, there is no reasonable case to divert from the current course of action (noting the work already performed on the Lower Fitzroy Option) from updated information.

The observations of the Infrastructure and Exports Task of the perils associated with regulatory practice that quests for optimality and precision, rather than reasonable solutions are relevant to the above (refer Part A).

The particular features and benefits of the Lower Fitzroy Option are set out below.

10.6 Lower Fitzroy Option

10.6.1 Introduction

Details of this option are also provided in this section to highlight the various features, benefits, risks and other issues.

10.6.2 Features and benefits

(d) Infrastructure

The Lower Fitzroy Option involves:

(i) a nominal 1000mm diameter pipeline from upstream of the Fitzroy Barrage to the proposed Aldoga Reservoir;

(ii) associated pump stations;

(iii) a terminal storage (being the Aldoga Reservoir);

(iv) a water treatment plant to reduce the turbidity of water delivered to customers to better align with the quality of water from Awoonga Dam; and

(v) contributions to storage infrastructure in the Lower Fitzroy (either up-front or via annual charges) and securing 30,000ML water entitlement.

Water from the pipeline will be integrated into GAWB's existing raw water network from the terminal storage.

(e) Control

GAWB is able to control decisions relating to the construction of the pipeline and progress its development independent of other parties (subject, of course, to approvals).

(f) Core business and economies of scale

Pipeline and treatment infrastructure is core business to GAWB, as it has an existing skill set to operate and manage this infrastructure. This option is therefore low technology/operational risk and improves scale economies for GAWB and diversifies the risk of key infrastructure failure (e.g. pump station).

(g) Source diversification

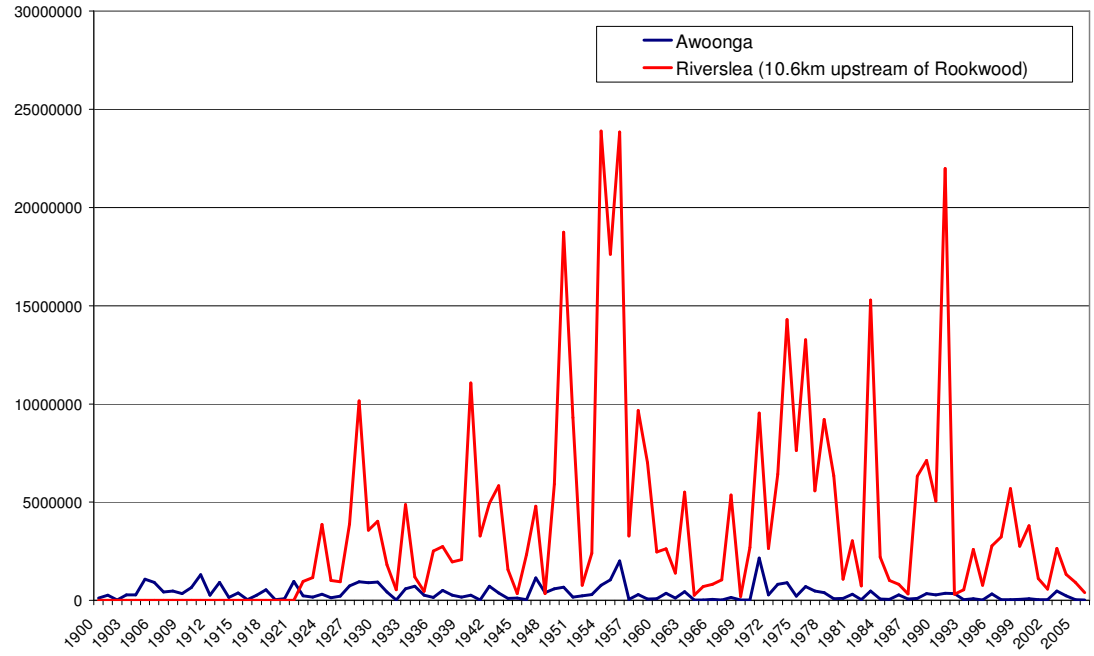
The Lower Fitzroy option diversifies GAWB's drought risk between two catchments – the Boyne (Awoonga Dam) and the Fitzroy. The Lower Fitzroy as at the end of a very large catchment, and hence receives steady inflows, with only relatively small storages available.

This contrasts with Awoonga Dam, which relies on less-frequent, but major, inflow events to provide supply – hence the Dam's storage capacity is nearly 10 times the annual supply.

The following chart illustrates the correlation in annual flows over time to Awoonga Dam and the Lower Fitzroy (upstream of the proposed Rookwood Weir).[86]

[86] No values are presented for Riverslea up to 1922 as no data is currently available for these flows.

Figure 7.



This provides a substantial advantage over other surface water options such as raising Awoonga Dam, and enables the Lower Fitzroy to be comparable (albeit not to the same extent) in terms of adding to the supply reliability for GAWB's customers.

Also, an alternative supply source such as Lower Fitzroy provides an additional benefit in the form of asset redundancy (or complimentary reinforcement). That is, the Lower Fitzroy Option reduces the risk of supply interruption caused by asset or associated failure (e.g. duplication and geographic separation of key pumping infrastructure).

(h) Regional benefits

The pipeline provides the potential for the Lower Fitzroy storages and Awoonga to be managed as a single system. This might, for example, facilitate future arrangements that provide users in Rockhampton and surrounding shires access water from Awoonga Dam in the event of major failure of the Lower Fitzroy.

These benefits can be derived by linking a system that is fed by the largest catchment on the Eastern seaboard, but which has limited long term storage potential (the Fitzroy system) to a system with a relatively limited catchment, but with the 4th largest storage in

the State (the Awoonga system) that can be readily augmented to become the third largest storage.[87]

This has been contemplated in the CQRWSS (see Part A).

The cost impact of providing for a bi-direction flow in the pipeline has been assessed as:

(i) an $8M increase on the base capital cost for enabling items that are not reasonably staged; and

(ii) later capital to construct the required works and modifications once water was required back to the Rockhampton region (these have yet to be assessed in detail).

There are a number of matters that need to be investigated before such a proposal could be considered However the Lower Fitzroy Option provides scope for this to occur if appropriate.

(i) Scalability

The capacity of any pipeline can be increased by allowing for higher operational pressures and/or additional booster pumps and associated increases in treatment capacity, storage volumes, pump station and power upgrades, etc.

Alternative models have been considered using the installation of large diameter pipe (at greater up-front capital cost) thereby reducing pumping costs at the point of augmentation. However, the nominal 1000mm pipeline option was determined as preferred on a whole-of-life basis, and least likely to involve redundant expenditure given the uncertainty of demands beyond an additional 30,000ML/a. [88]

This scalability has an additional benefit regarding drought mitigation if Awoonga Dam approached failure despite the provision of water from the initial 30,000ML/a pipeline. For example, a trigger to install the higher capacity could be set where the dam approached critical levels.

[87] With a capacity of some 1,170,000 Ml

[88] Further information is available on this assessment, if required.

Scalability would of course require access to additional water allocations from the Lower Fitzroy. These could be secured through trading arrangements as the need emerged.

10.6.3 Risks and risk mitigation – sourcing water from the Lower Fitzroy

The major risk associated with this option continues to be gaining access to water from the Lower Fitzroy, and the associated reliance on the construction of one or both of Rookwood Weir and the raising of Eden Bann Weir. Since the SWP in 2004, the State Government has announced funding totalling $22M for Rookwood Weir, and $14M for the Eden Bann Weir raising. Furthermore, Government has sought the completion of both storages by 2011.[89]

The CQRWSS sets out the volumes to be allocated from these developments, setting aside 30,000ML for GAWB.

Nonetheless, construction could be delayed. In such an event (e.g. due to weather or other factors), GAWB can still seek access to water from existing entitlement holders in the Lower Fitzroy under short-term arrangements. The table below lists the various holders of water entitlements in the region.

Table 2. Summary of water entitlement ownership from current infrastructure

Water Storage	Water Entitlement	Owner	Volume (ML)
Eden Bann Weir	High Priority	Stanwell Corporation	24,000
	High Priority	SunWater	233
	Medium Priority	Irrigators	3,100
Fitzroy Barrage	High Priority	Rockhampton City Council	50,000
	Medium Priority	Rockhampton City Council	575
	Medium Priority	Irrigators	11,760
TOTAL (all allocations)			89,668

Source – Resource Operations Plan – Fitzroy Basin.

[89] Taken from the Ministerial media statement found at : http://statements.cabinet.qld.gov.au/MMS/StatementDisplaySingle.aspx?id=45945

11 Ongoing planning and evaluation: Desalination and retrofitting

11.1.1 Introduction

Recent work in updating information highlights the value in the ongoing monitoring of key options to ensure that the proposed supply augmentation is optimal. This is consistent with, for example, the approach taken by Water Corporation in developing a suite of proven supply options to inform future planning and decision making (refer Part A of this submission).[90]

As a result GAWB proposes the following in relation to desalination and retrofitting of dry-cooling processes:

(a) investigations for a desalination plant continue to identify key technical aspects and more fully determine its potential feasibility. A more detailed and costed desalination option provides a simple means to benchmark the Lower Fitzroy and other options into the future, in the event of any changes to circumstances; and

(b) the option for CS Energy and CPM to retrofit air cooling has a number of commercial and technical complexities, with any decision to proceed presently outside the control of GAWB. GAWB intends to continue discussions with these customers to be in a position to better understand and assess both the technical feasibility and commercial appetite for such an arrangement.

11.2 Desalination

Having regard to the need to have another contingent supply identified and capable of ready development upon the Lower Fitzroy option being implemented,[91] it is considered prudent to continue to gather further technical information on the desalination option as part of preparatory expenditure to the contingent source strategy. This will enable future decision making to be more fully informed on the technical and cost aspects of this option, as well as its potential to be delivered with certainty within a defined timeframe.

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[90] Water Corporation Report at p3.

[91] Chapter 9.2 of GAWB's DMP.

Further investigation work will enable GAWB to assess whether desalination could in fact be a suitable future source after assessing more fully threshold matters of feasibility including:

(a) likely sites for the extraction of seawater and disposal of brine;

(b) the water quality features of the seawater and the processes required to produce water of a suitable finished standard;

(c) environmental issues associated with discharging brine and other waste streams;

(d) the availability of a suitable potential site(s) for a desalination plant and associated infrastructure, if required; and

(e) other detailed engineering matters such as connection to the raw water network.

In summary, water supply planning should not end with the selection of a preferred next water source. Rather, the planning process should be dynamic (within reasonable limits of time and cost) and account for change.

Based on current information, there is a strong case to continue to investigate and assess the desalination option (with resultant costs to be included in GAWB's regulatory asset base) so that:

(a) GAWB is in a position to understand whether desalination is feasible (based on more detailed engineering and environmental assessments) and therefore could be relied upon as a secondary measure in times of severe drought;

(b) GAWB and its customers are fully informed of the likely development path for water infrastructure, including future incremental costs of supply; and

(c) future assessments of options can be made on an informed basis and against a relatively simple benchmark.

11.3 Retro-fitting of air cooling at power stations

This option has been assessed as reliably providing up to 14,000ML in water savings from Awoonga Dam.

However, a number of key matters are considered important by GAWB:

(a) GAWB does not control decisions associated with capital investment at these power stations.

(b) there is some uncertainty surrounding the longevity of such a benefit. These power stations will have lives substantially less than the infrastructure associated with the Lower Fitzroy Option; and

(c) reducing demands from Awoonga Dam through these means does not provide improvements to overall system reliability (for Gladstone and CQ). Rather, customers would remain exposed to the drought risks associated with a single-storage system (ie no catchment diversification).

However, this option has merit because of its relatively short lead-time and the present assessment of its cost. Accordingly, GAWB intends to continue to progress discussions with the owners of both power stations at appropriate intervals to assess whether a mutually beneficial proposal may exist, and if so, how it could be established with the high level of certainty required.

12 Need for preparatory expenditure

12.1 Introduction

The Lower Fitzroy option would normally require up to five years to complete from the point of triggering detailed assessments (such as that work already completed as Stage 1). Hence there is a need to undertake preparatory work to reduce critical timeframes and generate greater certainty about its delivery.

In addition, there are benefits associated with further investigating the desalination option to assess whether it could be relied upon, if required, into the future and to rule out major risks to this option including unsuitable seawater quality, environmental issues, locational issues and unforeseen costs.

These are examined below.

12.2 Planning and investigation process

There is a marked difference between high-level planning – which can be used to identify the best supply solutions – and the actual development of a project. Any one of the following factors either individually or in combination – which can only be assessed following detailed investigation - could potentially rule-out or fundamentally change individual options:

(a) environmental impacts and potential mitigating measures (and costs);

(b) detailed engineering assessments such as survey, hydrology and geotechnical investigations;

(c) social impacts and community consultation;

(d) native title and cultural heritage;

(e) connection to infrastructure such as the electricity network;

(f) availability of key materials or suppliers;

(g) land acquisition; and

(h) impacts on third-parties (including relocation of or modification to existing infrastructure).

12.3 Benefits from preparatory expenditure – Lower Fitzroy

12.3.1 Introduction

Where time is limited, a number of items will emerge as being on the 'critical path' to achieving the target delivery date. These critical path items are not always the highest cost to the Lower Fitzroy Option. For example, approvals, procurement, detailed design and land acquisition are almost always on the critical path as they are necessary before a final commitment to the Lower Fitzroy Option's development can be made. These are relatively low cost in the terms of the overall project but undertaking them now will greatly reduce the development timelines if and when the Lower Fitzroy Option is to be implemented as they are removed from the critical path.

Reductions in delivery timing beyond the above 'preparatory' work can become far more costly and at higher risk. For example, fast-tracked development can be purchased at a premium through, for example, increasing number of 'work fronts', hours of construction, accelerated production and delivery of materials. Fast-tracking can also be achieved through paralleling certain activities that would normally occur sequentially – again at higher risk.

In summary, preparatory expenditure enables reductions to development timeframes at relatively low cost compared to the total project.

The benefits arising from such expenditure to advance a 'state of readiness' are significant given the greater certainty they provide, including:

(a) financial benefits to the Lower Fitzroy Option;

(b) reduction in delivery risk; and

(c) economic benefits and option values.

These are considered below.

12.3.2 Financial benefits to the Lower Fitzroy Option

Direct financial benefits arise to the Lower Fitzroy Option from making prudent preparatory expenditure. These mostly relate to avoiding the costs associated with fast-tracking project delivery, including:

(a) premiums paid for expediting the manufacture and/or delivery of long lead time items – for example air freighting overseas manufactured items such as pumps or motors rather than sea freight, or paying premiums to increase output from manufacturers to cover the costs of, for example, increased operating hours for pipe manufacture;

(b) greater cost risk from construction where lesser geotechnical investigations have been performed – for example to avoid underlying rock;

(c) lack of well-defined scope of works, including detailed design and pipeline route, increasing the scope for contract variations and costs associated with route changes;

(d) avoiding the risk of selecting sub-optimal responses given the decision making environment and lack of time for options analysis; and

(e) hastened procurement processes that are likely to lead to less-than-optimal selection of preferred suppliers and associated terms – all other things being equal construction and materials would cost more under a fast-tracked project.

In conclusion, preparatory expenditure provides financial savings to the Lower Fitzroy Option when compared to the alternative approach of fast-tracking decisions and project delivery. The effect of this is a reduction to the net cost of the preparatory work given there is a later benefit. However, there are further strong reasons for undertaking this work.

12.3.3 Reduced timing risks

Targeted preparatory expenditure should reduce the risk of project delay. For example, preparatory expenditure generates better information to identify critical path items and reduces their risks to timing by addressing them in advance.

12.3.4 Economic benefits of preparatory expenditure

Whilst there are clearly direct financial benefits from preparatory expenditure, the economic benefits are far reaching. For example, prudent preparatory expenditure:

(a) ensures proponents of new projects do not select alternate locations on the basis that water supplies were not sufficiently certain;

(b) facilitates improved restriction arrangements – delaying the need for restrictions and reducing their severity;

(c) provides scope to increase the utilisation of storages (or at least reduces the risk arising from a downgrade to water availability from Awoonga Dam) thereby potentially deferring major capital expenditure; and

(d) substantially reduces the risk of supply interruption to customers and the associated costs to the regional and state economy.

GAWB does not propose to undertake a detailed economic analysis of costs and benefits. It is self evident that, given GAWB's customer base, the economic benefits (and avoided costs) are substantial on a local, regional and national level.

PART D – COSTS AND PRICE TREATMENTS

The Terms of Reference require consideration of the costs of preparatory expenditure and the associated pricing treatments.

These matters are considered in the following sections.

13 Regulatory Treatment of Preparatory Expenditure

13.1 Introduction

This section sets out GAWB's proposal for treatment of preparatory expenditure in prices.

13.2 Current Economic Regulation and Pricing Arrangements

GAWB is not subject to ongoing regulatory reviews by QCA. Each pricing investigation is triggered by a separate referral from the QCA Ministers'. GAWB implements those QCA price investigation recommendations which are accepted, either wholly or with modification, by the QCA Ministers'.

GAWB's standard contracts set out a procedure for setting prices. The contract provides for price reviews every five years. The next price review will set prices for the five years from 1 July 2010. In between price reviews, prices are subject to annual CPI increase.

Where the QCA or other relevant economic regulator undertakes a pricing investigation that coincides with a GAWB price review, the pricing investigation outcomes can be used as part of the GAWB price review. In the absence of a specific investigation, GAWB will review prices based on pricing principles contained in the contract.

Whilst there is no formal ongoing economic regulation, the effect of adopting the recommendations of previous QCA pricing investigations is that commercial outcomes (including rate of return, optimisation risk, volume risk and incentives for cost reduction) for GAWB are similar to other price-regulated utilities.

The expected benefits of this investigation by the QCA for GAWB include providing:

(a) a reasonable level of certainty as to regulatory treatment of expenditure in the case of a future QCA price investigation; and

(b) an independent assessment as to the prudence of GAWB's proposed strategy in the event that prices for the next review period are set without a specific investigation by an economic regulator.

13.3 Summary of GAWB's Proposed Regime

GAWB does not propose to modify prices from 1 July 2007.

Instead, the cost of preparatory work for the contingent source strategy will be treated as work in progress (WIP) and rolled-forward (using a cost of capital of 7.73%) until 1 July 2010. The economic costs will then be included in prices from 1 July 2010.

GAWB requests that QCA endorses the following principles for the 2010 price review:

(a) that the contingent supply strategy is appropriate and prudent;

(b) that preparatory expenditure is prudent;

(c) that certain specific types of costs and expenditure (detailed in Section 13.6 below) should be included in GAWB's asset base used to calculate tariffs from 1 July 2010; and

(d) that preparatory expenditure will not subsequently be optimised out of the asset base without compensation to GAWB (always allowing regulators' normal caveat that they haven't been deliberately misled).

The effect of these changes on prices (discussed in more detail in Section 14) will depend on the demand assumptions used to calculate the 2010/11 to 2015/16 prices. However, GAWB's current best estimate, based on demand forecasts used to develop the 2005/06 prices, is an increase in the water reservation and storage price of $51/ML (2010/11 dollars) or 16%. When delivery charges are considered the average price increase to customers in 2010/11 will be approximately 9.1%.

13.4 Actual and Forecast Contingent Source Expenditure

13.4.1 Introduction

By 30 June 2007 GAWB will have spent $2.9m on preparatory work for the Fitzroy River - Gladstone pipeline. In addition GAWB anticipates spending approximately $20.9m in 2007/08.

Table 3 - Forecast Capital Expenditure, Fitzroy River - Gladstone pipeline

Forecast Capital Expenditue ($m)	2006/07	2007/08	Total
Project Management	0.9	2.6	3.5
Approvals	0.9	1.0	1.9
Land Acquisition	0.0	5.1	5.1
Consultation / Communication	0.3	1.3	1.5
Engineering and Investigations	0.9	6.0	6.9
Asset Creation	0.0	5.0	5.0
	2.9	20.9	23.8

13.4.2 Components to preparatory expenditure

The following is an overview of the components to the above forecast expenditure:

(a) Project management

For a large-scale infrastructure project on a relatively tight timeframe, project management across all aspects of work is essential. This entails a range of activities, from coordination and reporting to information and workflow management, to programme analysis and cost tracking. It does not include any overhead costs or other costs already recovered by GAWB in user prices.

(b) Approvals

The cost of obtaining approvals is largely related to preparation of the EIS, and contributory studies. Approvals are on the critical path to the Lower Fitzroy Option and therefore are an essential element of preparatory expenditure.

(c) Land acquisition & Asset Creation

The land acquisition item refers in part to actual acquisition of land or easements by GAWB, and in part to the payment of licence fees to the State for its position in the SDAs (which in turn compensates the State for their land and easement acquisition). The asset creation item refers to early funds required to commence procurement of long lead items, such as power, pipe, pump motors, etc.

Construction cannot, of course, be triggered without having land tenure for the pipeline assets. Also, early procurement of a limited number of items in parallel to the design and approvals processes can shorten the construction period post approvals and therefore delay commitment to full capital expenditure. The very nature of the planning and design

phases of a project means that, whilst it is known that these costs are likely to be required, insufficient information is yet available to allow precise quantification and the estimates are therefore nominal.

(d) Consultation /communications

Consultation is a key requirement of the EIS process and other approvals, and is tightly associated with any and all field studies (e.g. to arrange access to private property). Project communications in this case are extensive, due to the large number of regional and government stakeholders, major customers and the number of directly and indirectly affected landholders and communities.

(e) Engineering and investigations

Whatever the procurement strategy, detailed design by some mechanism is required prior to construction to specify the components to be procured, and the required assets to be built. The cost allowed for this item is based on a percentage of capital cost typically incurred in infrastructure design.

(f) Desalination

GAWB also plans to spend in the order of $1m to assess the feasibility of a local desalination plant and provide a more detailed assessment of likely costs. The major component of this work would be a siting study, since the plant siting is fundamental to estimates of marine works costs, power supply costs, plant site costs, water quality and therefore process plant costs, and network integration costs.

The terrestrial siting considerations would (broadly) include proximity to power, industry, and utilities and services, consider environmental, land tenure, heritage and community constraints, and review access and flooding constraints. The marine considerations would (broadly) include criteria relating to the intake and outfall, and might also require studies such as water quality data review and/or collection, dispersion modelling and conceptual outfall design. Based on this, cost estimates could be revised to a far greater level of confidence than currently exists.

13.5 Regulatory Treatment of Expenditure

GAWB proposes that contingent source expenditure be treated as work in progress (WIP) – representing capital expenditure that is yet to result in a commissioned asset.

WIP is generally treated in one of two ways. Either the regulated business earns a return on the WIP (but no depreciation allowance) or the WIP is rolled-forward at WACC (effectively capitalising the foregone return on investment) until the asset is commissioned (or otherwise rolled into the regulated asset base for pricing purposes). The latter treatment is appropriate in this case because GAWB does not propose to modify prices until 1 July 2010.

GAWB proposes that WIP balance be rolled forward each year using a cost of capital of 7.73%, being the WACC used for striking prices for the current pricing period. This approach provides economic outcomes for both GAWB and customers consistent with what would have resulted had this expenditure been forecast in 2005 as part of the pricing practices investigation.

13.6 Ex Ante Approval of Types of Allowed Expenditure

Where the level and timing of forecast capital expenditure is well understood, the forecast capital expenditure is used to set prices. QCA summarised the process in its recent Dalrymple Bay Coal Terminal (**DBCT**) access undertaking decision

> *'…The traditional approach adopted by the Authority and other Australian regulators to the approval of capital expenditure has been a two stage process. First, the Authority conducts an upfront assessment of the proposed capital expenditure program with the forecast, prudent capital expenditures being included in the initial determination of the reference tariffs. Second, at the end of that term of the undertaking, or regulatory period, the Authority assesses the efficiency of the past capital expenditure program and includes into the asset base all efficiently incurred actual capital expenditure…'*[92]

Where capital expenditure on a particular project is included in forecasts, accepted by the relevant regulator for inclusion in prices and subsequently constructed, there is little risk that expenditure will not be included into the asset base at the next price review.

[92] QCA, DBCT Draft Access Undertaking Final Decision, April 2005, p46

However, where the level and timing of significant items of capital expenditure is uncertain, these items of forecast capital expenditure may be excluded from the initial price setting activity. Similarly, as is the case with GAWB's proposed expenditure, there are occasions where significant items of capital expenditure are not forecast at the time of a price review, but subsequent analysis or events reveal that the expenditure is required before the next price review. In these cases, the regulated business has much less certainty that the expenditure will be accepted by regulator at the next review.

This uncertainty is undesirable for both customers and regulated businesses. Undesirable outcomes for customers occur when necessary infrastructure is not constructed (or delayed) because the regulated business is concerned that the investment will not be rolled in. Similarly, undesirable outcomes for regulated businesses occur when regulators fail to allow (or delay) roll-in of expenditure resulting in insufficient returns to the business.

Regulators are generally reticent about binding their future conduct. However, regulators also understand the importance of regulatory consistency in facilitating appropriate levels of investment and providing the lowest sustainable prices (since price is a function of risk). Therefore, while preserving their right to revisit approvals if they have been misled, most regulators are willing to provide a level of ex ante approval of expenditure to provide comfort to regulated businesses that a reasonable return on investment can be expected.

Indeed, the QCA recently agreed to guarantee roll-in of certain DBCT[93] and Queensland Rail[94] investments provided that certain criteria were met. In both cases these criteria largely related to the investment process (majority customer agreement, competitive tender of capital work, etc.) as described in the box below.

93 *Supra No.* 99 chapter 4.2

94 QCA, Queensland Rail, 2005, Appendix 2

Box 1 Ex Ante regulatory approval of capital expenditure by the QCA

The QCA has recently approved access undertakings for the Dalrymple Bay Coal Terminal (DBCT) and Queensland Rail (QR) which have included principles and detailed guidance regarding regulatory approval of capital expenditure. The key principles established are that the QCA will accept capital expenditure into the regulatory asset base if it determines that it is prudent in regard to the scope, standard and cost of works.

Detailed guidance is given as to what the QCA will regard as prudent. For example, for DBCT, the QCA will accept capital expenditure if it is satisfied that:

- the scope of the works is consistent with the current approved Master Plan;
- the standard and specification of the works is appropriate;
- the 60/60 requirement has been complied with (i.e.. DBCT Management has secured firm contracts for a 10 year period for at least 60% of the proposed capacity increment and 60% of existing users do not oppose the expansion); and
- the works were undertaken in accordance with an approved tender contract management process (TCMP).

A similar framework applies in QR's access undertaking, with the QCA committing to accept capital expenditure into the asset base where it determines it is prudent having regard to scope, standard and cost (although there are differences in the detailed framework).

Both the DBCT and QR access undertaking include scope for obtaining ex-ante approval by the QCA in regard to elements of the above framework, such as the scope of works and, in the case of DBCT, approval of the tender contract management process (TCMP).

Prudency in scope

Prudency in the scope of works will be assessed having regard to its acceptance by customer groups or whether it can be demonstrated to be reasonable based on the circumstances at the time. There is scope for obtaining ex-ante approval of the works:

- QR – QCA will give ex-ante approval where the scope of the capital expenditure – to be outlined in a Coal Master Plan - is accepted by 60% of the relevant customer group. QR must establish a Coal Master Planning Forum for this purpose;
- DBCT – QCA will accept the scope of a proposed expansion if it is satisfied it is consistent with the current approved Master Plan.

Prudency in standard

Prudency in the standard of the works relates to whether the standard and specifications of the works is appropriate:

- QR – QCA will accept the standard as prudent if QR can demonstrate that it has reasonable grounds for its design; or the proposed works are consistent with the standard of existing infrastructure with similar usage which has previously been accepted by the QCA;
- DBCT – QCA will review the standard and specifications of the works and all relevant contract terms to ensure they do not involve any unnecessary works or contain design standards that exceed those necessary to comply with contractual agreements or are not likely to materially adversely impact on a prudent balance between price and risk.

Prudency in cost

Prudency in cost encompasses as assessment of a range of factors. The QCA has provided scope for pre-approval of procurement processes:

- QR – the QCA will accept costs as prudent having regard to a number of factors, including: QR's Network Asset Management Plan; Coal System Master Plan; the scale, nature and complexity of the works; prevailing market conditions; and QR's Procurement Policy (if approved by the QCA);
- DBCT – the QCA will accept capital expenditure as prudent where, among other things, the capital works were undertaken in accordance with an approved TCMP or were otherwise reasonable;
  - QCA will approve DBCT Management's TCMP if it is satisfied it is consistent with a number of principles, including: if it is accordance with good industry practice; it will generate an efficient and competitive outcome; it will avoid conflicts of interests; it is prudent in the circumstances; and it will avoid unreasonable exposure to contract variation claims. The undertaking includes considerable detail on the assessment and approval of the TCMP.

the QCA will accept that the value of a contract as awarded is prudent and will include it into the regulated asset base if: the QCA has approved the TCMP; the QCA is satisfied contract provisions regarding variations and escalation accord with good commercial practice; and an auditor (approved by the QCA) certifies that the tender has been conducted in accordance with the approved TCMP.

GAWB submits that the SWP process and this QCA investigation are appropriate processes to conclude that the proposed preparatory expenditure is prudent.

GAWB requests that QCA provides ex ante approval for certain types of expenditure over the next three years. That is, GAWB requests that QCA confirms that prices that charged from 1 July 2010 should take into account certain types of investment in the contingent source (subject only to a test that the standard of the works is appropriate in that the proposed works do not involve any unnecessary works and are not over-designed).

Further, GAWB requests that QCA confirms that it is prudent for GAWB to undertake the specific types of expenditure outlined at section 13.4.2 with respect to the Lower Fitzroy Option and such other types of preparatory expenditure that GAWB can demonstrate is reasonably necessary to have the Lower Fitzroy Option capable of completion within 24 months.

GAWB also proposes to conduct a preliminary investigation to establish the feasibility and cost of a desalination plant. GAWB requests that QCA specifically confirm that the types of expenditure outlined at section 13.4.2(f) are prudent.

GAWB does not request an ex ante approval of expenditure levels to be included in prices. An ex post review before the 2010 price reset could be used to confirm that expenditure levels were appropriate. GAWB is merely seeking to minimise investment risk by obtaining confirmation that categories of expenditure are appropriate.

GAWB accepts that GAWB, not customers, should bear the risk of inefficient expenditure. For example, GAWB should not be able to automatically pass on to customers the cost of land purchases where the price paid is significantly higher than valuation. However, GAWB submits that necessary land purchases per se should be accepted as prudent with roll-in optimisation limited to the efficiency of the amount paid.

13.7 Ex Post Roll-in of Phase 2 Actual Expenditure

GAWB proposes that the QCA now endorses future roll-in of prudent preparatory expenditure on a supply from the Fitzroy River and investigation into the feasibility of construction of a desalination plant in the Gladstone region. Specifically, GAWB proposes that QCA endorses roll-in of actual investment in the contingent source subject only to a test that:

(a) the standard of the works is appropriate in that the proposed works do not involve any unnecessary works and are not over-designed; and

(b) the cost of the works is reasonable [within that context, efficient].

For the avoidance of doubt, GAWB seeks to exclude a test that preparatory work itself (as opposed to its cost) was necessary or prudent. This investigation is the appropriate forum for establishing that the contingent source strategy (with supply available within 24 months of a trigger) is prudent and that preparatory work is necessary to achieve a 24 month lead time target.

13.8 Future Optimisation of Phase 2 Expenditure

It would not promote investment or provide regulatory certainty if the QCA were to conclude that preparatory expenditure on a supply from the Fitzroy River was prudent in 2007 but then optimise out investment made in a subsequent review without compensation to the service provider.

GAWB proposes that QCA confirms that if the preparatory work for the Fitzroy River – Gladstone pipeline becomes redundant (for example, because desalination becomes the preferred contingent supply), then GAWB would be compensated for the optimisation out of the WIP or RAB of the remaining capital balance. Specifically, GAWB proposes that any write-off is treated as a depreciation expense recoverable through tariffs.

This approach would be consistent with that previously endorsed by QCA:

> '*…A key issue in applying* brownfields *optimisation is that over time, assets that, even if initially prudent and optimal, may become redundant or sub-optimal due to changes in technology, demand expectations or other circumstances. The Authority's general approach is not to optimise these investments without some form of compensation to the service provider unless the regulator had previously been misled in some way, if there are actual bypass options or other issues in relation to customers' capacity to pay, or in order to promote outcomes in downstream or upstream markets that are consistent with those of properly functioning competitive markets…'*[95]

[95] *Supra No.* 63 p72

14 Recovery of Preparatory Costs through Prices

GAWB proposes to recover Phase 2 costs incurred in the current pricing period from 1 July 2010. This section provides an indicative assessment of the expected affect of forecast expenditure on prices.

14.1 Objectives of Pricing

In their 2005 review the QCA stated:

> *'…To be consistent with the regulatory objectives, prices should reflect efficient outcomes, provide GAWB with revenues necessary to promote sustainable investment and take account of the public interest…'* [96]

To achieve these objectives, the QCA recommended[97] that GAWB should apply a two-part tariff structure for each of storage and delivery services. Each two-part tariff consists of a fixed ("access") component and volume-dependent ("volumetric") component. The volumetric component is set to recover the LRMC of the service. The access component is set to recover GAWB's remaining economic costs.

14.2 Cost Allocation Principles for Phase 2 Costs

In the case of drought, all customers benefit from the timely supply from an alternative source that reduces the risk of supply failure. Similarly all customers benefit if the preparatory expenditure – which enables shorter lead time – allows delay of triggering the full construction beyond a significant rainfall event.

In the case of demand-triggered augmentation, the QCA has already stated that:

> *'…as a general principle, the cost of common infrastructure should be allocated to all existing and expected new customers, provided the costs represent the least cost option to meet projected demand…'* [98]

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[96] *Supra No.* 62 at p36

[97] *ibid* at p40

[98] *ibid* at p64

Because the benefits of the Lower Fitzroy Option are seen by all customers, GAWB proposes to recover project costs through the water reservation and storage charge, which is payable by all customers.

The efficiency and public interest principles discussed above are best served by setting the volumetric component of tariffs equal to the LRMC of capacity.[99] Because the capital expenditure is "capacity enhancing", under AIC method of calculating LRMC the additional costs will increase the volumetric price (rather than access price).

14.3 Estimating the Effect of Phase 2 Costs on Prices from 2010

To estimate the effect of Phase 2 costs on prices from 2010, GAWB used the 2005 pricing investigation model (including 2005 demand) modified only for:

(a) the subsequent purchase of Calliope Shire Council's North Industrial zone assets and transfer of customers directly supplied from these assets to GAWB; and

(b) sale of some assets in the Calliope and Mt Larcom zones to Calliope Shire Council.

Into this model GAWB has added the proposed Phase 2 capital expenditure. The forecast capital expenditure (including $1m on investigation of the feasibility and costs of desalination) is included in the table below.

Table 4

Forecast Capital Expenditue ($m)	2006/07	2007/08
Real (2006/07 Dollars)	2.9	21.9
Nominal	2.9	22.5

As discussed above the capital expenditure is treated as WIP – there is no depreciation or revaluation but the expenditure is inflated at the normal return on investment rate until 1 July 2010. From 1 July 2010 the expenditure is rolled into the regulated asset base and is depreciated over its expected economic life.

The table below shows the forecast water reservation and storage price for the period 2010/11 to 2015/16.

[99] *ibid* at p38

Table 5

Price excl. Contingent Source	2010/11	2011/12	2012/13	2013/14	2014/15
Access Price ($/ML)	292	299	307	314	322
Volumetric Price ($/ML)	20	21	21	22	22
	312	320	328	336	344

The table produced below shows the price path resulting from including a return on forecast capital expenditure. The price effect of including the capital expenditure is to increase the water reservation and storage charge by $51/ML (2010/11 dollars) or 16%. When delivery charges are considered the average price increase to customers in 2010/11 will be approximately 9.1%.

Table 6

Price incl. Contingent Source	2010/11	2011/12	2012/13	2013/14	2014/15
Access Price ($/ML)	292	299	307	314	322
Volumetric Price ($/ML)	71	73	75	77	78
	363	372	381	391	401

For the avoidance of doubt, the price increase discussed above recovers only a return on the preparatory expenditure. If pipeline construction is triggered, a significant additional price increase will be required.

14.4 Pricing of a Multi-source System

Pricing arrangements for the multi-source system that would exist after construction of the next source will discussed in a future submission.

14.5 Trigger Points for construction

It is noted that the QCA's referral includes GAWB's proposed criteria for triggering construction of appropriate augmentation. This will be the subject of a separate submission to the QCA.

15 Conclusion

As a water supplier, GAWB faces a demand and supply environment that presents a number of challenges:

(a) recent history has shown that severe drought events can occur, and occur to an extent that could severely impact on GAWB's customers;

(b) these customers require highly reliable water and generally cannot tolerate severe or prolonged restrictions – some users cannot manage any restrictions at all;

(c) there are numerous projects in the region that may or may not proceed to development. This is difficult to predict with any certainty and, moreover, these projects require water within the same window to their commissioning and development;

(d) the lead time for new infrastructure responses could be expected to take around five years in the absence of preparation.

The development of a contingent source strategy is a prudent measure to deal with this environment – it is also emerging as industry standard in major urban and industrial centres. In order to have contingent sources available within the timeframes required to meet new demands and/or respond to drought, a two-year window is required for development.

The alternative to taking forward-looking and dynamic approach is to simply await the onset of a severe drought and response through restrictions and/or fast-tracked projects. These are sub-optimal outcomes in terms of GAWB's customers who wish to be assured about their long-term water supply.

The inclusion of preparatory expenditure in users prices will only have a mild effect relative to the costs of their existing water supplies, and inputs generally.

Glossary

Term	Meaning
Act	Water Act 2000
AHD	Australian height datum – survey reference to a level of height to a standard base level
AIC	Average Incremental Cost
Board	GAWB
BSL	Boyne Smelter Limited
CQRWSS	Central Queensland Regional Water Supply Strategy
DBCT	Dalrymple Bay Coal Terminal
DMP	Drought Management Plan
DNRW	Department of Natural Resources and Water
EC Report	Exceptional Circumstances Report
EIS	Environmental Impact Statement
ERA	Economic Regulatory Authority
Fitzroy ROP	Fitzroy Resource Operations Plan
GAWB	Gladstone Area Water Board
GEIDB	Gladstone Economic and Industry Development Board
GSDA	Gladstone State Development Area
HNFY	Historic No Failure Yield
LRMC	Long Run Marginal Cost
Minister	Minister for Natural Resources and Water
QAL	Queensland Alumina Limited
QCA	Authority or Queensland Competition Authority
RAB	Regulated Asset Base
ROL	Resource Operations License
ROP	Boyne River Basin Resource Operations Plan

Term	Meaning
SAMP	Strategy Asset Management Plan
SDAs	State Development Areas
SWP	Strategic Water Plan
WACC	Weighted Average Cost of Capital
WIP	Work in Progress
WRP	Water Resource (Boyne River Basin) Plan