QUEENSLAND COMPETITION AUTHORITY

Final Report

Gladstone Area Water Board: Investigation of Pricing Practices

March 2005

Queensland Competition Authority

Final Report

Gladstone Area Water Board: Investigation of Pricing Practices

March 2005

Level 19, 12 Creek Street Brisbane Qld 4000
GPO Box 2257 Brisbane Qld 4001
general.enquiries@qca.org.au
www.qca.org.au

PREAMBLE

Direction

On 16 April 2004, the Premier and the Treasurer directed the Authority to review the pricing practices applied by the Gladstone Area Water Board (GAWB) to its bulk water activities.

The direction was made under the provisions of the *Queensland Competition Authority Act 1997* that require the Authority to ensure that a monopoly service provider does not abuse its monopoly power.

The Authority was not directed to set prices for GAWB's customers although it was directed to advise customers on a confidential basis of the maximum indicative price GAWB would be entitled to charge under the pricing practices recommended by the Authority.

Submissions

Since the release of its Draft Report, the Authority has received, and considered, a wide range of submissions, the consideration of which has resulted in the issue of this the Final Report of the Authority on the matter.

Pricing Practices

No substantive changes are proposed to the pricing practices recommended in the Draft Report, except in relation to the framework for monitoring GAWB's pricing practices.

The recommended pricing practices allow GAWB to recoup reasonable costs for operations, maintenance and depreciation, and also enable it to earn a fair return on its assets.

The recommended pricing practices have regard to efficient costs, capital contributions where relevant, and available water supply and demand estimates. This approach provides GAWB with the incentive to invest in appropriate infrastructure, while ensuring that customers only pay prices commensurate with efficient service delivery.

Thrust of Recommendations

In general, the application of the recommended pricing practices will result in GAWB being entitled to charge higher prices than in the past.

The main reasons for the increase are the reduction in the reliable yield of Awoonga Dam resulting from the review of the hydrology after the recent drought, and a reduction in anticipated demand. Put simply, the dam can no longer reliably provide the volume of water it was previously expected to provide. While the reduction in demand has resulted in the deferral of some capital expenditure over the 20 year planning period, to the benefit of customers, the costs associated with the dam have not decreased in proportion to the change in demand.

The maximum indicative prices advised to customers do not reflect the commercial judgements and public interest considerations which GAWB is required to take into account in setting actual prices. Actual prices may differ from the maximum indicative prices. Where higher service quality is sought by users, it can be expected that prices will be commensurately higher.

The actual prices will also need to reflect changes in the risk free rate between 4 March 2005 when they were calculated for the purposes of this report and 1 July 2005 which is the date on which prices are to be set by GAWB.

The recommended pricing practices apply only to GAWB's prices and not to those of the Gladstone City and Calliope Shire Councils. The Councils have the discretion under the *Local Government Act 1993* to set rates and charges as they see fit. This discretion is evident in the case of the Calliope Shire Council which currently has set a significantly higher fixed cost charge for Mt Larcom residents ($428) than it has for other residents in the Shire ($154).

Lack of Information

The Authority's investigations have been hampered by a lack of historical records in respect of many key issues and by the late production of relevant documents despite repeated earlier requests by the Authority for all relevant information to be made available to it.

It appears to the Authority that inadequate resources may have been applied by some key stakeholders to enable the provision of relevant information to the Authority in a timely manner. This was evidenced by the fact that a good deal of relevant information was not provided to the Authority until after the delivery of the Authority's Draft Report.

The efficacy of Authority's determinations on this and all other matters with which it deals is heavily dependent on the timely provision of relevant information.

It is likely there is information relevant to the issues the subject of this Report that has not yet been provided to the Authority. To the extent such information is later provided, it may be necessary to realign prices to reflect that information.

Mt Larcom

The difficulty caused by the provision of inadequate or deficient information was bought into sharp focus in dealing with the matter of pricing with respect to the Mt Larcom area.

Subsequent to the release of the Draft Report, two key pieces of information were provided to the Authority that significantly changed the Authority's understanding of the issues.

The previously unadvised information was to the effect that (i) there was an agreement that water supplied to Mt Larcom was to be pooled with other Calliope Shire and Gladstone City water; and (ii) there was an agreement with Cement Australia that water supplied to Mt Larcom was to benefit from the capital contributions made by Cement Australia towards key pipeline infrastructure and that Cement Australia would assume responsibility for the operating costs associated with that infrastructure.

Had this information been originally provided to the Authority, the issues regarding Mt Larcom would not have arisen and unnecessary distress to Mt Larcom residents would have been avoided. That said, the Draft Report was intended to draw out stakeholder concerns and any additional relevant information.

Prices to Councils and Pooling

In this Final Report, it is recommended that Calliope Shire Council be charged only one price for water. The impact of including water supplied to Mt Larcom in that price adds less than 1% to the price.

So far as the issue of price pooling between Gladstone and Calliope Councils is concerned, the Authority notes there is a dispute between those Councils regarding the arrangements. There is a lack of evidence in the form of agreements, documentation, etc as to the position agreed by the two Councils.

The Authority considers that the issue of price pooling is a matter for the relevant parties to determine. The Authority will support whatever arrangements are agreed between those parties. At the same time, the Authority is of the view that, on the balance of probabilities, there is an agreement to pool prices between GCC and CSC.

TABLE OF CONTENTS

PAGE

GLOSSARY **VII**

EXECUTIVE SUMMARY **IX**

1. BACKGROUND **1**
1.1 The Direction 1
1.2 Background 2
1.3 Scope of the Current Investigation 2
1.4 Monopoly Prices Oversight 2
1.5 Maximum Indicative Prices 2
1.6 Limitations 3
1.7 Approach to the Investigation 3
1.8 Structure of the Report 5

2. BUSINESS OVERVIEW **6**
2.1 Nature and Scope 6
2.2 Assets 6
2.3 Customers 7
2.4 Commercial Arrangements 7

3. REGULATORY FRAMEWORK **13**
3.1 Regulatory Framework 13
3.2 Objectives of Monopoly Prices Oversight 13
3.3 Approach to Regulation 15
3.4 GAWB's Commercial Risks 15
3.5 Customers' Commercial Risks 21
3.6 Allocation of Risks 21
3.7 Form of Regulation 23
3.8 Establishing Price Caps 32
3.9 Regulatory Review Period 34

4. PRICING FRAMEWORK **36**
4.1 Regulatory Pricing Objectives 36
4.2 Efficient Pricing 37
4.3 Application of Two Part Tariffs to GAWB 43
4.4 Differential Pricing 50

4.5 Adjustments for Capital Contributions and Contributed Assets 67
4.6 Pricing for Exceptional Circumstances (including drought) 71
4.7 Transitional Pricing 75

5. GAWB'S WATER SUPPLY AND DEMAND 77
5.1 Supply 77
5.2 Demand 81
5.3 Supply and Demand 86

6. ASSET BASE 88
6.1 Background 88
6.2 Approach to Asset Valuation 88
6.3 Approach to Revaluation 90
6.4 Optimisation 93
6.5 Valuation of Other Assets 96
6.6 Estimating DORC for GAWB 98
6.7 Other Asset Valuation Matters 110

7. RATE OF RETURN 112
7.1 Introduction 112
7.2 Overview of the Authority's Approach 113
7.3 Cost of Capital for GAWB 115
7.4 Summary of WACC Parameter Values 131

8. RETURN OF CAPITAL 132
8.1 Background 132
8.2 Approaches to Return of Capital 132
8.3 Renewals Annuity 134

9. OPERATING COSTS 140
9.1 Background 140
9.2 Cost Allocation 140
9.3 Efficiency of Operating Costs 142
9.4 Efficiency Carryover Mechanisms 148

10. ONGOING REGULATORY ARRANGEMENTS 151
10.1 Ongoing Regulation 151
10.2 Loss of Monopoly Status 151
10.3 Responses to Changes in Circumstances 152
10.4 Pricing Adjustments 155
10.5 Monitoring Framework 158

11. IMPLICATIONS OF PROPOSED REGULATORY AND PRICING ARRANGEMENTS 163
11.1 Introduction 163
11.2 Aggregate Revenue Projections 163
11.3 Implications for Pricing Arrangements 164
11.4 Implications for GAWB's Financial Viability 167
11.5 Public Interest 168

APPENDIX 1 – ESTIMATING LONG RUN MARGINAL COST 174

REFERENCES 177

GLOSSARY

ACG	Allens Consulting Group
AIC	Average Incremental Cost
Capex	Capital Expenditure
CAPM	Capital Asset Pricing Model
COAG	Council of Australian Governments
CPI	Consumer Price Index
CPM	Callide Power Management
CSC	Calliope Shire Council
DBCT	Dalrymple Bay Coal Terminal
DORC	Depreciated Optimised Replacement Cost
DRC	Depreciated Replacement Cost
DMP	Drought Management Plan
DNRM	Department of Natural Resources and Mines
DSD	Department of State Development
ECM	Efficiency carryover mechanism
FOI	Freedom of Information
FSL	Full Supply Level
GAWB	Gladstone Area Water Board
GCC	Gladstone City Council
GSL	Guaranteed Service Level
HNFY	Historic No Fail Yield
LRMC	Long run marginal cost
MJA	Marsden Jacob Associates
ML	Megalitre
MRR	Maximum Revenue Requirement
NPV	Net Present Value
Ofwat	Office of Water Services, UK
OTTER	Office of the Tasmanian Energy Regulator
QAL	Queensland Alumina Limited
QCA Act	Queensland Competition Authority Act (1997)
QER	Queensland Energy Resources
ROP	Resources Operations Plan

SMEC	Snowy Mountains Engineering Corporation
the Authority	The Queensland Competition Authority
WACC	Weighted Average Cost of Capital

EXECUTIVE SUMMARY

Ministerial Direction

On 16 April 2004, the Premier and the Treasurer directed the Authority to investigate the pricing practices relating to the declared activities of GAWB and investigate an appropriate framework for monitoring pricing practices including prices and contractual arrangements.

The Authority's Previous Investigation

In September 2000, the Ministers declared, under the *QCA Act 1997,* the bulk water storage, delivery and treatment services undertaken by GAWB to be government monopoly business activities and directed the Authority to undertake an investigation of GAWB's pricing practices.

The Authority recommended pricing practices for GAWB in its September 2002 Final Report *Gladstone Area Water Board: Investigation of Pricing Practices*. The Ministers accepted the Authority's recommendations.

Structure of the Report

The Final Report is structured as follows:

- Chapter 1 – Ministerial Direction and the process of the investigation;
- Chapter 2 – overview of GAWB's business and contractual arrangements;
- Chapter 3 – the regulatory framework;
- Chapter 4 – pricing framework for GAWB;
- Chapter 5 – GAWB's projected demand and water supply;
- Chapter 6 – GAWB's regulatory asset base;
- Chapter 7 – cost of capital for GAWB;
- Chapter 8 – return of capital for GAWB;
- Chapter 9 – efficient operating costs for GAWB;
- Chapter 10 – ongoing regulatory arrangements; and
- Chapter 11 – implications of the proposed regulatory and pricing arrangements for GAWB.

Key Findings and Conclusions

Regulatory Framework

Objectives of Monopoly Prices Oversight: Monopoly prices oversight is intended to ensure that a regulated entity does not abuse its monopoly power. Effectively, pricing practices should result in prices which do not exceed a level necessary to achieve economic efficiency and revenue adequacy, and promote the public interest. Actual prices charged by GAWB will be determined by GAWB on a commercial basis in conjunction with its customers. In setting actual prices, GAWB, as a bulk water supplier to a small number of customers, may take

account of a wide range of factors that may be specific to each customer. These may include existing contractual arrangements, past pricing agreements, service quality standards and public interest matters.

Approach to Regulation: The current hybrid approach to price regulation, combining cost-of-service and incentive regulation, should be retained for GAWB.

Customers' Commercial Risks: Customers are best placed to assess their own demand for water from GAWB.

Allocation of Risks: Risks should be allocated to those parties best able to manage them. In GAWB's circumstances:

- demand risk is best managed by relevant customers;
- planning and infrastructure risks are best managed by GAWB, as the owner and manager of infrastructure;
- hydrology risk is not manageable by any party as it is essentially unpredictable and the costs of changes should be to the account of customers;
- drought risk is best allocated to GAWB as it is in the best position to manage overall supply options and any relevant restrictions;
- water quality risk is best managed by GAWB; and
- financial risk is best managed by GAWB.

The Authority considers that:

- contractual arrangements should be put in place which promote the efficient allocation of risks;
- GAWB should facilitate the tradeability of contracted amounts between customers; and
- GAWB should exercise its discretion to vary contracted amounts upon request by customers. However, GAWB should not unilaterally vary contracted amounts.

Form of Regulation: The Authority recommends that price cap regulation be maintained as a means of ensuring GAWB has the incentive to put in place appropriate contractual arrangements to effectively manage demand risk.

Planning Period: A planning period of 20 years is appropriate for GAWB.

Approach to Estimating Price Caps: A cashflow model should be adopted to calculate GAWB's maximum revenue requirement (MRR).

Regulatory Review Period: A five year regulatory review period should be adopted.

Pricing Framework

Efficient Pricing: Prices should incorporate the LRMC of providing infrastructure services.

Tariff Structures: GAWB should apply a two part tariff structure for each of storage and delivery services. The components of that structure should be held constant in real terms over a regulatory period.

Estimating LRMC: The Authority recommends that LRMC be estimated by using the Average Incremental Cost (AIC) method.

Application of Two Part Tariffs to GAWB: It is recommended that:

- two-part tariffs be applied separately to storage and delivery services for each customer;
- a 100% take-or-pay component should be incorporated in access charges based on contracted volumes. GAWB should be able to vary contracted volumes at its discretion in response to customer requests;
- where actual demand exceeds the contracted volume for industrial customers, unless otherwise negotiated with GAWB, an additional load factor or penalty charge of:
  - 25% apply to the total charge for incremental volumes where actual consumption is between 110% and 125% of the contracted amount;
  - 50% apply to the total charge for incremental volumes where actual consumption is higher than 125% of the contracted amount; and
- where actual demand exceeds the contracted volume for Council customers, unless otherwise negotiated with GAWB, a load factor or penalty charge of 10% apply to the total charge for incremental volumes where actual consumption exceeds 125% of the contracted amount.

Geographic Differentiation: Prices should be differentiated for all customers according to their utilisation of specific components of GAWB's infrastructure network.

Differentiation between Councils: The Authority considers that the issue of price pooling is a matter for the relevant parties to determine. The Authority will support whatever arrangements are agreed between those parties. At the same time, the Authority is of the view that, on the balance of probabilities, there is an agreement to pool prices between GCC and CSC.

Based on the information supplied since the Draft Report was released, the Authority recommends that CSC be charged only one price for treated water, including water supplied to Mt Larcom residents, and that the price take account of the capital contributions made by Cement Australia as well as the arrangements with Cement Australia regarding operating and maintenance cost of the relevant infrastructure.

Differentiation between Existing and New Customers: 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. Access charges and queuing strategies proposed by GAWB are, in principle, valid commercial arrangements.

Differentiation on the basis of Supply Reliability and Service Standards: Prices should reflect service quality to the extent this involves cost differentials, and GAWB should develop full product descriptions for contractual purposes, in conjunction with its customers.

Other Price Differentials: The Authority recommends that price differentiation on the basis of credit risk, length of contract and for other differences is appropriate to the extent the proposed

response is commensurate with the cost/risk of service provision and that any such arrangements should be subject to regulatory oversight.

Adjustments for Capital Contributions and Contributed Assets: The Authority considers that:

- contributed assets should be recognised where there is appropriate evidence of a contractual or policy nature, provided the contribution is not a prepayment for services; has not been fully repaid or rebated; and the associated assets have not expired or have been replaced at the service provider's expense;

- where contributed assets are recognised, they should be included in the asset base for the purpose of determining the revenue requirement and prices;

- unless otherwise specified, rebates for future contributed assets should include the return on capital and return of capital components, provided their contribution was intended to reduce prices in this manner;

- in some circumstances, particularly where contracts stipulate, the rebate may be equal to the return on capital component only; and

- where a capital contribution attracts a tax liability, the net cost should be included in customers' charges.

Pricing for Exceptional Circumstances including drought: The Authority considers that:

- prices should incorporate the costs of investment, operational and managerial responses where:

  – the risk is commercially relevant;

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

  – GAWB is the most appropriate party to bear the risk; and

  – the response is cost-effective;

- higher prices are justifiable during droughts to promote efficient water use. However, where they are not cost related, and other resource rent arrangements are not applicable, the revenues should be returned to users at a later stage on the basis unrelated to the volume actually saved by a customer; and

- until GAWB releases its Drought Management Plan, no provision be provided in prices for related costs.

Transitional Pricing: Price transitioning is appropriate for significant price increases, having regard to the provider's financial viability and users' capacity to pay.

GAWB's Water Supply and Demand

Supply: Planning and prices for services provided by Awoonga Dam should be based on the most recently established historic no failure yield (HNFY) of 78,000ML.

Demand: For pricing purposes, the demand scenario for the regulatory pricing period commencing 1 July 2005 should reflect anticipated customer contractual requirements and allow an amount for future unknown demand nominated by GAWB. The Authority has adopted the demand estimates provided by MJA, with adjustments as advised by individual customers since the Draft Report, for the purposes of estimating maximum indicative prices.

Regulatory Asset Base

Approach to Asset Valuation: GAWB's assets should continue to be valued on the basis of DORC.

Approach to Revaluation: Due to significant changes in GAWB's circumstances, and given that the Authority's previous recommendations are not yet reflected in customer contracts, a revaluation of GAWB's asset base is recommended. It has been adopted for the purposes of determining maximum indicative prices for individual customers.

Optimisation of Assets: Where optimisation is considered appropriate, an incremental optimisation approach is recommended for the purpose of establishing GAWB's revised regulatory asset base.

Land and Easements and Other Assets: Land should be valued at market value and easements should be valued at their historic cost indexed for inflation.

Work in Progress: Work in progress should be capitalised using WACC and be recognised in the asset base for pricing purposes once it is fully completed and able to contribute productive capacity to the system.

Other Assets: The Authority recommends that:

- the DORC of the recreational facilities and fish hatchery assets should be included in the asset base; and
- the cost of assets necessarily relocated should be incorporated into the asset base at their cost of relocation.

DORC Valuation of Assets: The Authority recommends that the revised DORC asset valuation estimated by SMEC be adopted for pricing purposes, that is, $355.6 million as at 1 July 2005.

Working Capital: An allowance for working capital should be determined on the basis of debtors less creditors plus inventories.

Contributed Assets: Pricing benefits attributable to previously identified contributed assets should continue to be recognised on the basis of their depreciated replacement cost (DRC) values. It is further recommended that capital and operating costs associated with the pipeline for the delivery of treated water to Calliope and intended for Mt Larcom residents not be incorporated in the price paid for treated water by CSC

Rate of Return

Rate of Return Framework: The Authority recommends, in relation to the approach for determining the cost of capital:

- the use of the Officer CAPM for determining the cost of equity capital;

- a gamma of 0.50;
- a risk free rate based on a 20-day average of the 10-year government bond rate;
- the debt beta be estimated as the mid-point between zero and the upper bound including the default premium on corporate debt; and
- the use of the Conine beta levering formula which incorporates the imputation-adjusted corporate tax rate.

Risk Free Rate: For the purpose of advising customers of maximum indicative prices, the Authority has used a risk-free rate for GAWB of 5.45%. However, the Authority accepts that GAWB will reset this rate using the 20-day average of the yield on a 10-year Commonwealth Government bond as at 1 July 2005.

Market Risk Premium: 6.00%.

Equity Beta: 0.65.

Capital Structure: 50% debt and 50% equity, with an associated credit rating of BBB.

Cost of Debt: 6.77%, based on a risk-free rate of 5.45% and a total margin of 132 basis points above the risk-free rate.

Gamma: 0.50.

Expected Inflation: 2.69%.

Estimated WACC: Nominal post-tax WACC is 8.05% compared with 8.72% at the time of the previous investigation.

Return of Capital

Depreciation: Return of capital should be based on straight line depreciation for all GAWB's assets.

Operating Expenditure

Cost Allocation: General administration costs should be allocated on the basis of 10% to customer service allocated equally to each customer; and 90% to demand based functions, allocated to storage, raw water delivery and treated water delivery according to relative administrative effort. The recommended relative effort weightings are:

- 0.5 x ML delivered for supplies out of Awoonga Dam;
- 1.0 x ML delivered for supplies to treated water customers; and
- 2.0 x ML for supplies to treated water customers.

Efficient Costs: The Authority recommends that independently assessed efficient operating costs be incorporated in the cash flows for pricing purposes.

Efficiency Carryover Mechanisms: While an ECM may provide incentives for GAWB to innovate, it is not considered appropriate at this time.

Ongoing Regulatory Arrangements

Cost pass-through: Material exogenous changes in expected costs may be passed through to customers, subject to approval by the Authority. Eligible costs include: changes in taxation; changes in government charges such as resource management charges; changes in compliance requirements; changes in law; and, changes in government policy. A material change is considered to be one which affects the annual revenue requirement consistent with the approved pricing practices by more than 1%.

Review Triggers: The Authority recommends that a review should be triggered if there is, or there is expected to be, a sustained variation of 15% or more in GAWB's aggregate revenue.

Escalation Factor: A CPI measure based on the Brisbane All Groups classification should be used for the purpose of annual price adjustments between price reviews.

Adjustments over Time: Where prices are smoothed over a planning period greater than the regulatory period, prices in the next regulatory period should incorporate an adjustment to account for the effects that price smoothing may have on investment incentives.

Monitoring Pricing Practices including prices and contractual arrangements: The Authority recommends that the *QCA Act 1997* be amended to allow the Authority to mediate or arbitrate disputes over the application of Ministerially approved pricing practices.

In the absence of a dispute resolution power, the Authority recommends that GAWB advise the Authority of all contracts entered into with customers within one month of becoming effective, with the Authority being obliged to advise its Ministers if any contract substantively departs from the approved pricing practices.

Monitoring of Service Standards: An appropriate framework for monitoring pricing practices must also involve the monitoring of service standards. It is recommended that GAWB annually publicly report service quality against the standard adopted for contractual purposes and submit the report to the Authority. The form of the report is to be developed in consultation with the Authority.

Aggregate Implications

Transitioning of Prices: The Authority recommends that increases in the prices currently charged to existing customers be transitioned over 3 years, subject to a minimum annual increase of 10%.

Aggregate Revenue Projections: A comparison of projected revenues for the current investigation with those of the Final Report recommendations from the previous investigation is shown in Table 1.

Public Interest*:* The Authority does not recommend any adjustments to the proposed pricing practices based on a consideration of public interest matters.

The key recommendations of the Authority's investigation are compared with the previous recommendations in Table 2 which incorporates the position adopted by GAWB in respect of each item.

Table 1: Summary of Aggregate Revenue Projections ($m)

	2005-06	*2006-07*	*2007-08*	*2008-09*	*2009-10*	*2014-15*	*2019-20*	*2024-25*
2002 projected revenue (existing contract prices where in place)	32.74	33.88	35.33	36.30	41.81	52.50	61.37	n/a
Current projected revenue (existing contract prices where in place)	22.54	23.64	24.72	27.78	31.99	40.02	48.80	59.43
Current projected revenue (assuming no contractual constraints)	22.30	23.40	24.48	27.41	31.61	39.65	48.46	59.12

Table 2: Summary of Key Previous and Current Recommendations

Issue	Previous Recommendation	GAWB Response	Current Recommendation
Regulatory Framework			
Regulatory Approach	Hybrid	No specific comment	Hybrid
Form of Regulation	Price cap	Fixed revenue cap with an unders and overs account, annual QCA approval of GAWB reference tariffs.	Price cap
Modelling approach and planning period	Cash flow model over a 20-year planning period.	Cash flow model over at least 20 years	Cash flow model over a 20-year planning period.
Review period	5 years	5 years	5 years
Pricing Framework			
Basis for pricing	LRMC estimated using Turvey method	LRMC estimated by either Turvey or AIC method	LRMC estimated by either method, AIC preferred as more transparent and explainable.
Tariff Structure	Two-part tariff, with fixed charge based on contracted volume or anticipated demand.	Two-part tariff with separate tariffs for storage and delivery. Fixed charges based on contract volumes with load factors for use in excess of contracted volume.	Two-part tariff with separate tariffs for storage and delivery. Fixed charges based on contract volumes with load factors for use in excess of contracted volume.
Differential pricing	Differentiated geographically according to use, no differentiation between existing and new customers.	Differentiated geographically according to use, no differentiation between existing and new customers.	Differentiated geographically according to use, no differentiation between existing and new customers.
Council price equalisation	Council prices equalised on the basis of a historical agreement and continued acceptance of this agreement.	Councils to manage this process outside the regulatory process.	The issue of price pooling is a matter for the relevant parties to determine. The Authority is of the view that, on the balance of probabilities, there is an agreement to pool prices between GCC and CSC. The Authority recommends that CSC be charged only one price for treated water, including water supplied to Mt Larcom residents, and that the price take account of the capital contributions made by Cement Australia as well as the arrangements with Cement Australia regarding operating and maintenance costs.

Issue	Previous Recommendation	GAWB Response	Current Recommendation
Contributed assets – pricing approach	Include assets in asset base and provide a price rebate for the return on capital component as indicated in current contracts.	No specific comment.	Include assets in asset base and provide a rebate for the return on capital component as indicated in current contracts. In future cases, the rebate should also include both the return on capital and return of capital components to provide the full benefit to the contributor.
Exceptional circumstances - Drought	Insurance costs to be included in cash flows. Drought management costs to be incorporated in cash flows, after review by GAWB of Drought Management Plan	Preparatory costs of agreed contingency responses to be included. Only actual costs included after droughts occur.	Prices should incorporate costs where the risk is commercially relevant,
Supply and Demand			
Supply	Safe yield of 87,900ML	Revised safe yield of 78,000ML	Revised safe yield of 78,000ML
Demand Projections	Based on SMEC preferred planning scenario.	Conservative over-forecasting approach for planning purposes.	Based on MJA estimates of demand which reflect anticipated customer contractual demand, with adjustments as advised by individual customers.
Asset Valuation			
Method of valuing assets	DORC	DORC	DORC
Revaluation	No specific recommendation.	Roll-forward of 2001 DORC valuation. Periodic revaluation at 10-year intervals	Revaluation is required due to significant changes in GAWB's circumstances and as previous recommendations are not yet reflected in contractual prices.
Optimisation approach	Incremental	No specific comment.	Incremental
Land and easements	Indexed historic cost	No specific comment.	Land valued at market value. Easements valued at indexed historic.
Rate of Return			
Approach	WACC/CAPM	WACC/CAPM	WACC/CAPM

Issue	Previous Recommendation	GAWB Response	Current Recommendation
Risk free rate	20 day average of 10-year bond rate – 6.02%	No specific comment	20 day average of 10-year bond rate – 5.45%
Market Risk Premium	6%	No specific comment	6%
Equity Beta	Equity beta of 0.63. Upper bound debt beta applied in Brealey Myers re-levering formula.	In initial submission, asset beta of 0.60, as applied by ACCC to Central West Pipeline. In later submission, an equity beta of 1.0	Equity beta of 0.65. Mid-point debt beta applied in the Conine beta levering formula.
Capital structure	50% debt to total assets	No specific comment	50% debt to total assets.
Cost of debt	160 basis points reflective of BBB credit rating	No specific comment	132 basis points reflective of BBB credit rating.
Gamma	0.5	No specific comment	0.5
Nominal post-tax WACC	8.72%	8.68% to 9.0%.	8.05%
Return of Capital			
Approach	Straight line depreciation over asset design lives.	Straight line depreciation, with accelerated depreciation for potentially redundant assets.	Straight line depreciation over asset design lives. Accelerated depreciation appropriate for prudent investments that could later become redundant.
Operating Costs			
Cost Allocation	Common costs allocated 10% by customer and 90% by administrative effort.	Common costs allocated 10% by customer and 90% by administrative effort.	Common costs allocated 10% by customer and 90% by administrative effort.
Efficient costs	CPI-X approach not appropriate for GAWB. Appropriate efficient costs included in cash flows based on independent assessment.	CPI-X approach not appropriate for GAWB. Appropriate efficient costs included in cash flows based on independent assessment.	CPI-X approach not appropriate for GAWB. Appropriate efficient costs included in cash flows based on independent assessment.
Efficiency Carryover Mechanisms	No specific recommendation.	Supports in principle the sharing of efficiency gains across regulatory periods, but that implementation be deferred until regulatory arrangements are more stable.	Not considered appropriate at this time.

Issue	Previous Recommendation	GAWB Response	Current Recommendation
Ongoing Regulation and Monitoring			
Cost pass-through	Variations in exogenous costs may be passed to customer subject to assessment of materiality by the Authority.	Additional cost pass-through for government declared emergency, disaster or extraordinary circumstance.	Variations in exogenous costs may be passed to customer subject to assessment of materiality by Authority.
Review triggers	Review triggered if revenues vary by more than 15%.	Additional trigger for investment over $5 million.	Review triggered if revenues vary, or are expected to vary, by more than 15%.
Escalation Factor	CPI	Brisbane all groups March Quarter CPI.	Brisbane all groups March Quarter CPI.
Regulatory consistency	Future reviews to take into account the basis for previous pricing recommendations, but no specific constraints placed on future investigations.	Fixed revenue cap with unders and overs facilitates inter-period consistency.	Where prices are smoothed over a planning period greater than the regulatory period, prices in the next period should incorporate an adjustment to account for price smoothing where possible.
Monitoring	QCA not actively monitor prices in contractual arrangements. Monitoring limited to review triggers and cost pass-throughs.	QCA should not monitor individual contracts. Monitoring limited to annual approval of reference tariffs.	The Authority recommends that the QCA Act 1997 be amended to allow the Authority to mediate or arbitrate disputes over the application of Ministerially approved pricing practices. In the absence of a dispute resolution power, the Authority recommends that GAWB advise the Authority of all contracts entered into with customers within one month of becoming effective, with the Authority being obliged to advise its Ministers if any contract substantively departs from the approved pricing practices.
Pricing Implications			
Transitioning of Prices	Prices transitioned over three years subject to long term contractual limitations.	No specific comment.	Prices transitioned over three years, subject to a minimum annual increase of 10%.

Issue	Previous Recommendation	GAWB Response	Current Recommendation
Public interest	No specific recommendation	No specific comment	Public interest issues, particularly social and equity issues, be taken into account. The Authority does not recommend any adjustments to the proposed pricing practices based on a consideration of public interest matters.

1. BACKGROUND

Summary

The Authority was directed by the Ministers to investigate the pricing practices and appropriate framework for monitoring pricing practices including prices and contractual arrangements relating to the declared activities of GAWB.

The reference to the Authority was made under provisions of the QCA Act 1997 that require the Authority to ensure GAWB does not abuse its monopoly power as the sole supplier of bulk water in the Gladstone area.

Ministers also directed the Authority to advise customers, on a confidential basis, of the indicative prices consistent with the recommended pricing practices. These indicative prices, which will be forwarded to customers separately, are based on the information available to the Authority at the time of the investigation. In setting actual prices, GAWB, as a bulk water supplier to a small number of customers, may take account of factors specific to each customer.

The Authority's investigations have been hampered by a lack of historical records in respect of many key issues and by the late production of relevant documents despite repeated earlier requests by the Authority for all relevant information to be made available to it. It is likely there is information relevant to the issues the subject of this Report that has not yet been provided to the Authority. To the extent such information is later provided, it may be necessary to realign maximum indicative prices to reflect that information.

In preparing this Final Report, the Authority considered all stakeholders' submissions on an Issues Paper released in April 2004 and a Draft Report released in December 2004.

1.1 The Direction

On 16 April 2004, the Premier and the Treasurer (the Ministers) issued the following referral notice under Sections 23 and 24 of the *Queensland Competition Authority Act 1997* (*QCA Act 1997*).

> As the Premier and the Treasurer of Queensland, we hereby refer under Section 23 of the *Queensland Competition Authority Act 1997* the declared government monopoly business activities of the Gladstone Area Water Board (GAWB) to the Queensland Competition Authority (QCA) for the following:
>
> (a) an investigation about the pricing practices relating to the declared activities; and
>
> (b) an investigation of an appropriate framework for monitoring pricing practices (including prices and contractual arrangements) relating to the declared activities.
>
> Under Section 24 of the *Queensland Competition Authority Act 1997* we direct the QCA in relation to this referral to:
>
> (a) provide a Draft Report on the investigation by 31 December 2004, with the Final Report to be provided by 21 March 2005;
>
> (b) consult with GAWB, GAWB's customers and other relevant stakeholders; and
>
> (c) advise, on a confidential basis, individual customers of indicative prices consistent with the Authority's recommended pricing practices.

1.2 Background

GAWB is a Category 1 Water Authority[1] and registered Service Provider established under the *Water Act 2000* and is responsible for the supply of raw and treated water to industrial and local government customers in the Gladstone area. It operates as a commercialised statutory authority. Under the *Water Act*, GAWB is required to be commercially successful in its business activities and efficient and effective in providing goods and services, including CSOs.

In September 2000, the Ministers declared the bulk water storage, delivery and treatment services undertaken by GAWB to be government monopoly business activities and directed the Authority to undertake an investigation of GAWB's pricing practices.

The Authority recommended pricing practices for GAWB in its September 2002 Final Report *Gladstone Area Water Board: Investigation of Pricing Practices*. The Ministers accepted the Authority's recommendations.

The recommended pricing practices were to apply until 30 June 2005. The Authority recommended, and the Ministers accepted, that a further investigation was required to define pricing practices to apply from 1 July 2005. The further investigation was considered necessary to respond to certain outstanding issues and the potential impact of emerging changes in circumstances.

1.3 Scope of the Current Investigation

Since 15 August 2003, when Ministers accepted the Authority's recommendations, and the date of the current referral, GAWB has not had the opportunity to give effect to the approved pricing practices. In responding to the current Ministerial direction, the Authority is therefore seeking to:

- identify the impact of changed circumstances including hydrology, demand and drought management arrangements on previously recommended pricing practices; and
- assess pricing practices currently being proposed or being put in place by GAWB in respect of these changed circumstances.

1.4 Monopoly Prices Oversight

Part 3 of the *QCA Act 1997* provides for the regulatory oversight of Queensland Government owned monopoly business enterprises, with the Authority having the responsibility to make recommendations to the Ministers about any monopoly business enterprise referred to it.

The reference to the Authority was made under provisions of the *QCA Act 1997* that require the Authority to ensure GAWB does not abuse its monopoly power as the sole supplier of bulk water in the Gladstone area.

1.5 Maximum Indicative Prices

Ministers also directed the Authority to advise customers, on a confidential basis, of the maximum indicative prices consistent with the recommended pricing practices. These indicative prices, which will be forwarded to customers separately, are based on the information available to the Authority at the time of the investigation.

[1] A Category 1 Water Authority under the *Water Act 2000* is subject to the principles of commercialisation. GAWB, along with the Mt Isa Water Board, is identified as Category 1 Water Authorities in the Act.

The maximum indicative prices will need to be adjusted to reflect changes in the risk free rate between 4 March 2005 when they were calculated for the purposes of this Report and 1 July 2005 which is the date on which prices are to be set by GAWB.

The recommended pricing practices apply only to GAWB's prices and not to those of the GCC and CSC. The Councils have the discretion under the *Local Government Act 1993* to set rates and charges as they see fit. This discretion is evident in the case of the CSC which currently has set a significantly higher fixed cost charge for Mt Larcom residents ($428) than it has for other residents in the Shire ($154).

Actual prices charged by GAWB will be determined by GAWB on a commercial basis in conjunction with its customers.

In setting actual prices, GAWB, as a bulk water supplier to a small number of customers, may take account of factors specific to each customer. These may include existing contractual arrangements, past pricing agreements, service quality standards and public interest matters which typically require the establishment of formal Community Service Obligations on the basis of a clear and explicit decision taken by Government.

In some instances, actual prices will be lower than the maximum indicative price but may be higher where, for example, higher standards of service quality have been required and are provided.

1.6 Limitations

The Authority's investigations have been hampered by a lack of historical records in respect of many key issues and by the late production of relevant documents despite repeated earlier requests by the Authority for all relevant information to be made available to it.

It appears to the Authority that inadequate resources may have been applied by some key stakeholders to enable the provision of relevant information to the Authority in a timely manner. This was evidenced by the fact that a good deal of relevant information was not provided to the Authority until after the delivery of the Authority's Draft Report. While the additional information had no implications for the recommended pricing practices, there were implications for the maximum indicative prices.

The efficacy of Authority's determinations on this and all other matters with which it deals is heavily dependent on the timely provision of relevant information.

It is likely there is information relevant to the issues the subject of this Report that has not yet been provided to the Authority. To the extent such information is later provided, it may be necessary to realign maximum indicative prices to reflect that information.

In addition, the Authority notes that GAWB has yet to prepare a Drought Management Plan, estimate systems losses or fully assess all the risks associated with the business activity, including insurance costs associated with those risks.

1.7 Approach to the Investigation

In undertaking the current investigation of GAWB's pricing practices, the Authority:

- released an Issues Paper (April 2004) and a Draft Report for comment (December 2004) to facilitate submissions from interested parties on relevant matters;

- took into consideration all views expressed in submissions when formulating its Final Report;

- commissioned advice from independent consultants where appropriate on technical issues including pricing frameworks, asset valuation, efficient operating costs and the cost of capital; and

- consulted with GAWB and all other stakeholders to gain a further understanding of matters relevant to the investigation.

In response to the Draft Report, the Authority received a number of submissions which raised issues relating to the process of the investigation:

- the Member for Gladstone, Mrs Liz Cunningham, expressed concern the Draft Report was released 2 days before Christmas;

- Councillor Todd Comrie, CSC, requested that supporting figures and calculations be divulged to concerned parties before the Final Report was completed;

- CSC noted the Final Report will not be released until it is approved by the State Government. It noted that the Draft Report is the only opportunity for comment;

- Mr Garry Ross, of Gladstone City, submitted that it was unreasonable to expect the general public to read and comprehend such a detailed and technical report and to make submissions that present logical and economically sound arguments, which can technically challenge the model developed by the QCA and its consultants; and

- a number of submissions from Mt Larcom residents noted that GAWB is the only regulated water authority in Queensland and that it has been the subject of 2 detailed pricing investigations.

In respect of these matters:

- the Authority was required under its Ministerial reference to release a Draft Report by 31 December 2004. The timing of the receipt of information was a factor which dictated the timing of the release of the Draft Report. In any event, it was not able to be released until late December;

- apart from the Councils, most customers have previously requested the Authority maintain the confidentiality of proposed maximum indicative prices. The Authority maintained the confidentiality of all information that could result in the public disclosure of such prices;

- the Draft Report came at the end of a long consultative process commenced in April 2004 which was preceded by the Authority's 2002 investigation. Reports from that investigation have been publicly available for some time. There is no more the Authority is able to do about informing relevant stakeholders;

- it is accepted the general public will not always be able to respond to highly technical reports. The Authority relies on the representatives of these groups to make relevant representations - and provide the necessary technical information. The work of the Authority necessarily descends to complex economic issues. In appropriate cases it may be that interested groups should engage technical experts to assist in preparing submissions; and

- while the need for a second review of GAWB was identified in the Authority's 2002 Final Report in response to a number of outstanding issues and the then emerging drought, it was solely the Government's decision that the Authority undertake another review.

1.8 Structure of the Report

The Final Report is structured as follows:

- Chapter 2 - overview of GAWB's business and contractual arrangements;
- Chapter 3 - regulatory framework;
- Chapter 4 - pricing framework;
- Chapter 5 - GAWB's projected demand and water supply;
- Chapter 6 - GAWB's regulatory asset base;
- Chapter 7 - cost of capital;
- Chapter 8 - return of capital;
- Chapter 9 - operating costs;
- Chapter 10 - public interest and ongoing regulatory arrangements; and
- Chapter 11 - implications of the proposed regulatory and pricing arrangements for GAWB.

2. BUSINESS OVERVIEW

Summary

GAWB is a commercialised statutory authority which has responsibility for providing water storage and delivery services to industrial, electricity generation and local government customers in the Gladstone area.

GAWB's pricing practices have changed over time and contracts largely reflect the arrangements prevailing at the time of their negotiation.

Since the Authority's previous pricing investigation, GAWB has initiated discussions with customers to implement the pricing practices recommended following that investigation. However, at the time of writing, apart from arrangements with the Councils and new customers, the recommended pricing practices have not yet been fully put into effect.

2.1 Nature and Scope

As noted in Chapter 1, GAWB is a Category 1 Water Authority and registered Service Provider established under the *Water Act 2000.* It operates as a commercialised statutory authority. Under the *Water Act*, GAWB is required to be commercially successful in its business activities and efficient and effective in providing goods and services, including CSOs.

As a commercialised government owned entity, GAWB is required to adopt pricing practices consistent with the Council of Australian Governments (COAG) principles of full cost recovery and consumption-based pricing. The COAG principles also require the implementation of two-part tariffs for urban water services where cost effective.

Consistent with the requirements of the *Water Act 2000,* GAWB is required to:

- **commercially manage its affairs.** This includes managing contracts with suppliers and customers, regulatory pricing oversight arrangements with the Authority, debt management and opportunities to improve its financial performance;

- **plan and deliver future water supply capacity, reliability and quality**. This involves identifying likely demand scenarios and evaluating water supply and demand management options, including responses to future material reductions in supply;

- **develop the treated and untreated water delivery system**. This involves assessing the network's existing capacity and condition, and identifying emerging planning issues and appropriate capital or operating responses;

- **manage water quality**. GAWB is required to maintain acceptable water quality for customers and for discharge; and

- **manage the water distribution system**. GAWB must operate and maintain a water distribution network of pump stations, pipelines and reservoirs.

2.2 Assets

GAWB owns and operates:

- the Awoonga Dam on the Boyne River in Calliope Shire;

- delivery pipelines, being 147 km for delivery of untreated water to treatment plants and industrial customers and 58 km for delivery of treated water to the GCC and CSC water reticulation systems and to other industrial consumers;
- water treatment plants in Gladstone City and at Yarwun in Calliope Shire;
- untreated water pumping stations at Awoonga and Boat Creek, and treated water pumping stations at Benaraby, Calliope, Glen Eden and Boat Creek;
- Gladstone Water Treatment Plant (High Lift & Low Lift) and Yarwun Water Treatment Plant;
- untreated water reservoirs at Boat Creek, Gladstone (Fitzsimmons Street) and Toolooa, and treated water reservoirs at Boyne Island, East End, Golegumma and South Gladstone;
- the Lake Awoonga Recreation Area adjacent to Awoonga Dam; and
- a fish hatchery in Gladstone City.

A map of major assets including Awoonga Dam and pipelines is provided in Figure 1.

2.3 Customers

GAWB's major customers are CS Energy, Callide Power Management and Queensland Alumina Limited (QAL), which together account for 75% of GAWB's total demand. Other industrial customers include Gladstone Power Station, Boyne Smelters, Orica, Comalco and the Gladstone Port Authority. GCC and CSC account for most of GAWB's treated water demand, which in total accounts for almost 20% of total demand.

2.4 Commercial Arrangements

Past Practices and Contractual Arrangements

GAWB's pricing policy has evolved since its inception, reflecting changes in funding requirements and Government policy over that period. There have been four pricing policy approaches adopted, with policy changes in 1980, 1991 and 2000. These policies are summarised in Table 2.1.

Table 2.1 Summary of Pricing Policies – GAWB

Cost Element	1976-1980	1981-1990	1991-2000	2000-2002
Return on Capital	Actual interest costs recovered.	Actual interest costs recovered.	Actual interest costs recovered.	Return on all capital employed.
Return of Capital	Redemption on actual loans recovered.	Redemption on actual loans recovered. Depreciation based on 20 year asset life.	Redemption based on actual loans recovered. Also, financial annuity based on estimated asset life (62 years and a capital development charge based on projected augmentations and demand over the next twenty years.	Financial annuity based on average asset lives in the key segments
Opex	Included.	Included.	Included.	Included.

1976 to 1980

In 1976, the Queensland Government approved a pricing policy essentially based on cost recovery principles designed to recover the actual costs of GAWB's operations and maintenance, and actual interest and redemption associated with the proposed capital works program. This was reflected in a raw water price for industry of $100 per ML, to be indexed annually according to inflation, commencing in 1976-77.

For each major industrial customer, GAWB established a point of supply of water. The industrial customer was required to meet the full cost of connection from their plant to the nominated supply point by way of a repayable security deposit. The Board assumed ownership of these link pipelines, but recognised the customers who paid a security deposit had a prior right to the supply of water through the pipeline.

To ensure domestic consumers received the full benefit of Government subsidy payments, the price of raw water for domestic consumers was set at 65% of the industrial rate plus water treatment costs.

1980 to 1990

In the 1980s, the pricing policy was modified to explicitly include a return of capital, with assets depreciated over 20 years. New customers were required to contribute to any augmentation.

Existing customers remained with the prior charging arrangement of $100/ML indexed at CPI.

1991 to 2000

In 1991, the pricing policy was again refined for new customers. The key changes were that:

- a water asset replacement charge determined using a financial annuity based on an average 62 year asset life was substituted for the previous asset consumption charge based on 5% of asset value; and

- a charge to fund the anticipated cost of known required system augmentation was included as a capital charge based on projected augmentation and demand over the next 20 years.

2000 to 2002

Since GAWB became a commercialised entity in October 2000, it has sought to establish a new pricing framework, via contracts, which reflects COAG water pricing principles. The key differences between the pricing framework introduced in October 2000 and previous pricing practices were as follows:

- the inclusion of a rate of return commensurate with market returns on capital. This return was applied to the reproduction cost of the dam and delivery infrastructure, replacement cost for plant and equipment and market values for land, buildings and improvements, in place of the previously used actual interest costs; and

- the use of different average asset lives in different segments, rather than an overall average of 62 years, to determine a return of capital.

GAWB's existing water supply agreements typically includes a specified volume, referred to as a 'deemed quantity', and a price per megalitre which is indexed each year by the CPI. Customers are typically contracted to minimum 'take-or-pay' arrangements requiring them to pay for 75% to 85% of the deemed quantity.

The terms of existing contracts vary from 1 to 30 years or, in one case, in perpetuity. They are also based on different pricing policies and conditions depending on when the contracts were struck. Unless renegotiated, 25% of total 2003-04 water sales volume will remain in binding contracts beyond 1 July 2005.

Table 2.2 provides a summary of the current status of GAWB's contracts and the percentage of total volume (ML) affected.

Table 2.2: Summary of contractual status of GAWB's customers, 2003-04

Customer Category	***% of Supply, 2003-04***
Customers subject to existing formal contracts beyond 1 July 2005	25
Customers subject to existing formal contracts due to expire from 1 July 2005.	26
Customers subject to rolling contractual conditions (contracts expired and currently subject to re-negotiation)	46
Existing customers with no contract	3
	100

Previous Pricing Investigation

Following the Authority's earlier investigation of GAWB's pricing practices, the Ministers accepted the Authority's recommendations that:

- GAWB take into account relevant demand scenarios and alternate supply options;
- GAWB's asset base be determined using the depreciated optimised replacement cost approach, with the value of contributed assets to be recognised where there was evidence that the contribution was made with the intent of obtaining future price benefits;
- capital costs of future augmentations for both the raw and treated water systems be based on the optimal scale and timing of augmentations;
- the maximum revenue requirement incorporate a return on capital based on WACC/CAPM, depreciation, efficient operating costs and taxation adjusted for imputation. Prices by class of customers were to be smoothed over a 20 year period;
- prices be differentiated for each customer, with treated water to GCC and CSC to be priced as a separate class;
- GAWB transition the introduction of its new prices over a three year period with full prices to apply from 2005-06;
- GAWB's pricing practices be reviewed by the end of December 2004, unless triggered earlier by a variation in revenue of more than 15%; and
- a price cap be applied for regulatory purposes, with monitoring limited to within period reviews, consistent with recommended review trigger mechanisms and with pass-through of approved costs.

Since the previous investigation, GAWB has not had the opportunity to renegotiate contractual arrangements with industrial customers in order to apply the pricing practices approved by Ministers.

For the Councils, a single price has continued to be applied, with differentiated prices provided on invoices for transparency reasons. Following agreement between GAWB and CSC, the pooled pricing arrangements were extended to incorporate Mt Larcom in November 2002. GCC appears to have accepted this arrangement on the grounds that it viewed Mt Larcom as taking advantage of infrastructure that had been put in place for another purpose and viewed the costs as 'sunk'.

Councils' prices have been transitioned by GAWB to the levels considered by GAWB to be consistent with the pricing practices approved by the Ministers.

Issues Foreshadowed

Several issues were foreshadowed in the Authority's previous investigation as requiring further consideration, either by the Authority or GAWB, including:

- ensuring a consistent approach to the application of the pricing framework between successive regulatory periods;
- a review of GAWB's drought management options with results to be incorporated into prices as appropriate;

- use of a renewals annuities approach rather than depreciation;
- the need for an activity based analysis to enable allocation of general administration costs; and
- further review of incentive mechanisms.

Changed Circumstances

Since the previous investigation, changes in GAWB's circumstances indicated that the following matters may also need to be taken into account:

- the revised hydrological yield of Awoonga Dam; and
- changes in demand projections.

GAWB's Proposed Commercial Arrangements

GAWB proposes to sell water in the future only under contract. The contractual arrangements are proposed to consist of a separate Water Contract (access to capacity) and Delivery Contract (distribution of water) based upon similar periods, with a default term of 20 years, subject to a minimum of 5 years.

GAWB proposes that the Water Contract be based upon a set volume ('reservation amount'),. Contracts are to reflect the prevailing reference tariff for a particular service which is proposed to be a two-part tariff comprising an access charge and a volumetric charge. The latter is to be based on long run marginal cost (LRMC) of services. The result would be separate two-part tariffs for water storage and distribution services.

Where a customer seeks to be insulated from the impact of regulatory adjustments to the reference tariff, GAWB proposes to offer 'contracts for differences' (CFDs) to customers, which would allow for a fixed price for the term of the contract, or any other non-standard pricing arrangement. CFDs would be quarantined as unregulated revenues.

Water Contracts are to include a provision for tradability, with trades to be subject to approval by GAWB. Customers purchasing water 'reservation amounts' from other customers would pay charges reflective of the costs of servicing the purchasing customer.

GAWB's proposed contractual arrangements include provisions to vary the reservation amount as follows:

- where the customer requests a reduction, GAWB proposes to consider such issues as the financial impact on GAWB, the ability to resell the volume, the amount of spare capacity in the system and the current and forecast scarcity of water. The request may be granted in whole or in part;
- where the customer requests an increase, GAWB proposes to consider its other present and anticipated requirements, spare capacity and the public interest. The increase may be granted in whole or in part;
- GAWB may review and increase the customer's reservation amount where the total volume used in the previous two financial years exceeds 110% of the aggregate of the reservation amounts in those two years; and

- GAWB may review and decrease a customer's reservation amount if the total volume used in the previous two financial years is less than 90% of the aggregate of the reservation amounts in those two years.

3. REGULATORY FRAMEWORK

Summary

The regulatory framework establishes the overarching rules which govern how regulated businesses pursue their business interests and manage their commercial risks. To ensure that service providers do not take advantage of their monopoly position, pricing practices must be consistent with the regulatory objectives of economic efficiency and revenue adequacy, and take account of the public interest.

Recent events, and in particular the 2002 drought, defined more clearly the nature of the commercial risks confronting GAWB. The Authority sought to establish the nature of the risks confronting GAWB, and to ensure the regulatory framework provides incentives for those risks to be allocated to the party best able to manage them.

The Authority recommends that price cap regulation be maintained. While the Authority understands the reasons behind GAWB's proposal for a revenue cap approach, a price cap approach provides the best means of ensuring that GAWB manages its key risks, especially demand risk as it relates to future expansion.

Price caps will ensure that GAWB will not expand its infrastructure unless there is corresponding demand and/or unless there are contracted arrangements in place to offset the risks involved.

Such contracts should also reduce the exposure of GAWB's existing customers to errors in estimating demand by other existing users, and particularly from the risks associated with excessive expectations of future demand for new projects. This is of particular importance as GAWB's industrial customers are mainly international price takers. For those customers where reliability of supply is more critical than price, contracts provide a means for defining and securing their requirements.

Once price caps are in place, they also provide an incentive for GAWB to sell any excess capacity available after major augmentations and should thus improve GAWB's financial viability.

The Authority also recommends that, while prices should be reviewed every 5 years, a 20 year planning period should be adopted to ensure that prices provide appropriate signals for long term planning by customers.

3.1 Regulatory Framework

A regulatory framework establishes the overarching rules which govern how regulated businesses pursue their business interests and manage their commercial risks. To be effective, these rules should induce the regulated business to act in a way that also achieves desired regulatory objectives (Train, 1991).

The design of the regulatory framework, therefore, typically involves a consideration of regulatory objectives and approaches to regulation.

3.2 Objectives of Monopoly Prices Oversight

A monopoly or near monopoly service provider can exercise market power by restricting services, increasing prices, lowering quantities available for sale, or providing a lower standard of service or product quality, without the threat of competitive sanction.

Specific regulatory objectives of monopoly prices oversight are not defined in the *QCA Act*. However, section 26(1) emphasises particular matters which the Authority must have regard to:

- the need for efficient resource allocation, to promote competition and protect consumers from abuses of monopoly power;
- the cost of providing the goods and services in an efficient way and the actual cost of providing the goods and services;
- the standard of the goods and services including quality, reliability and safety; and
- the appropriate rate of return on assets.

Section 26(1) of the *QCA Act* also requires the Authority to have regard for a range of public interest matters such as: the impact on the environment of prices charged; demand management; social welfare and equity implications; the promotion of investment and innovation; ecologically sustainable development; workplace health and safety requirements; and economic and regional development.

In broad terms, these are typically considered to require the Authority to ensure that prices or pricing practices achieve economic efficiency and revenue adequacy, and promote the public interest.

The Authority considers that a properly functioning competitive market is the appropriate benchmark for establishing efficient outcomes. Such a market:

- is forward looking in nature;
- is responsive to consumer demand;
- ensures profits are sufficient for efficient investment and innovation;
- ensures production costs are not excessive and inefficiency not rewarded;
- allows a rate of return which reflects the market risks involved;
- may provide a degree of market power for a period. However, prices will not remain above long-run average full costs over a sustained period; and
- results in prices which reflect full economic costs and do not involve cross subsidisation over the longer term.

The key focus of revenue adequacy is to ensure regulated businesses have appropriate incentives to undertake new investment. However, this objective does not extend to guaranteeing the service provider's financial viability under all circumstances.

The Authority considers that monopoly prices oversight is intended to ensure prices or pricing practices achieve economic efficiency and revenue adequacy, and promote the public interest.

3.3 Approach to Regulation

Prices of monopoly or near monopoly businesses may be regulated directly, or indirectly by setting constraints on the revenues they are able to earn. General approaches to the regulation of prices applied by monopolies providing infrastructure services include:

- cost-of-service, or rate of return, regulation – where regulators determine the revenue required in order to recover an allowed rate of return on the business' asset base, plus an amount to cover its variable and other fixed costs;

- external benchmarking/incentive regulation – where adjustments to existing prices or revenues are made without direct reference to the provider's cost of service provision; or

- hybrid approaches – where cost-of-service and benchmarking/incentive regulation approaches are applied together to define maximum revenue or prices over a defined regulatory period.

The Authority has typically adopted a hybrid approach to economic regulation, to avoid embedding past inefficiencies, while still providing incentives for efficiency improvement that are achievable by the entity.

In mature regulatory environments, such as in many European countries, there is an increasing interest in alternative approaches to regulation, reflecting an evolution from ex ante approaches with high information requirements to light handed ex post approaches with the regulator focused on monitoring and facilitating greater contestability (see for example PC, 2001; Farrier Swier Consulting, 2003 and Bogetoft, 2002, 2004). Approaches relating to the latter include yardstick regulation which relies on external benchmarking and regulatory menus which enable a selection of regulatory approaches or parameters.

However, the alternative regulatory approaches emerging in mature regulatory environments are not appropriate to this stage of the regulatory oversight of GAWB. For instance:

- the alternative approaches are generally considered relevant only after an appropriate revenue or price benchmark is initially established and after assessing the financial and service performance of the regulated entity. As noted by the Productivity Commission (2001), prices should be 'in the ball park' before progress can be made towards more light-handed regulatory approaches; and

- external benchmarking requires suitable comparators and robust models. These have not been developed to a suitable level to provide a basis for regulatory pricing for GAWB.

More traditional and predictable approaches to regulation for GAWB, such as the hybrid approach, are appropriate. Moreover, a more radical approach to regulation may unduly increase regulatory risk.

The Authority considers the current hybrid approach to price regulation, combining cost-of-service and incentive regulation, should be retained for GAWB.

3.4 GAWB's Commercial Risks

To promote the lowest cost of providing services, risks should optimally be allocated to the party best able to manage the likelihood or impact of the risk (Posner and Rosenfeld, 1977).

Stakeholder Comments

In initial submissions, many stakeholders commented on the nature of the risks associated with the supply of water and their appropriate allocation. The key risks identified by stakeholders included:

- demand risk (Callide Power Management (CPM), CSC, GCC, Coolum Beach Progress & Ratepayers Association (CBP&RA), CS Energy and GAWB):
  - CPM submitted that many of the pricing issues relate directly to the forecasting of demand. CPM commented that a central component of price cap regulation is that the regulated supplier carries demand risk;
  - CSC and GCC submitted that new demand primarily related to new industrial demand and therefore these customers were a higher risk group;
  - Comalco submitted that customers should not be disadvantaged from reducing their demand as it increases the resource capacity of GAWB and defers the need for augmentation;
  - CBP&RA submitted that service providers must balance the scale effects of adding capacity in large increments against the uncertainty implicit in demand forecasting which favours flexibility through small increments. They suggested benchmarking of system utilisation against enterprises with similar climatic conditions, end use patterns, demand growth and service standards;
  - CS Energy noted the risk faced by GAWB where customers use a different volume of water to that contractually allocated;
  - GAWB submitted that it faces significant risk from its exposure to large industrial projects and the markets that influence project proponents, that make the process of estimating long run demand challenging. GAWB proposes to sell water in the future only under contract;
- the risk of changing hydrology (CPM, CSC, GCC, GAWB, DNRM and Treasury);
  - CPM accepted that changing hydrology was a risk outside of GAWB's control and that GAWB should be able to recover the cost of water storage infrastructure from the reduced yield, provided the raised dam remains the least cost option;
  - CSC and GCC noted recent changes in hydrology and that a lower yield would impact on GAWB's financial and planning decisions;
  - GAWB submitted that it was practically certain that the Historic No Failure Yield (HNFY) of Awoonga Dam will be revised downward again sometime in the future;
  - DNRM noted that any future significant variability in hydrology may cause the timing of projected augmentations and hence pricing to change;
  - Treasury considered the risk of changing hydrology affecting future augmentation was sufficient to justify a review trigger;
- drought risk (CSC, GCC, DSDI and GAWB);

  - CSC and GCC submitted that the risk of drought should be handled by GAWB in such a way that the price of water reflects the different reliability products provided to various customers;

  - DSDI submitted that developments to address security of supply may not be consistent with the 'just-in-time' basis of the previous asset valuation;

  - GAWB stated its drought management plan was being revised to reflect lessons learnt in the recent drought;

- supply risks relating to infrastructure investments (CPM, CSC, GCC and GAWB);

  - CPM submitted that the risk of a decreased least cost of supply should be allocated to the service provider;

  - CSC and GCC stated that shifts in demand and supply required a revaluation of the asset base and operating costs should be similarly optimised, allocating risk to GAWB. Conversely, CSC also recognised the risk that optimisation posed to GAWB and suggested that processes be put in place to ensure investment certainty;

  - GAWB submitted that its investments are large and infrequent and have significant price and service implications for customers. It submitted that it faces significant asset stranding risk from implicit frequent asset revaluations and technological development; and

- regulatory risks (CSC and GAWB);

  - the risk of increased environmental releases (CSC submitted these should be funded by a CSO rather than by customers); and

  - GAWB submitted that it faced price investigations of uncertain frequency and scope determined by discretionary Ministerial discretion, asset revaluation risk, and no regulatory mechanisms to offset future high returns against low initial returns.

In general, GAWB submitted that its regulatory and commercial environment exposes it to more risk than many other utilities.

However, in its initial submission, Comalco submitted that GAWB's risks are very low, as evidenced by the nature and quality of its assets and its customer base, low complexity involved in service delivery and stable cash flows. Comalco submitted that GAWB's risks should be assessed on: security and certainty of cashflows; customers' credit ratings; price risk environment; technological environment; threat of competition; debt levels; and, service levels.

In response to the Draft Report:

- DSD expressed concern that the Government will need to take on the major augmentation risk which the Board cannot pass directly to new customers;

- Mr Garry Ross, a resident of Gladstone, noted that the risk associated with new large industrial customers is significant and submitted that the State Government should retain this risk until the customers come on line. Mr Ross also submitted that the State Government should quarantine returns required for excess capacity provided to facilitate industrial development; and

- CS Energy did not support the inclusion of hydrology risk. It stated that hydrology is a vague term that should not be glossed over as a reason for GAWB avoiding its responsibility for acting as a prudent operator. CS Energy submitted that both GAWB and CS Energy can take steps to minimise the impact of an event. Further, CS Energy stated that a similar comment applies to drought risk.

QCA Analysis

Demand Risks

GAWB's demand risk applies to existing customers, expected new customers and unidentified new customers.

In relation to existing customers:

- except for the impact of the recent drought, annual volatility in demand is typically low;
- further substantial reductions in demand in the short term are not likely unless prices rise considerably or supply is restricted as a result of drought, reduced reliability, lower long term yield or water quality. However, future demand trends by existing customers are, not predictable with absolute certainty:
  - GAWB may, of course, seek to influence the demand of existing customers through the introduction of new demand management initiatives, although GAWB has not identified any such initiatives at this time; and
  - over the longer term, there may be further reductions in demand if customers substitute sea-water for cooling purposes or adopt alternative technologies or competing sources of supply such as stormwater and waste water recycling;
- growth expected in the demand for treated water over the next 20 years is now lower than that projected prior to the last drought, as a result of the application of two-part tariffs by GCC and leakage reduction initiatives by both Councils; and
- GAWB's small customer base does not provide significant opportunities for diversification and the loss of any of the larger customers could have a material impact on GAWB's financial position, or conversely customers (depending upon the nature of the regulatory framework).

GAWB has proposed the contractual allocation of volume risk to existing customers, through take-or-pay arrangements and long term contracts with specified review periods combined with a revenue cap. The issue of the form of regulation is addressed further below. GAWB also proposes that, where a customer requests a reduction or an increase in its contracted amount, GAWB may grant the request in whole or in part, depending on financial impacts, other demand and system capacity. GAWB also proposes to review customers' contracted amounts where volumes taken in the previous two consecutive years fall below 90% or above 110% of the contracted amount.

While not yet implemented, GAWB is also proposing the following initiatives to reduce risks to existing customers:

- tradeability of contracted demand; and
- disaggregation of prices for storage and delivery services.

Expected new customers are typically large industrials with identifiable projected demand, albeit with some uncertainty surrounding their establishment and the timing and staging of demand. Their demand may be driven by national or global macro-economic variables and trends outside GAWB's control.

Depending upon their expectations of the responses by GAWB and the regulator, new customers may have an incentive to overstate demand estimates if they consider that they will not bear the cost implications. However, GAWB is proposing to make customers pay capital contributions and access reservation fees to limit GAWB's exposure to the volume risks associated with any expansion of infrastructure for expected new demand. This should also provide an incentive for existing customers to more accurately estimate demand.

Requirements of unidentified customers have been incorporated in demand estimates in the past and, in many cases, failed to materialise. The volume and timing of demand from unidentified new customers cannot be predicted with any certainty.

Where demand differs from that originally anticipated, there are consequences for GAWB and its customers, particularly for infrastructure planning and associated costs. From a regulatory perspective, GAWB may have an incentive to overstate demand if the regulatory framework permits it to pass excess costs to customers. Alternatively, GAWB may have an incentive to underestimate demand if it anticipates that this will result in higher per unit prices under the regulatory framework. The desired framework should promote a neutral stance by GAWB.

In response to DSD's submission, the Authority notes that, within this framework, Government will only need to take on major augmentation risk if it wishes to pursue the uncontracted augmentations which GAWB judges to be uncommercial. Government funding of such risks is consistent with the framework established for government owned enterprises. If GAWB wishes to proceed without a contractual basis, or Government CSO, then it should assume responsibility for the investment.

Supply Risks

Supply risks fall into three main categories: planning risks associated with inaccurate estimates of demand; infrastructure risks associated with inappropriate responses to assessed demand; and resource risks.

Planning and infrastructure risks are relevant as the minimum efficient economic scale for capacity expansion is typically large and lumpy resulting in the potential for excess capacity. In particular:

- supply planning risks affect the location, scale and timing of infrastructure development;
  - where demand is understated, the risk for GAWB is that infrastructure capacity will not be available, or only available at high cost, and customers may turn to alternative sources of supply. In response to the recent drought conditions, one of GAWB's major customers substituted sea water for a significant proportion of their fresh water demand, other customers investigated air cooling substitution and a committed new project reconfigured its specification to reduce fresh water requirements;
  - where demand is overstated, GAWB may be left with substantial excess capacity. Such risks are exacerbated by the large and 'lumpy' nature of demand associated with large projects which are prominent in Gladstone. Responsibility for such errors can arise from either customers or GAWB; and

- inappropriate infrastructure responses to assessed demand may affect GAWB's ability to provide desired services at least cost.

The key sources of resource risk are:

- volume of available supply or hydrology risk. GAWB currently operates well within the catchment's hydrological capacity, as DNRM's Boyne Resources Operations Plan (ROP) indicates the catchment has the capacity to service a larger dam of up to 97,000ML. Key hydrological risk relates to GAWB's HNFY for Awoonga Dam at its current level of development, which is based on simulation data for rainfall, stream flow and storage level information developed from records since 1891. GAWB's HNFY is currently 78,000ML after allowing for environmental flows as specified under the ROP. The HNFY has been revised downwards three times since 1985, the most recent being in 2003 subsequent to the drought. Increasing evidence of climatic change with a declining average rainfall over the last 25 to 30 years imposes risks of further downgrades in Awoonga Dam HNFY in future. In relation to the submission from CS Energy, it is noted that GAWB is not able to predict or manage the occurrence of these hydrology risks, and that it must comply with DNRM's ROP;

- drought risk. Drought risk refers to short term seasonal and annual downturns in rainfall patterns. Neither GAWB nor its customers have the ability to predict the occurrence of non-seasonal drought conditions. GAWB's response to the recent drought was to impose supply restrictions to ration the supply of water and extend availability to priority customers. GAWB is yet to complete its Drought Management Plan (DMP).

  Drought management planning is designed to minimise supply risks to customers. While it affects customers, responsibility typically falls to the service provider as the service provider has the best information on the availability of supply and is best placed to prioritise overall supply in consultation with all customers. Flexible trading and pricing arrangements proposed by GAWB can, within limits, minimise the impact of drought by allowing customers a direct role in managing this risk; and

- water quality risk. Supply quality risk refers to deteriorations in overall water standards such as turbidity, salinity, colour, odour and taste or contamination from blue green algae, giardia or cryptosporidium. Low storage levels exacerbate the impacts of water quality risks. Water quality issues can only be addressed by GAWB as owner and manager of the physical infrastructure and land catchment.

Other Risks

GAWB's key finance risk relates to the cost of, and ability to make payments on, loan obligations arising from the Awoonga Dam upgrade.

Constrained sales during recent drought conditions and delays in negotiating new contracts may have increased this risk. GAWB's financial performance suffered from the drought conditions, with operating income (after tax) declining from a surplus of $3.1 million in 2001-02 to a loss of $3.4 million in 2002-03. However, GAWB has retained a BBB credit rating, partly by holding additional cash reserves until sales generate a sufficient margin over cash required to service debt financing.

Finance risk should be allocated to GAWB as it is the only party able to manage such considerations. GAWB is also exposed to the risk of customers making late payments or permanently defaulting.

In addition to these key risks, GAWB must manage various contract risks, operational and management risks, legislative risks and risks relating to government regulation, policy and general economic conditions.

3.5 Customers' Commercial Risks

As noted previously, GAWB's major customers include CS Energy, CPM and Queensland Alumina Limited (QAL), which together account for 65% of GAWB's total demand. Other industrial customers include Gladstone Power Station, Boyne Smelters, Orica, Comalco and the Gladstone Port Authority. GCC and CSC account for most of GAWB's treated water demand.

Customers such as QAL, Comalco and Boyne Smelters that sell an international product face the risk of changes in global demand and supply. These can be affected by industrial demand and global economic growth, sovereign political risks, competitive risks and policies relating to international trade. Customers such as the electricity generators must manage risks associated with domestic economic conditions. Customers are best placed to assess these trends and their implications for their demand for water.

Customers are also more able to take steps to mitigate their operational exposure to lack of water supply by:

- investment in alternative sources such as recycled water or saltwater cooling;
- investment in new technology to reduce reliance on water from GAWB; and
- contractual arrangements which provide priority access to volumes required.

The Authority considers that customers are best placed to assess their own demand for water from GAWB.

3.6 Allocation of Risks

To ensure that least cost of supply is achieved, regulatory and commercial arrangements should promote the allocation of risk to those parties best able to manage the risks.

Ability to Manage

The more substantial risks involved in the supply of water and the parties best able to manage them would appear to be as follows:

- risks of estimating the relevant demand of individual existing, identifiable and potential future customers are best managed by those customers;
- planning risks arising from responding to estimates of demand are best managed by GAWB, as the owner and manager of infrastructure;
- infrastructure risks of investments to meet estimated demand are GAWB's responsibility;
- risks of hydrological changes are not manageable by any party as they are essentially unpredictable. However, it is reasonable that the cost of any changes be passed through to customers;

- drought risks, while difficult to predict, would be best allocated to GAWB as it is in the best position to manage overall supply options and any relevant restrictions;

- water quality risk is best managed by GAWB; and

- financial risks are best managed by GAWB as it is best placed to define contractual arrangements, manage debt, cash reserves and payments arrangements.

Least Cost Outcomes

Estimates of future demand have in the past been subject to significant uncertainty and have usually been overestimated. Augmentation options are typically large and lumpy. The costs of any errors to GAWB and its customers are potentially significant.

Under these circumstances, long term contracts would appear particularly relevant to GAWB for significant trades in water, as:

- where customers must pay for specified volumes, it places an onus on customers to manage their demand, and any demand management initiatives, and gives GAWB some certainty of demand around which to plan its next augmentation;

- by setting prices, contracts can protect individual customers from the costs of other customers' inaccurate estimates of demand or costs arising as a result of inappropriate infrastructure investments by GAWB in response to uncontracted future demand; and

- responsibilities and expectations relating to the allocation of risks can be clearly established.

The Authority notes that the Gladstone Port Authority currently only invests in new infrastructure if it has customers contracted to support the new investment, so that excess capacity is limited to no more than 10% of installed capacity.

GAWB proposes to sell water in the future only under contract and has proposed to put in place the following contractual arrangements:

- it will request reasonable forward estimates of demand from customers. While GAWB will consider any customer request for a change in demand taking into account its financial impact and other factors, it does not consider it is obliged to grant the request. This will place the onus on customers to accurately negotiate for expected demand and manage demand to this level;

- the demand risk of new customers will be mitigated through upfront capital contributions or pre-payments for capital charges and options to reserve available water in advance through the payment of access charges in the intervening period; and

- customers requiring price protection will be offered a 'contracts for differences', with revenues or losses being dealt with outside of regulated revenue.

In general, the Authority considers that customers should bear the risk of variations in their own demand, and contracts should explicitly define the basis for variations in contracted amounts. GAWB should be able to exercise its discretion to alter contracted amounts upon request by customers. However, the Authority considers that GAWB should not unilaterally vary contracted amounts as it may not be aware of customers' future intentions. The Authority supports tradeability as providing a means of offsetting this risk for customers, to allow

contracted volumes to be made available to other customers, particularly during times of scarcity or where augmentations become necessary.

As well as being a mechanism for allocating risks, contracts can provide greater certainty in the face of significant uncertainties for future business and investment decisions by both parties and can avoid underinvestment in specialised assets. In general, the greater the specialised investment, the longer the duration of contracts required to justify the original investment (Joskow 1989).

The Authority considers that risks should be allocated to those parties best able to manage them. In GAWB's circumstances:

- **demand risk is best managed by relevant customers;**
- **planning and infrastructure risks are best managed by GAWB, as the owner and manager of infrastructure;**
- **hydrology risk is not manageable by any party as it is essentially unpredictable and the cost of changes should be to the account of customers;**
- **drought risk is best allocated to GAWB as it is in the best position to manage overall supply options and any relevant restrictions;**
- **water quality risk is best managed by GAWB; and**
- **financial risk is best managed by GAWB.**

The Authority considers that:

- **contractual arrangements should be put in place which promote the efficient allocation of risks;**
- **GAWB should facilitate the tradeability of contracted amounts between customers; and**
- **GAWB should exercise its discretion to vary contracted amounts upon request by customers. However, GAWB should not unilaterally vary contracted amounts.**

3.7 Form of Regulation

The most common forms of regulation are revenue and price caps.

Revenue Caps

A revenue cap provides a service provider with the flexibility to vary the level and structure of their prices, provided the revenue constraint is not breached. The pricing flexibility available to the business under pure revenue caps may result in cross-subsidies between individual customers. In practice, therefore, the revenue cap is often accompanied by pricing principles which limit inappropriate pricing.

Revenue caps are designed to provide the entity with sufficient revenue to be financially viable provided it operates in an efficient manner. However, if demand is higher than expected, and additional unanticipated capital investment is incurred, the extra revenues required to repay any

new investment may not be available until the next price review if no arrangements are in place for cost pass-through or review triggers.

There are three common forms of revenue caps:

- fixed revenue caps, which set a maximum total revenue that may be collected from the regulated service over a defined period;
- average revenue caps (or the 'revenue yield approach'), which set controls on per unit revenues; and
- variable revenue caps, where allowed revenues are linked by a predetermined formula to variables such as demand growth or cost drivers.

Key differences relate to the incentives to set efficient prices and minimise costs, and the allocation of volume risk between the service provider and customers.

Price Caps

Price cap regulation aims to control the prices charged by the service provider, rather than its total or average revenue. That is, price caps restrict the regulated entity to a price per unit regardless of the total volume sold. Under price cap regulation, there is no effective limit on revenue within the regulatory period as it depends on the volume sold.

Where price caps are based on costs for different service and customer groups, they limit the prospects for cross-subsidies between those groups. Price caps usually result in the service provider bearing the financial risk associated with variations from projected demand. If demand is lower than expected, the entity cannot increase prices to offset lower sales.

The Authority's Draft Report recommended that a price cap approach be adopted as it provided GAWB with the incentive to put in place appropriate contractual arrangements to effectively manage demand risk.

Other Jurisdictions

The ICRC (2004) concluded that an average revenue cap (per unit) was an appropriate form of regulation for regulated water services as 'it provides an appropriate balance of risk between ACTEW and customers and at the same time provides incentives for ACTEW to reduce costs and provide services in response to customer demand'.

The ESC's (2004) guidance to Victorian service providers on its intended approach to reviewing Water Plans indicated that it considered individual price caps to be the most appropriate form of price control in the first regulatory period. The ESC did express a willingness to consider proposals from businesses for a tariff basket approach, although it generally considered that the costs of complexity are likely to outweigh any benefits in the initial three year regulatory period.

The ESC's Draft Decision (2005) stated that individual price caps met the requirements of its Water Industry Regulatory Order by ensuring that the form of price control is consistent with the need for prices to signal efficient costs and provide appropriate incentives to customers. The ESC also indicated that price caps provide greater certainty for customers about the actual prices and tariff structures to be implemented over the next 3 years and impose fewer administrative costs associated with annually deriving tariffs, consulting with customers and seeking approval from the regulator. However, while price caps were proposed for most

businesses, the tariff basket approach was accepted for some businesses where tariff strategies for the regulatory period were clearly articulated.

When making determinations regarding pricing for government monopoly water supply services, IPART in NSW is limited by government regulation to fixing the maximum price or setting the methodology for fixing the maximum price. To date, the principal focus has been fixing maximum prices.

In the UK, OFWAT applies price caps to regulated water service providers.

Stakeholder Comment

In its initial submission, GAWB proposed that the form of regulation adopted should be a single revenue cap for regulated products and services with side price constraints which would limit increases to CPI+5% where the accumulated balance in the 'overs and unders' account is less than 20% of the maximum allowable revenue.

Within this framework GAWB would annually determine reference tariffs, to be approved by the Authority, for compliance with agreed pricing principles, the revenue cap and any pricing side constraints. The reference tariffs, addressed further in Chapter 4, would incorporate a Water Access Charge, Water Volume Charge, a Delivery Capacity Access Charge and a Delivery Volume Charge.

The Water Access Charge would be payable on the aggregate volume sought (that is, contracted volume) and the Water Volume Charge would relate to the volume of water consumed from storage in a particular year. The Delivery Capacity Access Charge would be payable on the maximum instantaneous flow rate specified by the customer in its Delivery Contract. The Delivery Volume Charge would be paid on the actual volume of water delivered to the supply point. GAWB propose to retain geographically differentiated pricing for the delivery infrastructure.

Non-standard services would receive different prices, as negotiated between GAWB and the relevant customer. For example, GAWB proposed that contract lengths shorter than the standard 20 years would attract a price premium. GAWB also proposed 'contracts for differences' or CFDs, which would provide a fixed price or other non-standard arrangement in contracts and would be handled outside the revenue cap. Any profit or loss on CFDs would be quarantined from other regulated revenues, while customers would benefit from greater price certainty.

GAWB submitted that, in its circumstances, a revenue cap was more appropriate for a number of reasons, including that it:

- results in an efficient allocation of volume risk;
- is less sensitive to inaccurate demand forecasts;
- manages drought risk more effectively, as it does not require estimates of the future costs of drought;
- is not biased against demand side management;
- is more likely to maintain regulatory consistency and revenue adequacy across time due to the unders and overs regime which considers past returns; and

- is consistent with the Authority's 2003 decision to retain fixed revenue caps for Queensland electricity distributors.

GAWB stated that, if a price cap were adopted, it would investigate modifying its demand forecasts by an empirically calibrated scale factor reflecting past overestimates in demand.

Few customers commented on the form of regulation in initial submissions. Those that did favoured price caps, or were neutral. GAWB recognised in its submission that customers almost universally express a preference for price predictability and regime stability.

In other initial submissions:

- CPM observed that, subsequent to the raising of Awoonga Dam, a number of events have challenged some of the Authority's previously held assumptions, and how the Authority responds should be guided by a clear position on which party should carry certain risks. CPM submitted that:
  - under a price cap, GAWB is responsible for demand risk within the regulatory period, and should not be permitted to recoup revenue shortfalls from users where demand is less than that forecast, including under drought conditions; and
  - pricing should ensure customers have incentives to continue to pursue 'cost-effective and socially responsible' demand management measures;
- Comalco stressed that pricing should not provide a disincentive for customers to manage their own demand, as this strengthens the resource capacity of GAWB and defers the need to spend on augmentation. Comalco suggested, however, that under a price cap, GAWB faces more risk and may have an incentive to increase sales and exacerbate drought impacts. Comalco noted that, under a revenue cap, the risk to GAWB is low as it is similar to a 'take or pay' environment; and
- CS Energy submitted that, in between price reviews, prices should be escalated by a CPI-X formula, indicating support for a price cap approach.

In submissions in response to the Draft Report, GAWB:

- reiterated its view that a revenue cap with side constraints would be a superior form of regulation, providing GAWB with 'a level of certainty more commensurate with its risk';
- considered there would be demand-management benefits associated with its proposed hybrid revenue cap approach, in that it would provide a regime which better supports both GAWB and its customers in pursuing effective management of the scarce water resource; and
- noted that a revenue cap is much better suited to handling drought and expressed concern that the indicative prices have become de facto tariffs.

CSC indicated that the price cap approach has not provided an incentive to put in place effective demand management strategies as lower demand has resulted in higher prices for customers.

CS Energy sought the Authority's view on the use of a price cap for the volumetric charge and a revenue cap for the access charge. It submitted that a revenue cap may be more appropriate for the access charge as it is presumed that, for CS Energy, the major determinant of that component is the capital cost of the dam, which is relatively static in magnitudes between upgrades.

QCA Analysis

Drawing on the issues identified above, including those raised by stakeholders, the key matters relevant to determining the appropriate form of regulation for GAWB include:

- the appropriate allocation of risks, including:
  - demand risk and the sensitivity of the form of regulation to inaccurate demand forecasts; and
  - supply risks, including drought risks and demand side management, environment, system failure, water quality and hydrology;
- pricing efficiency, including the removal of cross-subsidies, flexibility in pricing design;
- pricing certainty to customers;
- regulatory consistency; and
- transparency and administrative complexity.

Demand Risk Management

A primary focus in arriving at the appropriate form of regulation is ensuring risks are borne by the parties best able to manage them.

Accepting that more significant customer water demands should be subject to contractual arrangements, there is a case for the form of regulation to provide GAWB and its customers with an incentive to put appropriate contractual arrangements in place.

A revenue cap may not provide GAWB with sufficient incentive to put in place relevant contractual arrangements as prices can be varied to achieve allowable revenues within the regulatory period. Nor would it necessarily provide customers with an incentive to correctly estimate demand unless they are bound by their forecasts. History in Gladstone indicates that estimates of demand are not achieved.

Revenue caps allocate the full volume risk to existing customers. However, the Authority does not consider it appropriate that existing users should bear the costs of managing the risks associated with uncontracted demand (predominantly relating to new users) unless they choose to do so. This could occur, for example, where new augmentations result in lower costs.

The Authority accepts that price caps expose GAWB to downside risks. However, it thus provides GAWB with a clear incentive to put in place contractual arrangements based on agreed volumes (as is being proposed by GAWB). GAWB's proposal to apply penalties where demand varies significantly from contracted amounts will act to limit the downside revenue risks for GAWB. GAWB has expressed concern over the adequacy of the Authority's proposal to limit the penalties to the access charges only. This matter is addressed in Chapter 4 below.

Price caps also provide GAWB with the incentive to promote sales where spare capacity exists (usually after major augmentations), consistent with the efficient use of available infrastructure.

In its initial submission, GAWB proposed that, if revenue caps are not adopted, it would submit a revised demand projection. To overcome such issues and to ensure demand estimates are not subject to bias, the Authority has relied on independently verified demand forecasts in its calculation of the maximum revenue requirement (Chapter 5).

In summary, the Authority considers that a price cap provides GAWB with the best incentives to manage demand risk through contractual and other commercial arrangements.

Supply Risks and Environment

Supply risks relating to system failure and resource risks such as water quality are best managed by GAWB as owner and manager of infrastructure and as service provider. The costs of managing these risks would be incorporated in either a revenue or price cap. Under both forms of regulation, GAWB has an incentive to put in place the most appropriate least cost relevant infrastructure. That is, either revenue or price caps will address supply risks of this type.

With no party effectively able to manage risks of changes to hydrology, relevant costs should be borne by customers. A similar approach applies to changes in environmental releases that may be required by relevant agencies. This is best addressed through cost pass-through arrangements. Either price or revenue caps would require adjustment for this purpose.

Drought risks appear best managed by GAWB as these typically require management of overall demand and prioritisation of supply, and any required differentiation of water reliability. These issues are being addressed by GAWB under its proposed Drought Management Plan (DMP). Where expected costs of droughts, including those associated with the DMP, are incorporated into cash flows on an ex ante basis, they would be incorporated in revenue and price caps. The costs of unexpectedly rare and severe droughts may not be able to be estimated in advance and may need to be addressed after the event. Demand management can play a large role in avoiding or ameliorating drought conditions although there are limits on the extent to which they can be effective.

Both revenue caps and prices caps should provide appropriate responses to these categories of risk.

Demand Management

GAWB's customers would prefer that the form of regulation retains incentives for them to put in place effective demand management options.

In principle, price caps should provide an incentive for customers to do so, as lower volumes purchased result in overall savings to users within a regulatory period. Under a revenue cap, the impact on costs of reduced demand can be immediately passed through to customers within the regulatory period, subject to contractual conditions.

For GAWB, the opposite incentives apply. Under a revenue cap, GAWB could implement demand management initiatives and recover the lost revenue by increasing prices. Under a price cap, GAWB has no incentive to implement demand management practices unless it can on-sell saved water.

The experiences of other regulators are, in part, relevant:

- Energy Australia, in its submission to IPART in relation to the form of regulation to apply to NSW electricity distribution businesses (2001), noted that customers' incentives under a revenue cap framework do not promote demand management as when demand grows the price per unit decreases which provides (an incorrect) pricing signal to customers that they can afford to consume more;

- IPART (2004b) noted in respect of the electricity distribution businesses that, under a revenue cap, customers' increased demand in NSW resulted in capacity augmentation but there was no evidence of demand management initiatives being adopted by the

distribution businesses. IPART (2004b) noted that price caps provide the correct incentives to apply the appropriate balance between demand management and infrastructure capacity expansion; and

- the NT Utilities Commission (2003) identified perverse incentives to maintain service standards under a revenue cap, whereby the network service provider's income is fixed, regardless of how much electricity it distributes. While the network service provider faces an incentive to reduce total costs since, with revenue fixed, lower total costs increase total profits, a primary means of achieving lower costs is to lower service standards by restricting output.

Under the contractual arrangements proposed by GAWB, customers will be required to pay a Water Access Charge based on the contracted volume and a Delivery Capacity Access Charge based on the instantaneous flow rate. The Water Volume Charge and the Delivery Volume Charge will be based on actual demand.

At the outset, any gains customers expect to achieve through future demand management initiatives should be reflected in contract volumes.

Under a revenue cap, there will be a general expectation by customers that revenues will increase to offset any customer driven demand management gains within the regulatory period. There may, however, be an incentive for those customers who envisage that their gains will exceed those of other customers to direct further effort in this regard. GAWB may have an incentive to introduce demand management incentives of its own accord, given that revenues can increase to offset volume losses. However, this is a weak incentive for the effort involved. The experience of other regulators cited above suggests that this does not occur, presumably as, in those instances, there was insufficient gain to the service provider for the effort involved.

A price cap would provide an incentive for customers to continue to introduce demand management initiatives as the total cost would fall. The take-or-pay arrangements for the access charge will, however, limit customers' incentives to do so. There may also be a disincentive to doing so if gains made by a customer are lost in a subsequent review period. Should the overall impact materially affect GAWB's revenue, the proposed review trigger mechanism would come to play. Clearly, where aggregate demand growth is high then individual efforts in demand management will be rewarded and GAWB's revenues will not be adversely impacted. Where savings become evident, it will be open to companies to negotiate with GAWB to reduce their contractual commitments (as has been proposed by GAWB). GAWB will have an incentive to do so where new demand arises.

Demand management becomes a key issue during periods of drought or when capacity limitations are being reached. However, water supply from the catchment is not a limiting constraint for the foreseeable future. Drought management arrangements are yet to be prepared. However, price caps would provide incentives for GAWB to put contractual arrangements in place to manage drought impacts, and these could be tailored to individual customers' requirements, as in the absence of the relevant details it is not possible to incorporate appropriate provisions in estimates of prices.

In respect of CSC's comments, the price cap approach has yet to be effectively implemented. Over time and successive regulatory periods, the financial viability of GAWB also becomes an issue. In this particular instance, the higher prices are also a factor of the reduced yield of the hydrological yield.

Pricing Efficiency

Pricing efficiency relates to whether prices are cost reflective, and whether there is flexibility in pricing design and the pricing certainty provided to customers. Price caps explicitly provide for such arrangements.

Certainty

Price caps would provide GAWB's customers, including those who are international price takers, with greater certainty in prices within the regulatory period. Greater pricing variability would be possible under revenue caps. However, GAWB has sought to mitigate price volatility for customers in the event that revenue caps are applied through side constraints which would limit increases to CPI+5%.

Certainty for GAWB in meeting its revenue requirement will arise from contractual and other commercial arrangements proposed either under the revenue or price cap regime. The Authority proposes to accept GAWB's proposal to impose penalties on a user that fails to take up the quantity nominated in contracts (discussed in Chapter 4) provided it could not be sold to another party.

In respect of unidentified future customers, it is open for GAWB to determine whether expenditure on infrastructure should occur to meet this demand. Having regard to the lumpiness of additional capacity, past lack of forecasting success, and inability of existing customers to carry any errors, it is open to GAWB whether it wishes to take this risk. However, if it does, and no existing or prospective customers are prepared to commit to such capacity, there is a case for GAWB to carry the attendant risks. There is also the possibility of seeking Government support in respect of excess capacity.

The Authority notes that GAWB has proposed that customers requiring pricing certainty be offered 'contracts for differences' (CFDs). These arrangements can effectively protect customers from the risk of pricing variability and cross-subsidisation. However, while it remains unclear how the negotiated 'fixed' price would be determined, if customers voluntarily elect to negotiate such arrangements, these would be a commercial matter between the customers and GAWB. Nevertheless, as the CFD's could be excessive for the quality of service being negotiated. Though they do not represent a core service, GAWB can potentially exercise its market power. Accordingly, CFDs should be incorporated as part of the regulatory arrangements.

The issue of pricing certainty over successive periods is further discussed in Chapter 10. The Authority has dealt with the issue of flexible pricing for non-standard services (including price premiums for shorter than normal contractual periods) in Chapter 4.

Regulatory Consistency

While the Authority notes that the form of regulation should remain as consistent as possible over time to minimise regulatory compliance costs, it may change over time subject to developments in regulatory practice and actual outcomes.

As noted above, GAWB's initial submission proposed that to adopt a revenue cap would be consistent with that adopted for the electricity industry. However, the electricity industry is generally characterised by greater predictability and certainty of future (non-peak) demand than GAWB and a far larger number of users. The ability of the various parties to manage and absorb relevant risks is different. It is not appropriate therefore to base any recommendation on the appropriate form of regulation for GAWB upon that adopted for electricity or any other sector without an analysis of the underlying conditions.

Transparency and Administrative Complexity

In GAWB's circumstances, there is little difference in the transparency of a revenue cap with appropriate side constraints and a price cap. Both GAWB's proposal and the Authority's response involve substantial effort but the Authority is not convinced that one is materially less complex than the other. Further, given that GAWB has just 12 customers it is not considered that the task involves an unreasonable effort.

Revenue caps, with under and over accounts and side constraints as proposed by GAWB, require a greater degree of annual information gathering, and ongoing price approval and monitoring. Although GAWB's customer base is small, a revenue cap would require GAWB to develop sufficient internal capacity to calculate proposed prices on an annual basis.

GAWB's comment that price caps require estimation of volumes and demands in each category is accepted. Similar if not exactly the same information will be required to establish the reference tariffs for defined delivery 'hubs', under the approach proposed by GAWB under the revenue cap.

GAWB also submitted that 'we believe the task of setting price caps, independent of the contract negotiation process, is fraught with difficulty' in that 'under a price cap, the QCA must estimate the volumes in each tariff category including not only customers' annual and instantaneous demand, but also understanding something of the distribution of possible outcomes around the expected demand and each customer's attitude to risk (and therefore estimating where the customer will set its contract capacity relative to its expected demand). GAWB considers that this is not particularly onerous where there is a consumption/contracting history based on a stable tariff structure. However, where a new regime is being developed (as is the case here) or where new tariff components are introduced (for example, the Instantaneous Volume Charge), this task is not trivial'.

The Authority is reliant on customers' estimates of the demand to be contracted. Customers need to translate their estimates of instantaneous demand into contract volumes. This is necessary under either price or revenue caps.

On the matter raised by CS Energy, suggesting a combination of a revenue cap for fixed charges and a price cap for volumetric charges, the Authority considers that such an approach is overly complex. In addition, under LRMC based pricing, the relative proportion of the fixed charge in total charges varies between customers.

Conclusion

While the Authority understands the reasons behind GAWB's proposal to adopt a revenue cap approach, a price cap approach provides the best means of ensuring that GAWB manages its key risks, especially demand risk as it relates to future expansion.

Price caps will ensure that GAWB will not expand its infrastructure unless there is corresponding demand and/or unless there are contracted arrangements in place to offset the risks.

In addition, once price caps are in place, they also provide an incentive for GAWB to sell any excess capacity available after major augmentations and should thus improve GAWB's financial viability.

While the price cap will submit GAWB to a greater risk in terms of its revenues, this is considered necessary to ensure that GAWB has appropriate incentives for the management of the contractual arrangements related to its capital and operating expenditure. The proposed

contractual arrangements, including pricing, take-or-pay arrangements and penalties (see Chapter 4), return on capital (Chapter 7) and the proposed review triggers (see Chapter 10) are considered to provide returns commensurate with GAWB's risks.

In terms of supply risks, pricing efficiency, regulatory consistency, transparency and complexity, there is no overwhelming argument in favour of any of the proposed approaches. While price caps may have some benefits in encouraging customers to adopt demand management strategies within a regulatory period, the extensive implementation of demand management practices since the recent drought, and the proposal to apply penalties where actual volumes differ materially from contractual volumes (necessary to maintain GAWB's financial viability) minimises these advantages.

A number of additional matters have been raised by GAWB and stakeholders relating to the nature of the appropriate response to identified risks. These include: implications for the risk premium; differential pricing for customers with different risks; the application of load factors to non-contracting parties; and, the implication of the approach to regulation for asset revaluation and more specifically optimisation of the asset base. These matters are addressed in subsequent chapters.

The Authority recommends that price cap regulation be maintained as a means of ensuring GAWB has the incentive to put in place appropriate contractual arrangements to effectively manage demand risk.

3.8 Establishing Price Caps

Planning Period

The Authority's previous investigation adopted a 20 year assessment period for pricing matters. The longer time frame was adopted to ensure that a long term perspective, most relevant to water service providers, is maintained. Such a perspective reflects:

- the expected time required for the additional supply capacity from the Stage 1 augmentation of the Awoonga Dam to be utilised; and
- project evaluation conventions use a 20-30 year evaluation period for water infrastructure projects.

Establishing the planning period according to the time required to effectively utilise an asset's service potential is also consistent with price stability and intergenerational equity objectives.

Other Jurisdictions

Ofwat (2002) notes that, although price limits are set for five years, they need to be established 'within a longer term context, taking into account the likely needs of the industry well beyond 2009-10 where these are relevant now'. A longer period might offset some of the inevitable uncertainty associated with the periods around price reviews but against that would be the difficulty of making robust forecast for many years ahead.

Stakeholder Comment

In its initial submission, GAWB supported the continued use of a 20 year perspective for planning purposes as it did not anticipate supply constraints until approximately 2023.

However, GAWB proposed a 5 year pricing horizon, under which prices would be set so that the present value of costs and revenues are balanced over 5 years. GAWB submitted that any longer period exposes GAWB to significant revenue risk and raises the potential for considerable intergenerational inequity in cost recovery. Specifically, GAWB argued that historical overestimates of demand have resulted in a 'value transfer' from the Queensland Government to existing customers due to GAWB not receiving required revenues, and that future customers may be forced to make up for this transfer, in the form of higher future prices.

In response to the Draft Report, QAL recommended that the QCA use a 30-year cash flow model to be 'consistent with long-life capital-intensive industry practice'.

QCA Analysis

The key objective which should guide the selection of the length of a planning period relates to the need for prices to provide appropriate signals for long term planning by customers. This is important to deal with any efficient excess capacity and provide consistent and stable pricing signals given the lumpiness of infrastructure investments. Under a shorter pricing period:

- current customers would be forced to pay for excess capacity inherent in lumpy capacity expansion, albeit optimal to meet long term demand;
- significant price shocks may result if a price smoothing period is adopted which is shorter than that required to utilise the capacity of major infrastructure. For example, such an approach would potentially result in much higher prices in earlier regulatory periods, declining in subsequent periods until the next major augmentation; and
- future additional demand, once the asset is utilised, could be priced at a relatively lower amount due to the larger denominator used in pricing calculation at that time and would not signal the correct marginal cost to new consumers.

At the time of the last review, the appropriate planning period was considered to be 20 years and it is proposed that this longer period be maintained for pricing and planning purposes. In response to QAL's comment, it is noted that the supply and demand information becomes particularly unreliable after the 20-year planning period.

The Authority considers a planning period of 20 years is appropriate for GAWB.

Approach to Estimating the Price Caps

Price caps are estimated on the basis of a maximum annual revenue requirement (MRR) which establishes the total amount of revenue that an efficiently operated business would need to remain commercially viable, but not enjoy monopoly profits.

Price caps are typically calculated for each class of customer to minimise the possibility of cross-subsidy and ensure cost reflectivity.

MRR can be calculated using either a NPV cash flow model or a building blocks model. Where identical assumptions are employed relating to the planning period and other variables, consistent results are derived from both approaches. The Authority believes that the building blocks model provides greater transparency of the pricing components which typically are:

- a return *on* capital;
- a return *of* capital; and

- efficient operational costs and actual tax expenses, net of imputation credits.

The Authority developed both the cashflow and building blocks model to ensure the accuracy of results. The cash flow model enables the estimation of maximum indicative prices over a smoothed 20-year period corresponding with the planning horizon, thus providing better long term price signals for customers. Further, the adoption of a cashflow model ensures all out of period costs are taken into account, such as delivery system and treatment plant augmentations. If prices were based simply on a 5-year building blocks model, prices would need to be adjusted substantially between reviews.

The Authority considers a cashflow model should be adopted to calculate GAWB's MRR.

3.9 Regulatory Review Period

The regulatory period must be long enough for management initiatives to be implemented and take effect. It should also be short enough for the regulator to forecast reasonable cost estimates and (where relevant) retrospectively validate efficiency gains. Most Australian regulators have adopted a review period of 3 to 5 years.

Where an investment is associated with a high level of risk, a longer review period may help ensure returns commensurate with that risk, by averaging out fluctuations over the relevant period. Conversely, where risk arises due to uncertainties over future developments or possible regulatory gaming, then a shorter regulatory period may be adopted to allow prices to be reset once the information is available.

Other Jurisdictions

Ofwat has adopted a regulatory period of five years for major 'periodic reviews' at which maximum price limits are set. Ofwat is presently considering between one and three year extensions to the regulatory period as 'some water companies believe that a five-year horizon does not provide sufficient stability for an industry that must plan to provide water services much further into the future' (Ofwat, 2002).

The Victorian Government will approve water prices for a 3-year regulatory period commencing on 1 July 2005. Future regulatory periods will be set by the Essential Services Commission (ESC).

IPART's price determinations for NSW water businesses usually apply for a regulatory period of five years, with a general mid-term review. However, more recently a 2 year period was adopted for Sydney Water reflecting medium term uncertainties.

The ICRC (1999) established a five year regulatory period for ACTEW's 1999-00 to 2003-04 price direction, consistent with the requirements of their terms of reference, noting the benefits this time period provides in terms of regulatory certainty.

More recently the ICRC (2004) finalised a price direction for ACTEW for the period 2003-04 to 2007-08, adopting a four year period, although indicating it will consider the benefit of returning to a five-year timeframe in the subsequent regulatory period.

GPOC has undertaken two investigations into the pricing practices of the three Tasmanian Water Authorities, establishing a three year regulatory period in both cases (GPOC 2004).

Stakeholder Comments

In initial submissions:

- GAWB proposed a 5 year regulatory period on the basis that it would:
  - provide a reasonable opportunity to evaluate the success of GAWB's proposed changes to the regulatory framework and pricing arrangements; and
  - facilitate the most rapid implementation of proposed future QCA recommendations, by aligning the regulatory review process with GAWB's contractual periods;
- CS Energy submitted that overly frequent price reviews are in conflict with the concept of stability of long term agreements, particularly when the impetus is based on objectively determined issues, which may prove to be neither consistent nor accurate. CS Energy submitted that price reviews should be held every 5 years or when there is a significant change in GAWB's asset base or customer base;
- CPM submitted that the regulatory pricing period should be truncated to the date of the next proposed augmentation or 5 years, whichever is the shorter; and
- Comalco supported the use of 5 year regulatory periods within long term contractual arrangement.

In response to the Draft Report, DNRM submitted that it considered the 5-year review period appropriate.

QCA Analysis

Comments by GAWB and its stakeholders generally support a regulatory pricing period of 5 years, which is consistent with the Authority's previous conclusions that the regulatory pricing period should, where practical, correspond to the timing of contract reviews.

For GAWB's present circumstances, it would appear that costs can be adequately forecast for the forthcoming five year period. Although uncertainties exist regarding future demand, yield and augmentation options, a shorter regulatory period would not resolve those uncertainties. Where significant changes occur within such a period which may warrant a review of price settings, these can be addressed through alternative mechanisms (addressed in Chapter 10).

The Authority recommends that a 5 year regulatory review period be adopted.

4. PRICING FRAMEWORK

Summary

The Authority recommends that prices should be based on long run marginal costs (LRMC) of supply, with two-part tariffs applied separately for storage and delivery services and incorporating a take-or-pay access charge based on contracted volumes. Penalty load factors are considered appropriate to apply to the total charge to provide the incentive for customers to accurately estimate their consumption. Further, the Authority recommends that tariffs be differentiated between users according to their utilisation of specific components of GAWB's infrastructure network.

Based on the information supplied since the Draft Report was released, the Authority recommends that CSC be charged only one price for treated water, including water supplied to Mt Larcom residents, and that the price take account of the capital contributions made by Cement Australia as well as the arrangements with Cement Australia regarding operating and maintenance cost of the relevant infrastructure.

The Authority considers that the pooling of Council treated water prices is a matter for the relevant parties to agree. The Authority will support whatever arrangements are agreed between those parties. In coming to this position, the Authority is particularly aware of the lack of documentary evidence about the arrangements as well as the contradictory views now held by the two Councils. At the same time, the Authority is of the view that, on the balance of probabilities, there is an agreement to pool prices between GCC and CSC.

On other pricing matters, the Authority recommends that:

- *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;*
- *where contributed assets are recognised, they be included in the asset base for the purpose of determining the revenue requirement and prices;*
- *unless otherwise specified, rebates for future contributed assets should include the return on capital and return of capital components, provided their contribution is intended to reduce prices in this manner; and*
- *in general, 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 provided in prices.*

4.1 Regulatory Pricing Objectives

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 (*QCA Act 1997*, Section 26). While revenue adequacy is intended to ensure regulated businesses have appropriate incentives to invest in regulated service provision, there should be no guarantee a return will be achieved on all investments made by a service provider, or that its financial viability will be maintained under all circumstances.

4.2 Efficient Pricing

Alternative Approaches

There are a number of alternative approaches to pricing, including average cost pricing and marginal cost pricing.

Average cost pricing is effective for ensuring sufficient revenue to sustain the investment made by the regulated business. However, because prices are not based on the cost of the additional unit of consumption, it does not generally promote efficient outcomes. Average cost pricing generally fails to signal the implications of continued growth in demand or upcoming capacity constraints.

Marginal Cost Pricing

Marginal cost pricing can provide correct economic signals for water use decisions and reflect the outcomes of a competitive market. There are two broad options for determining efficient prices - short run marginal cost (SRMC) and long run marginal cost (LRMC).

SRMC is the change in total costs when an additional unit of output is produced in the short term. If a small increase in demand can be accommodated within the existing capacity, then prices will be low as they reflect only the SRMC. However, as capacity is utilised, operating costs will eventually increase and congestion costs will be experienced. A distinction is sometimes drawn between the SRMC and the marginal operating cost where the latter incorporates inordinate direct costs specifically related to congestion. For the purposes of this Report, SRMC will be used as a proxy for the Marginal Operating Cost (MOC). After an investment response, prices based on SRMC would typically decline. This results in prices fluctuating, sometimes widely, producing a 'saw-tooth' pattern. The typically cyclical pattern in pricing is generally not acceptable to users desiring price stability, nor does it necessarily send a long term signal about the costs of future supply.

LRMC is the change in total costs when capacity is increased to produce an additional unit of output. LRMC comprises the SRMC as well as marginal capacity costs (MCC) associated with any unit capital costs of expansion. LRMC pricing is therefore a forward-looking concept incorporating the longer term cost implications of any augmentations arising from an increase in current demand expectations. In effect, LRMC smoothes the 'saw-tooth' pricing pattern characteristic of SRMC. LRMC reduces to the SRMC where no augmentation is considered necessary. In the event of scarce capacity, rising congestion costs could mean that SRMC may for a time increase above LRMC.

Other Jurisdictions

IPART's price determination for Sydney Water for 2003-05 notes that, although LRMC is theoretically correct and generally accepted, there is no definitive empirical evidence that it is effective (IPART, 2003). IPART's determination recommended an increased emphasis on usage charges, to provide a greater incentive for customers to manage their water consumption.

For the ICRC's 2004-05 to 2007-08 ACTEW price direction, regard was given to the LRMC of supply (ICRC, 2003). However, it was not the primary determinant of volumetric prices. The ICRC's final determination addressed the consistency of the tariff structure against a spectrum of public interest matters.

GPOC (2004) recommended LRMC pricing for Tasmanian bulk water providers, tailored to the circumstances of each supplier. GPOC recommended that the volumetric price at each node (supply point) should reflect the LRMC.

Ofwat (2003) has adopted LRMC pricing as a general principle in its tariff determinations for UK water companies, requiring that volumetric rates be set to reflect LRMC as closely as possible, to provide appropriate incentives to promote economy in the use of water.

ESC (2004b) has not indicated a specific view in relation to LRMC, but has indicated that service providers will be required to propose prices that are structured to provide incentives for the sustainable use of Victoria's water resources, by providing appropriate signals to customers about the costs of providing particular services. The ESC's initial view is that water businesses are best placed to design tariff structures that reflect the underlying costs of providing services.

Stakeholder Comment

In its initial submission, as well as in response to the Draft Report, GAWB supported the Authority's previous recommendation that 'variable prices' be based on estimates of LRMC.

QCA Analysis

The principles of LRMC pricing appear to have been widely accepted among water pricing regulators. The approaches adopted by IPART and ICRC for setting volumetric charges have had regard to LRMC and other more subjective parameters, such as the impact of changes in technology and policy on the cost and availability of supply augmentation options. IPART (2002b) noted that the estimate of LRMC would vary over time due to these factors. GPOC and Ofwat reinforce the importance of prices reflecting LRMC as closely as possible.

In assessing pricing matters, the Authority is required by the *QCA Act* to have regard to a range of economic efficiency and public interest matters (Section 3.2). The Authority considers that setting volumetric charges according to LRMC is generally consistent with delivering these outcomes. In regard to economic efficiency, the Authority notes that LRMC provides a signal to consumers in terms of the long term costs of supply, recognising that current consumption has implications for future capital investment as well as current operating costs.

LRMC prices also satisfy public interest objectives by encouraging strategies such as demand management and alternative water use technologies which may defer investments in major augmentations. At the same time, LRMC pricing is consistent with ensuring that socially desirable investment is not discouraged and that services are available to consumers. LRMC based pricing is of particular relevance to GAWB as the augmentation options it confronts are typically large. Furthermore, the major customers are long term industrial users typically seeking pricing certainty.

Where there is no imminent capacity augmentation, or there is substantial uncertainty regarding augmentation, the LRMC estimation reduces to SRMC which may be equivalent to SRMC. This issue was also emphasised by Turvey (1976), Ofwat (2001) and more recently by GPOC (2004).

The Authority recommends that prices should incorporate the LRMC of providing infrastructure services.

Tariff Structures

A concern with marginal cost pricing is that, where marginal costs are below average costs, prices based purely on marginal cost will not generate sufficient revenue to maintain the provision of services. Alternatively, where marginal costs are above average costs, prices will result in excess revenue being generated.

Where the marginal costs of production decrease with output growth, the resulting revenue shortfall is typically addressed by using a two part (or multi part) tariff incorporating a volumetric or usage charge and a 'fixed' (not related to actual consumption) or 'access' charge.

Where the business exhibits increasing marginal costs, prices based on marginal costs may generate an excess of revenue above that required to maintain revenue adequacy for the entity. Options on how any excess revenues should be allocated include: the payment of additional dividends to shareholders; the establishment of sinking funds to provide for future augmentation; or the provision of a rebate to users, in the same way that a surcharge or an access component would be applied when marginal cost is falling.

In its previous investigation of GAWB's pricing practices, the Authority recommended that GAWB apply two-part tariffs, with a volumetric charge set to promote efficiency and an access charge set to promote revenue adequacy.

Stakeholder Comments

In its initial submission, GAWB supported the application of two-part tariffs based on LRMC. However, GAWB proposed a change to how LRMC-based two-part tariffs are derived over time. It suggested that access charges should be fixed for a 5-year period with variable charges based on LRMC allowed to escalate or deflate in each year of the 5-year period, in line with LRMC estimates, as future capacity augmentations approach.

GAWB noted that, under LRMC pricing, the volumetric charge would increase as augmentation nears, requiring the access component to be reduced as a proportion of the total charge. GAWB's proposal was that, rather than reduce the access charge in these situations, it should be kept constant. This would result in the total price increasing prior to augmentation, and then decreasing once the augmentation is in place.

In response to the Draft Report, GAWB expressed concern that the Authority's proposed approach, which smoothed prices over 20 years, would provide weak signals to customers. GAWB prefers an approach where prices would increase as augmentation nears to provide a signal to justify impending investment decisions. GAWB's proposal, consistent with its submission on the Authority's Issues Paper, incorporates access charges which are fixed for a 5-year regulatory period, with variable charges based on LRMC allowed to escalate or deflate between years. This would mean that total charges would vary each year. GAWB considered that such price variations are appropriate where water is a modest cost for most of GAWB's customers.

QCA Analysis

In the Authority's previous recommendations, the volumetric component of the two-part tariff was to be set according to LRMC, with the access charge derived as the residual to meet GAWB's revenue requirement. Under the Authority's approach, the LRMC was based on a 20-year planning horizon, with LRMC re-estimated at the commencement of each 5-year review period. The tariff was to be established for the initial year of the regulatory period and escalated by CPI for each subsequent year of the regulatory period. It was proposed to retain the same tariff structure throughout the regulatory period and reset it at the next review. Hence, if a

major augmentation becomes imminent, at the time of the next review the volumetric charge would increase and the access charge decrease within the total charge. After the augmentation, the volumetric charge would decrease and the access charge would increase at the time of the next review.

GAWB has instead proposed, in submissions in response to the Issues Paper and Draft Report, that the access component be held constant for each year within the 5-year regulatory period, and that the volume component should be recomputed each year to reflect changes in LRMC. The Authority's proposal, involving adjustments to the tariff structure every 5 years, would continue to provide appropriate signals. Further, any significant changes to GAWB's circumstances may trigger a review within a period and would allow for adjustments to tariff structures. The Authority does not consider that water is an insignificant cost for most customers, as demonstrated by the issues raised in submissions, particularly from Councils. Given the current excess capacity, and the expected time to the next augmentation, it is not necessary to provide pricing signals on an annual basis.

The Authority proposes that a two-part tariff with a volumetric charge based on LRMC be adopted over a regulatory period with no annual adjustment to the LRMC or to the access charge. LRMC would be re-estimated at the commencement of the next regulatory period. As an augmentation comes closer, the LRMC will increase and the proportion of the access charge in the total charge will decline.

The Authority is aware that, as the access charge is progressively reduced, there may be incentives for customers to contract for additional volume to lower their holding costs for any planned increase in demand or to secure additional allocation in times of impending scarcity. However, once the augmentation is in place, the LRMC would decline and the access charge would again increase. Hence, customers should have an incentive to ensure that contracted volumes closely match actual demand volumes over the long term. The proposed penalty charges to apply where customers under-state their planned consumption will also provide incentives for customers to match demand to contracted volumes.

The Authority's proposed approach would provide stability in the total price and certainty for customers over the regulatory period, while meeting the objectives of efficient prices and revenue adequacy. It also provides sufficient signalling of any impending augmentations, while recognising that LRMC is subject to change over time as technology, government policy and other circumstances change.

The Authority recommends that GAWB should apply a two part tariff structure for each of storage and delivery services. The components of that structure should be held constant in real terms over a regulatory period.

Estimating LRMC

A major drawback with using LRMC is the difficulty of estimation. In an analysis for IPART, the CIE (2004) noted that LRMC can be difficult to estimate, because it is a forward looking measure dependent upon demand and future capital works programs (and, therefore, technology and unit cost forecasts), timing issues and changes in operating costs.

The Authority's previous GAWB investigation identified two alternatives for measuring LRMC:

- the present worth of incremental costs as devised by Turvey (1976) and applied by Hanke (1981). Turvey's method determines LRMC as the difference between the present worth of the next planned capital investment and the present worth of delaying that capital

investment by one year. The result is then divided by the increment in demand, to arrive at a unit marginal capacity cost. The difference in the marginal operating costs associated with the delay is also included; or

- average incremental costs (AIC). This approach essentially determines an average incremental cost over a designated planning horizon. It takes additional operating costs in each year (compared to present operating costs) plus capital expenditure and expresses the result in present value terms on a unit basis. It requires estimates of cash flows over a nominated planning horizon, which may incorporate future augmentations.

It was subsequently recommended that, subject to the revenue adequacy requirements of GAWB, GAWB's prices be based on the long run marginal costs of providing services, on the basis of the Turvey method. The Authority considered that the Turvey method provided a more appropriate estimate of LRMC than the average incremental cost (AIC) method - as it more closely reflected incremental costs.

The Authority has since become aware that, in a number of instances (not related to GAWB), the Turvey and AIC methods have been applied with significant differences in estimates of LRMC being derived.

Other Jurisdictions

Ofwat (2001) noted Turvey and AIC as the two leading alternatives for estimating LRMC, but did not indicate a preference for either method. However, AIC has more recently been identified by Ofwat as the more common methodology adopted by water companies in the UK.

Stakeholder Comments

In initial submissions, GAWB indicated that it does not have a strong preference for either the Turvey or AIC methods. GCC and CSC submitted that the estimation of LRMC can differ markedly depending on the methodology employed and that the different methods for deriving marginal cost and average cost should be reviewed. The Councils suggested that perhaps an average of the Turvey and AIC method should be taken to prevent significant changes between regulatory reviews.

In response to the Draft Report, GAWB supported the Authority's use of Average Incremental Cost to estimate LRMC. GCC also submitted that the new measure of LRMC is appropriate.

QCA Analysis

Published literature on the approach for calculating LRMC is limited and has not been significantly advanced since the early defining works were written by Turvey (1976), Hanke (1981) and Mann et al (1980).

The Authority commissioned Marsden Jacob Associates (MJA) to undertake a review of alternative methods for estimating LRMC, focusing on the Turvey and AIC methods. A more comprehensive overview of the two methods, based on analysis by MJA, is provided in Appendix 1.

MJA noted that both approaches incorporate a component for SRMC and a marginal capacity cost (MCC). MJA note that, for all practical purposes in the water industry, estimating SRMC by reference to operating costs seems a reasonable proxy.

MJA's interpretation of the Turvey method is based on published literature which recognises only the next increment in capacity and ignores any future increments that may exist in the planning period.

MJA also note that, based on the literature, there is some uncertainty as to whether the SRMC in the Turvey method should be based on the immediate SRMC or the SRMC following the first upgrade. The Turvey method may also be appropriately adjusted to account for residual values at the end of the planning period.

In the AIC approach, SRMC is the present value of marginal operating costs over a designated planning period. The AIC method estimates the MCC as the present value of a stream of capital costs needed to satisfy projected demand increments, divided by the present value of the stream of demand increments. Where the AIC method is not derived over the full asset life, a residual value should be established at the end of the planning horizon.

MJA noted that the two approaches would generally not give the same estimates for marginal capacity cost (MCC). MJA assessed the alternative approaches against the key principles of:

- *demand efficiency* – users should be charged no more or no less than it costs to produce the unit of service to them;
- *supply efficiency* – the water utility should be able to recover sufficient costs to sustain the provision of services required by customers;
- *a solid theoretical foundation* – any cost concept or methodology employed should be based on solid theoretical framework;
- *fairness and objectivity* – the pricing methodology should be based on objective decision criteria and result in a fair outcome;
- *pricing stability* – the charges, and components making up the charges, resulting from application of the methodology should not fluctuate substantially from year to year;
- *transparency and reliability* – the pricing regime should be explainable and credible to consumers and defendable to government and regulators and minimise potential for error;
- *practicality and ease of understanding* – the pricing methodology should be understandable, easy to use and practical; and
- *flexibility* – the methodology when applied to different circumstances should be adaptable and sensibly yield different outcomes.

MJA's analysis concluded that both methods meet the criteria of demand and supply efficiency, are based on a solid theoretical foundation (despite some lack of clarity in specification of the Turvey method) and are fair and objective. However, MJA's assessment of the practical application of the two approaches favoured the AIC approach on the grounds that:

- the AIC approach incorporates all augmentations over the planning period, not just the first augmentation as is the case with the Turvey method. Hence, it will produce more stable prices over the planning period;
- it has advantages in cost and decision rules being fully transparent and readily explainable to stakeholders; and

- it is easy to understand and computationally straight forward, despite a requirement for forward looking data for capital and associated marginal operating costs which is more comprehensive than that required for the Turvey method.

The Authority considers that the instability associated with the Turvey method could be rectified by taking into account all capacity increments envisaged over the planning period. Further, the Turvey method may also be appropriately adjusted to account for residual values at the end of the planning period.

A more fundamental issue with the Turvey method is that it has not been fully developed in the academic literature and there is some imprecision in its application. There is greater clarity on the practical application of the AIC method.

The Authority considers that the Councils' suggestion that both methods should be used and averaged would impose unnecessary additional computational constraints and would make the resulting LRMC less transparent and more complex.

Given that both methods are acceptable on conceptual grounds, the Authority considers that either method could be used provided that:

- all planned augmentations are incorporated – this is automatically the case with the AIC method. While the Turvey method can be adapted to incorporate all augmentations, it essentially then becomes a variation on the AIC method; and

- both incorporate a residual value.

Based on MJA's analysis, the Authority favours the AIC method on the basis that it is more transparent and explainable, and is generally the preferred method in empirical practice, most notably by UK water businesses.

The Authority recommends that LRMC be estimated using the Average Incremental Cost (AIC) method.

4.3 Application of Two Part Tariffs to GAWB

Background

In its previous investigation, the Authority recommended that a two-part tariff apply to each class of customer, with a volumetric charge based on LRMC and an access charge comprising the residual required to achieve required revenue. The two-part tariff was established for each customer by aggregating the estimated LRMC for each relevant segment and the estimated access charge for each segment.

Stakeholder Comments

In its initial submission, GAWB proposed to implement contracts for all customers incorporating a two-part tariff with a 100% take-or-pay access charge based on contracted volumes. GAWB further proposed separate two-part tariffs for water availability (storage services) and the delivery system (delivery services), because of their different cost drivers.

In its initial submission, for storage services, GAWB proposed a two-part tariff comprising of:

- a Water Volume Charge ($/ML) paid on the actual volume consumed and based on the LRMC of storage services. GAWB proposed the volumetric charge would vary annually to reflect LRMC. In addition, a 50% load-factor was proposed where consumption exceeds the reservation volume. Where GAWB had been informed beforehand of the excess consumption and the impacts could be managed by GAWB at no additional cost, the excess charge would not be imposed; and

- a Water Access Charge ($/ML) for the residual revenue. GAWB's proposal was for the fixed charge to be payable on a set('reservation') volume and to be fixed for 5 years, or subject to annual CPI. The reservation volume would be subject to change in the light of demand trends.

GAWB also proposed a two-part tariff for delivery services comprising of:

- a Delivery Volume Charge ($/ML) paid on the actual volume of water delivered to the supply point and based on the LRMC of delivery services. An 'excess instantaneous charge' based on a 50% load-factor was proposed where the required maximum instantaneous flow rate exceeds the contracted rate. Where customers informed GAWB of a requirement to exceed their contracted instantaneous flow rate, and the additional consumption imposed no cost on GAWB or other customers, the excess instantaneous flow rate charge would not be applied; and

- a Delivery Capacity Access Charge ($/ML/s) payable on the maximum instantaneous flow rate specified in the contract.

The storage services outlined above were to be incorporated into a Water Contract. GAWB proposed to introduce tradability for Water Contracts, with trades subject to its approval because of concerns over counter-party default risk. Customers who purchased water contracts from other customers would pay the associated storage access charge plus the standard volumetric rate for each unit of water consumed. GAWB's proposal did not expand on how delivery services would be priced in respect of traded contracts..

In other initial submissions:

- CS Energy considered that difficulties exist for GAWB in planning and price setting where there is a difference between volume of water actually used by customers compared with their individual contractual allocations;

- Comalco submitted that a framework for water trading be established within the user community, or at least between entities related through ownership; and

- CPM submitted that the regulator's pricing calculation must be based on the higher of contractual or actual volumes as, if GAWB has a contractual requirement to provide capacity to a certain customer, the costs of doing so must not be carried by other users. Further, regulatory pricing should also accommodate 'banking' of water entitlements (i.e. it would be more efficient for CPM to store water in Awoonga Dam, as property of CPM, until it is required).

In response to the Draft Report, GAWB sought clarification that the Authority supports GAWB's move to delivery prices based on customer nominated peak instantaneous demands.

GAWB also responded to the Authority's proposal for a load factor or penalty charge to apply where customers' actual consumption is higher than the contracted amount. The Authority proposed a two tier approach with a 25% penalty to apply to the access charge where actual consumption is between 110% and 125% of the contracted amount of industrial customers, and

a 50% penalty would apply where actual consumption is higher than 125% of the contracted amount.

GAWB did not agree with the proposed specific charge calculation regime. GAWB considered that the incentive would be so marginal that it would have no effect. GAWB also provided an example of the penalty charges which indicated that a consumption over-run of 50% of the nominated allocation could result in a price increase of only 3%.

GAWB suggested that there may be incentives to nominate contract quantities lower than expected consumption levels, particularly where capacity is scarce and the access charge becomes a smaller component of total charges. It suggested that this may be an unintended and perverse outcome of the Authority's proposed approach. GAWB therefore proposed that the excess volume charges should apply to the sum of the access charge and the volume charge.

In addition, GAWB submitted that Councils should have the same penalty charge arrangements as other customers. GAWB did not accept that a customer with a more volatile consumption pattern should be excused from the excess charges. CS Energy also did not accept the different approach for Councils.

GAWB also made additional comments on the issue of over-runs:

- GAWB is not obliged to supply water in excess of the annual quantity specified in the water contract or at a rate exceeding the maximum flow rate set out in the delivery contract;
- GAWB may waive the penalty charge where there are exceptional circumstances or where there are no consequential costs incurred by GAWB; and
- a customer taking supply in excess of its contract specifications is liable for any consequential costs incurred by GAWB.

GCC noted that, under the proposed tariff arrangements, where a load factor of 10% is to be applied to the access charge where actual consumption exceeds 125% of the contracted amount, it may be beneficial for Councils to continually underestimate their demand to reduce their relative fixed charge.

CSC noted CPM's comments in relation to banking of water, but suggested that any proposal would need to include a factor for evaporation and the holding cost of water.

CS Energy submitted that water banking is an integral part of demand management and requires further consideration by the Authority. It noted that it unsuccessfully sought a banking facility during the drought in 2002-03 and stated that GAWB must demonstrate a willingness to reciprocate for cooperation from customers in times of distress. CS Energy proposed that relief from take or pay provisions or the ability to take water at a later date at no charge or a reduced charge are possible ways to deal with the matter.

QAL supported the Authority's comment that banking of water demand for future use is valid, but considered that there must be an allowance between regulatory periods for a reduced access charge so that water users have the incentive to reduce demand.

In addition, QAL submitted that water users should have the right to trade water unfettered by GAWB as this would enhance competitive local markets.

QCA Analysis

Issues in applying two-part tariffs to GAWB include:

- the proposal to separate charges for the storage and delivery components (separate two-part tariffs) rather than in a single two-part tariff;
- the basis for establishing access charges for storage services, with options including actual usage, contracted entitlements or anticipated demand;
- the basis for volumetric charges for storage;
- the basis for establishing access charges for delivery services, with reference to instantaneous flow rates;
- the basis for volumetric charges for delivery;
- the use of load factors where customers seek more storage or delivery services than specified in their contracts; and
- 'banking of water' and trading.

Separate Two-Part Tariffs

GAWB's proposal to separate storage and delivery two part tariffs is consistent with the approach adopted in the Authority's previous investigation. The Authority's previously recommended prices were based on the LRMC-based volumetric charges for each segment. Storage and delivery charges were separable although indicative prices were expressed as a single price. The Authority considers that GAWB's proposal provides greater transparency and opportunities for greater flexibility for customers.

Basis for Access Charges - Storage

GAWB's proposal to calculate access charges for the storage two part tariff using contracted demand is considered appropriate as contracted demand (or the reservation amount) is a key driver of capacity and therefore costs.

Such an approach, however, could result in higher costs for existing customers where these customers have over time reduced their demand relative to that specified in historical contracts.

Existing customers in this position could trade their unused contract volumes to other customers. However, such opportunities may be limited when GAWB has additional capacity available for new customers. Alternatively, rather than trading its unused contracted volume to other customers, a customer may negotiate with GAWB to reduce its contracted volume. However, GAWB need not agree to a proposed reduction. Nevertheless, as customers' requirements drive capacity, GAWB's proposed arrangements are considered appropriate.

Customers will need to accurately forecast long term consumption, and any expected variations in consumption, in order to ensure a close match between contracted and actual usage. Any strategies by customers to take advantage of lower access charges where an augmentation is imminent would need to be balanced against the cost of meeting higher access charges once the augmentation is in place.

Basis for Volumetric Charges for Storage

As noted in Section 4.2 above, the Authority proposes that the volumetric charge be based upon the LRMC, estimated using the AIC method. GAWB's proposal is consistent with the proposed approach to estimating LRMC.

Basis for Access Charges - Delivery

GAWB's proposal for delivery system charges is based upon the maximum instantaneous flow rates required to service each customer.

GAWB's proposal to adopt this may result in significant permanent increases in access charges for customers with low levels of 'normal' demand but high peak demand relative to other customers in the network segment. However, given that their usage patterns require such capacity, such an outcome would be consistent with cost reflectivity.

GAWB sought clarification on the Authority's position in relation to pricing on the basis of peak instantaneous flow demands. As these arrangements may require additional metering and monitoring, the costs of implementing such arrangements should be assessed against the benefits. Typically, benefits take the form of deferred augmentation, so that pricing signals on the basis of peak flow rates may only be justified where pipeline or pumping capacity emerges as a constraint. In general, however, the main constraint on using peak flow rates is the availability and cost of time-of-day or time-of week metering.

A key issue with the implementation of pricing according to peak flow rates is the uncertainty in revenues given that customer responses to the proposed approach are not known. Additionally, there is uncertainty as to how the peak flow rate pricing signal could be passed on by the Council customers to their own retail customers.

The Authority notes that Brisbane Water, in supplying its customer Councils, allocates costs according to each Council's share of peak demand. Generally the peaks are driven by daily temperature and hence it is assumed that Councils' peaks are simultaneous peaks, and thus there are no complex metering issues. However, in GAWB's case, it could not be assumed that peak flow rates would reach simultaneous peaks given the dominance of industrial customers in total demand. More sophisticated metering mechanisms would seem to be required.

The Authority is aware that peak flow rate pricing will emerge as an increasing focus in the water industry. Appropriately applied, such arrangements have the potential to provide substantial benefits. Accordingly, the Authority accepts that GAWB's proposal for charges to be based on maximum instantaneous flow rates has merit, but that it is a matter for GAWB to assess the net benefits. In the meantime, the Authority's maximum indicative prices are based on contracted volumes for delivery purposes.

Basis for Volumetric Charges - Delivery

GAWB's proposal is for the delivery volume charge to be based on the actual volume of water delivered to a supply point, based on the LRMC of new delivery capacity. This proposal is consistent with the Authority's approach.

Load Factors (Penalty Charges)

In response to the Authority's Issues Paper, GAWB proposed a 50% load factor for excess storage and/or delivery usage as an incentive for customers not to understate anticipated demand and the associated contract reservation volumes. The load factor was proposed to apply to the access charge or take-or-pay component. In response to the Draft Report, GAWB was

concerned that, under LRMC pricing, a load factor or penalty charge applied only to the access charge may not provide sufficient incentive for customers not to understate demand. GAWB therefore proposed that the penalty charge should apply to the total charge.

Where customers underestimate their demand, they face the prospect of a lack of supply. However, they also potentially impose costs on other customers through higher prices as any augmentation required to meet unanticipated demand could incur higher costs than otherwise (due to the lumpiness of the augmentation required). To remove the incentive for such strategic approaches to estimating demand, and having regard to the costs imposed, some form of penalty is therefore considered necessary.

The arrangements proposed by the Authority in the Dalrymple Bay Coal Terminal (DBCT) draft decision (QCA 2004) provide, for users whose throughput exceeds contracted capacity, additional charges on that portion of throughput that exceeds contracted capacity as follows:

- a 25% additional infrastructure charge to apply to incremental throughput levels between 110%-125% of contracted capacity; and

- a 50% additional infrastructure charge to apply to incremental throughput levels greater than 125% of contracted capacity.

Such a potential penalty should provide the necessary incentive for industrial customers to estimate demand appropriately. Progressively higher penalties provide some buffer for genuine exigencies related to such forecasting. The penalty charges apply as additional charges to the infrastructure charges.

In the case of GAWB, the access charge will vary over time and between system segments depending on the shortfall between LRMC, which sets the volumetric charge, and total costs. The hypothetical example provided by GAWB would occur where LRMC is relatively high, and the access charge as a consequence relatively low. The Authority accepts that, where the access charge is relatively small as a percentage of the total charge, as in GAWB's example, the penalty effect would be reduced.

Accordingly, the Authority accepts GAWB's proposal for the penalty charge to apply to the total charge, that is, the access charge and the volumetric charge. This means that, in effect, where a customer's consumption exceeds its contracted amount by more than 10% but less than 25%, a penalty charge of an additional 25% would apply to the total charge for the incremental volume. Where consumption is more than 25% higher than the contracted volume, the penalty charge rises to 50% of the incremental volume. Penalty charges may be applied at GAWB's discretion and prior arrangements may be made between GAWB and the customer.

The Authority also accepts that specific contractual arrangements may be negotiated for individual customers in regard to penalty charges or where usage exceeds the contracted amount. These may cover whether or not GAWB is obliged to supply water, whether it may waive or reduce penalty charges or whether specific consequential costs are to be met.

In regard to issues raised by GCC, the Authority is aware that Councils (and other customers) may have an incentive to continually underestimate their demand given the greater scope for variation proposed for Councils. However, the key disincentive to such a strategy is that Councils may find that they have insufficient supplies when capacity is reached; or when drought restricts supplies. In addition, under-estimation of demand could incur higher costs than otherwise (due to the lumpiness of the augmentation required), which would result in higher prices for all customers.

The Authority maintains its view that, in the case of the Councils, there are greater inherent difficulties associated with estimating urban demand. For the Councils, it is recommended that:

- no penalty charge apply where actual consumption is less than 125% of the contracted amount; and

- a 10% penalty charge apply where actual consumption is higher than 125% of the contracted amount. The penalty charge is to apply to the total charge in respect of amount consumed in excess of the threshold amount.

Where customers overstate demand in contracts, they can impose additional infrastructure capacity costs and it is considered appropriate that GAWB recover such costs through the access charge for the contracted volume. This is consistent with GAWB's proposals and the Authority's arrangements relating to the DBCT although, in that case, take or pay arrangements operate within a band of 90 to 110% of the contracted amount.

Banking and Trading

Water banking represents the capacity to transfer the utilisation of contracted demand between periods. A number of GAWB customers have indicated that water banking should be introduced to provide for greater flexibility in relation to the timing of water use and improved incentives for water-use efficiency measures. To establish a water banking facility for its customers, GAWB would need to construct an appropriate set of rules. Such rules would need to take into account appropriate evaporation loss factors and holding charges to apply in respect of the carry-over of contracted demand from one period to the next. Limitations on the volume of contracted demand that can be transferred between periods may also need to be established to ensure that GAWB is able to satisfy both its future contractual requirements to supply its customers and the infrastructure operating rules which are set out in the Boyne Resource Operations Plan.

The Authority concurs with QAL's general view that, once the trading rules are established, GAWB should only be directly involved to ensure that there are no physical or capacity constraints in delivery systems, to enable any changes in delivery costs to be identified, and to enable appropriate billing.

The Authority recommends that:

- **two-part tariffs be applied separately to storage and delivery services for each customer;**
- **a 100% take-or-pay component should be incorporated in access charges based on contracted volumes. GAWB should be able to vary contracted volumes at its discretion in response to customer requests;**
- **where actual demand exceeds the contracted volume for industrial customers, unless otherwise negotiated with GAWB, an additional load factor or penalty charge of:**
  - **25% apply to the total charge for incremental volumes where actual consumption is between 110% and 125% of the contracted amount;**
  - **50% apply to the total charge for incremental volumes where actual consumption is higher than 125% of the contracted amount; and**
- **where actual demand exceeds the contracted volume for Council customers, unless otherwise negotiated with GAWB, a load factor or penalty charge of 10% apply to the total charge for incremental volumes where actual consumption exceeds 125% of the contracted amount.**

4.4 Differential Pricing

Where there are differences in the cost of providing services, differential prices provide appropriate incentives to users and service providers to use resources and services in a cost-effective manner. At the same time, it may not be possible or cost-effective to differentiate in this manner.

Key issues in regard to price differentiation relate to geographic differences, the pooled pricing arrangements for GAWB's Council customers, pricing between new and existing customers, and pricing for different supply reliability standards. Other potential sources of price differentials include counter-party default risk and contract length.

Geographic Differentiation

The Authority's previous investigation recommended that differentiated prices be adopted for each of the identified geographic segments of the network, as GAWB's water supply system has a number of clearly defined components and involves specific infrastructure to supply customers in defined geographic areas.

The Authority noted that the establishment of prices for each class of customer is more cost reflective than equalised or system wide charges, and does not add to administrative costs or complexity, as GAWB already identifies costs on such a basis.

Other Jurisdictions

The Authority notes that differentiated pricing is applied to a range of regulated industries. For example:

- in the case of electricity, differential pricing is a requirement under the *National Electricity Code* which stipulates that the usage component of transmission prices be set on the basis of cost reflective pricing, which is defined as the share of system assets used to supply each connection point.

  In addition, spot prices paid to electricity generators are adjusted to account for loss factors incurred during transmission and distribution of electricity;

- the approach for gas transmission pricing mirrors the approach for electricity transmission pricing. By way of example, in its 2003 third-party access decision for the Moomba to Sydney gas pipeline, the ACCC presented separate regulated prices in respect of each of 36 off-take points.

  Further, NSW and Victorian gas distribution businesses are required to apply zonal tariffs. Differential pricing also applies in gas retailing with transmission losses to be accounted for when calculating how much gas must be entered into the system by each retailer; and

- in the case of telecommunications, customer access network charges in Australia vary significantly across urban, metropolitan, regional and rural zones. The connection, network and access deficit charges are subject to variation related to the geographic location of lines (ACCC 2002b) in accordance with four 'bands' that are delineated on the basis of teledensity.

Differential pricing is also utilised in the water industry. Examples include:

- Hunter Water in NSW provides a tiered pricing structure with lower prices applicable to industrial users located close to the water storage in reflection of the lesser dependence on pipelines;

- Goulbourn Murray Water sets separate tariffs for each of its 6 different irrigation districts;

- Coliban Water in Victoria differentiates prices on the basis of the variation in supply cost for different water infrastructure and supply systems; and

- Harvey Irrigation in Victoria differentiates prices according to operating costs and scheme assets.

Stakeholder Comments

In initial submissions, GAWB supported retention of geographically differentiated pricing for delivery services. CPM submitted that customers served directly from Awoonga Dam should not have to pay proportionately for the costs of augmentations elsewhere (e.g. Castle Hope Dam) where they do not receive proportional benefits. CPM further argued that the Authority should maintain a 'dam only' segment for price differentiation.

In response to the Draft Report, CSC commented that the pricing methodology needs to be reviewed, stating that 'while we charge a so-called postage stamp price for electricity, telecommunications and other services, the QCA says that this option is not acceptable for water'. Mrs Liz Cunningham, Member for Gladstone, also cited the example of electricity pricing. Mrs Cunningham referred to the CSO applied by Government to the passenger rail system in the South East Corner. 'If customers paid per kilometre of assets used, those commuters further removed from the city would pay such an exorbitant amount as 'end line users' that elected representatives could never survive the revolt'.

More generally, QAL was concerned that 'there be no pricing differentiation or cross-subsidy between farmers, councils, government and industry, and sought assurances from the QCA that this is not the case'.

QCA Analysis

The Authority recognises that GAWB's water supply system has a number of clearly defined network components which result in significant differences in costs for servicing customers according to their location. Gladstone provides many alternative, widely separated opportunities for both industrial development (ranging from the northern industrial area to Boyne and possible sites adjacent to the dam) and residential location (from Mt Larcom to Boyne/Tannum).

To ensure that customers are cognisant of the costs associated with their locational decisions and level of services they seek, customer specific pricing reflecting those costs is considered appropriate. Such prices need to reflect the costs of the dam and each of the segments of the delivery system relevant to the particular users.

Such an approach has been reflected in past pricing arrangements for all customers with the exception of the price equalisation arrangements for the two Councils. It is stressed that, so far as the Councils are concerned, this issue relates only to the bulk water price charged by GAWB. Under the *Local Government Act 1993*, Councils can apply rates and charges to their own customers on any basis that they see fit, including postage stamp pricing.

GAWB has identified the same operational sectors as identified in the previous investigation:

- raw water sectors - Awoonga Dam; Awoonga to Toolooa; Toolooa to Gladstone (Fitzsimmons St Reservoir); Gladstone (Fitzsimmons St to Gladstone Water Treatment Plant); Gladstone to Boat Creek Junction (Mt Miller pipeline); Gladstone to Yarwun (existing Hansen Road pipeline); Boat Creek Junction to Yarwun Water Treatment Plant; Boat Creek Junction to Fishermans Landing; and Boat Creek Junction to Aldoga. In addition, there are customer spurlines from Toolooa to Boyne Island, Gladstone to Parsons Point and Boat Creek to East End Mine; and

- treated water sectors - Gladstone Water Treatment Plant to Gladstone City and Calliope Shire, with specific sectors for Gladstone area industrial customers (including NRG, QAL and the Gladstone Port Authority) and to Boyne Island industrial customers (including Boyne Smelters Limited). Supply from the Yarwun Water Treatment Plant to the northern industrial area and Mt Larcom are recognised as separate sectors.

The future addition of new supply sources may require a reconfiguration of the operational sectors and different aggregations of common infrastructure for pricing. However, such reconfiguration is not envisaged at this stage.

The Authority concurs with CPM's comments regarding a dam only sector. However, the separation of a storage sector would become more complex should a storage augmentation be required in a different location, for example, the Fitzroy or Calliope River. Some customers may be able to source water directly from both storages, while others may only be able to source water from one of the storages. The allocation of costs in such circumstances would need to be revisited. As noted above, the Authority agrees with GAWB's proposed separation of tariffs for storage and distribution services.

In response to submissions from CSC and Mrs Cunningham, the Authority notes that, as outlined earlier, there are many examples of differentiated pricing for utility services in Australia. Further, differentiated pricing has been applied in the water industry, both interstate

and for other Councils in Queensland, with different prices reflecting different costs applied to different townships within a Shire. An example of such differential charging is CSC, which charges Mt Larcom residents a fixed cost charge of $428 per service compared with $154 to other CSC residents.

In relation to QAL's comment, the Authority's principles are based on cost-reflective pricing without any sectoral cross-subsidies. However, the issue of pooled prices for the two Councils, as noted below, is a separate issue, which has no impact on other users.

The Authority recommends that prices be differentiated for all customers according to their utilisation of specific components of GAWB's infrastructure network.

Differentiation between Councils

In its previous investigation, the Authority recommended that differentiated prices be adopted for all customers, with the exception of GCC and CSC which were to be treated as a single entity. The exception for the two Councils was allowed on the basis of a joint submission made by the two Councils and CSC's advice that '*the decision to originally form the water board clearly shows that the provision of water supply to the region has no relationship to the location of local government boundaries*'.

Stakeholder Comments

In its initial submission, GCC proposed that the previous approach of price equalisation should no longer be adopted. GCC noted a Council resolution that, in the interest of the City's ratepayers, representations should be made to the Authority for non-equalised pricing to be reconsidered as part of the current investigation. GCC argued that:

- the extent of cross-subsidisation between GCC and CSC was not fully appreciated at the time of the previous investigation;
- pooling prices with CSC would result in Gladstone end users paying more than otherwise would be the case, while CSC residents would pay less; and
- had any alternative approach to supplying CSC been considered at the time of the original decision, it would have resulted in CSC residents paying a significantly higher price for their water than currently.

CSC's initial submission noted that equity is a critical reason for the pricing review process. It argued that no thought has been given to the price implications of the pre-existing network configuration and the consequential winners and losers created by this configuration.

CSC submitted that GAWB's pricing should not adversely impact on CSC customers, simply because of the current network configuration, which was constructed 'because of both historical and overall efficiency reasons'. Furthermore, CSC submitted that, under differentiated pricing:

- CSC would 'pay for 3 times the length of main that would be required if the treatment and delivery system was optimal for Calliope Shire residents'; and
- a greenfield approach to asset valuation and optimisation would be more equitable, which could include relocation of the existing water treatment plant to Benaraby, or establishment of a new water treatment plant.

GAWB submitted that the most appropriate method of delivering price equalisation across the Councils is for the Councils to directly manage the process, that is, outside the regulatory framework.

In response to the Draft Report, CSC supported the Authority's approach to common pricing for the two Councils.

The Member for Gladstone, Mrs Liz Cunningham noted that the price equalisation policy 'reflected an historic agreement to transport the water from Awoonga Dam for Calliope Shire via Gladstone to ensure Gladstone (more geographically remote from the water source than Calliope) could receive much needed water while CSC and the Calliope township received potable water through Gladstone albeit making the piping infrastructure to Calliope unnecessarily long'. Mrs Cunningham then noted that the Authority had applied a different policy to Mt Larcom.

The Authority's decision to retain an equalised pricing arrangement for the two Councils was GCC's major concern in relation to the Draft Report. Issues raised by GCC included that:

- the Councils have separate customers, separate budgets and very different cost structures;
- there is a contradiction in that price differentiation is applied to Mt Larcom;
- the regulatory decision could result in cross subsidies between a Council customer in one location and a bulk water customer in the same location;
- it is not certain that the original intent of the scheme was to provide treated water to both Council customers at a price based on average cost of supply;
- the pricing principles of any implicit or explicit agreement must now be deemed irrelevant in light of the adoption of NCP and COAG water reforms, particularly towards full cost recovery;
- the previous pricing regime was based on operating costs only, most of which are attributable to the operation of the water treatment plant. Now that return of capital and return on capital are required to be recovered from the distribution network, the old pricing regime is no longer valid and should be reviewed;
- if there are government policy issues with respect to past decisions, these should be handled directly between government and the particular customer. The State Government should provide a CSO to meet the price differential between Calliope Shire and Gladstone City;
- a cross-subsidy, or at best significant price discrimination, will always exist between the residential, commercial and industrial users of Gladstone and the residential, commercial and industrial users of Calliope Shire; and
- in regard to potential bypass options proposed by CSC, GCC noted that whether or not a customer wishes to proceed with an alternative solution is a separate issue and should not be considered when determining whether a pooled price should exist.

GAWB suggested the following course of action. For existing infrastructure:

- GAWB continues to charge pooled prices with the amount of price equalisation being explicitly calculated and reported to Councils;

- the industrial north class should be excluded from equalisation; and

- the current price benefit of capital subsidies should be, with Council approval, converted into GAWB liabilities specific to each Council. According to GAWB, this will provide flexibility for Councils to be paid out ahead of time, or enable the Councils to convert the payment stream into an immediate cash sum. However, GAWB indicated that there may be tax implications for the parties and that a view would be required on the expected life of relevant infrastructure as well as changes in the pricing, tax and regulatory framework in the future.

For new infrastructure, GAWB proposed that the starting point should be a commercial cost reflective basis. GAWB suggested that the Authority should provide explicit recommendations in this regard. GAWB also indicated that future capital subsidies should be passed through to Councils directly and not reflected in prices.

The question of whether Mt Larcom should be included in the pooled pricing arrangements was also raised extensively. The Authority received 83 submissions from residents and community groups of Mt Larcom in regard to the implications of the differential pricing approach for town water prices. Of these, 33 submissions specifically queried the differential charge for Mt Larcom, most stating that the price should be set at the same level as the remainder of Calliope Shire. In addition:

- CSC submitted that the pooled price for the two councils should incorporate Mt Larcom, and stated that this was the situation prior to, and following, the first QCA review.

- Councillor Todd Comrie, CSC, also indicated that Mt Larcom has previously been included in the price equalization arrangement;

- the Mt Larcom and District Chamber of Commerce questioned why Mt Larcom was not included in the pooling of prices of the two Councils; and

- DNRM suggested more investigation of this issue to identify the benefits and costs associated for each customer, and suggested an option of including Mt Larcom in the arrangements should be assessed.

QCA Analysis

The basis for the Authority's previous recommendation to support common pricing was that:

- there was an historical arrangement for a common price between the two Councils, on the basis that GAWB was established as a regional service entity with no regard to local government boundaries; and

- the Councils continued to support pooled pricing in submissions to the Authority on the previous investigation.

Historical Arrangements

In the Authority's previous investigation, which culminated in a Final Report of recommendations being released in September 2002, there was general agreement from all relevant parties for pooling of Councils' prices. Submissions in response to the Issues Paper of April 2001 were as follows:

- GCC's submission of 25 May 2001 stated that: 'Council accepts that there should be no price difference for treated water between the two Councils';

- CSC's submission of 9 May 2001 stated that 'The GAWB and the two local governments have accepted that no price differentiation should exist between the two Councils. This was the basis on which decisions such as the treated water line to Calliope were made… The decision to originally form a water board clearly shows that the provision of water supply to the region has no relationship to the location of local government boundaries'. CSC further says that 'the town planning schemes of both Councils recognise that urban growth will only occur in the triangle between Gladstone, Boyne/Tannum and Calliope. Consequently, the GAWB accepts that this is the boundary for urban water supply distribution and pricing'; and

- GAWB's submission of 4 June 2001 proposed that '…it may be administratively burdensome to price differentiate treated water. A further reason for treated water not be priced differentially by geographic region is that this may have unwanted price variation within the regional urban community'.

Since the previous recommendations, GCC has changed its position, as indicated in its submissions in response to the Authority's April 2004 Issues Paper and December 2004 Draft Report. In response to initial submissions, the Authority noted CSC's arguments that, at the outset of the water supply scheme, various matters were agreed in relation to infrastructure location and other decisions on the basis of future pooled pricing arrangements. In particular, the Authority noted comments by the Coordinator General (July 1971) when proposing to increase the storage capacity of Awoonga Dam and establish a Water Authority to manage the envisaged water supply augmentation programme for the Gladstone-Calliope area that:

> The Calliope Shire Council has expressed its anxiety at the fact it has not been permitted to investigate its own independent source of water for supplying water to the newly developing areas in its shire. (This would, in effect duplicate part of Gladstone Town's system and would not lead to efficiency on an overall regional basis.)
>
> In the report [Gladstone Infrastructure for Development Report] and its substantiating reports the scheme envisaged to supply water to the Gladstone-Calliope Area is an integrated one, developing initially the full potential of the Boyne River Catchment.

This appeared to indicate that, in establishing GAWB and its treated water distribution network, it was the Government's intention to adopt a regional approach for the supply of treated water for domestic consumers in both Councils. Government subsidies were provided for regionally based infrastructure to service domestic customers. There has been no departure from a common pricing policy for the two Councils since the inception of the Board.

In its subsequent submission, GCC indicated that the agreement related to operating costs only, most of which are attributable to the operation of the water treatment plant. However, the information available to the Authority is that:

- from 1976, Council customers were charged a price which included raw water costs (adjusted for the State Government subsidy for residential users), the operating and maintenance costs for treated water plus a share of the interest and redemption costs for treated water; and

- from 1995-96, with the prospect of GAWB's commercialisation and the onset of NCP reforms generally, GAWB, in consultation with the Councils, annually increased the pooled price at above CPI. As at 2000, therefore, the Councils' pooled price included at least some component for capital costs.

The Authority acknowledges that, following commercialisation of GAWB and adoption of full-cost pricing including a return on capital and return of capital, the cost differentials between the two Councils have become more marked.

The Authority recognises that there are significant differences in the cost of service delivery even between the urban areas of Calliope Shire and Gladstone and accepts that, with the greater emphasis on cost reflectivity, there is a presumption in favour of segmenting costs wherever it is possible to do so with reasonable certainty.

On specific matters raised by GCC, as noted above:

- the Authority's pricing framework meets the COAG requirements in terms of full cost recovery. In the case of the Councils, the historical pooling arrangements and overall intent of Government policy (as identified in the Draft Report) had been accepted by the Authority as over-ruling the generally preferred approach of differential pricing to reflect costs;

- it is accepted that the Councils have different costs and budgets, but that again, the historical pricing arrangements over-rule this principle;

- price differentiation was applied to Mt Larcom by the Authority as it was outside the main urban growth area bounded by Gladstone, Calliope and Boyne Island which, based on advices received from CSC, was understood to be the area covered by the original agreement (see further on this matter below);

- any potential for cross subsidies depends on the costs of servicing different customers and is subject to Councils' own decisions regarding pricing for industrial customers. However, on the basis of the definition of a cross-subsidy applied in local governments throughout Queensland, there is no cross subsidy in the prices between Calliope Shire, Gladstone and Mt Larcom, although different levels of cost recovery are achieved. Under the Guidelines for the Identification and Measurement of Cross-Subsidies (DNRM, 1998) a cross-subsidy arises where there 'is any paying class of consumer paying an average charge less than the LRMC while another class is paying an average charge higher than LRMC'

- the Authority adopted pooled pricing on the basis of an original historical agreement which was advised to the Authority in the previous investigation. This means that, in effect, prices are averaged across the designated area;

- the Authority was previously advised of the existence of the agreement at a time when Councils were well aware of the implications of the adoption of NCP and COAG;

- at the time of the last investigation, GCC was aware of GAWB's move to commercially based prices, and continued to support pooled pricing;

- the issue of a CSO is a matter for government. Under the CSO policy framework, to qualify as a CSO, an activity must involve a non-commercial product or service and be purchased by the Government on behalf of the community; and

- the Authority accepts that, if the prices were differentiated, the differences would be significant.

The Authority continues to hold the view that the pooling arrangements do not cover industrial customers served by the Councils and GAWB. Hence, the industrial north customers should pay cost reflective prices, as submitted by GAWB.

Issues relating to Differentiated Prices

Differential or nodal pricing for each Council, with separate prices for CSC according to its major geographic residential precincts, would be consistent with the cost-reflective pricing principles recommended for GAWB by the Authority.

Differential pricing under current supply arrangements and assuming no change to infrastructure would be likely to result in a substantial price rise for CSC and its domestic customers, while delivering lower prices to GCC.

Differential pricing could induce CSC to put in place alternative arrangements to bypass GAWB's treated water supply.

Were CSC to actually adopt a bypass option, GAWB would likely have some redundant assets (such as the Gladstone Calliope pipeline and some water treatment capacity) and GCC (and other treated water customers) would be required to meet some of the cost of spare treatment plant capacity. However, CSC would also incur costs involving treatment costs and trunk mains to supply Calliope and Tannum Sands.

Hence, overall regional supply efficiencies sought by the Queensland Government may not be achieved.

Nevertheless, the by-pass price of service delivery does provide a legitimate ceiling to pricing provided that all costs are taken into account.

Mt Larcom Prices

The issue of whether Mt Larcom should be included in pooled pricing arrangements was a key theme in many submissions to the Authority.

The Authority notes that the historical price pooling arrangements did not encompass outlying areas such as Mt Larcom and the northern industrial area. GAWB has previously applied a separate price to CSC for services to Mt Larcom when it was supplied with raw water. Both Mt Larcom and the northern industrial area are now supplied with treated water from the Yarwun Water Treatment Plant.

The Authority's understanding prior to the Draft Report was that Mt Larcom township was excluded from the pooled pricing arrangement. Relevant advices on which the Authority relied for this conclusion included:

- CSC's submission of 9 May 2001 which identified coverage as being restricted to the triangle between Calliope, Gladstone and Boyne Island/Tannum Sands; and

- the fact that Mt Larcom did not receive treated water at the time of the historical agreement.

Since the release of the Draft Report, the Authority has been advised by GAWB and CSC that, upon conversion of Mt Larcom's supply to treated water in 2002, 'understandings' have been reached between CSC and GAWB, and appear to have been accepted by GCC, to include Mt Larcom in the pooling arrangements.

It is proposed to accept these representations and incorporate Mt Larcom into the price paid by CSC for water. No separate maximum indicative price will therefore be issued for water supplied by GAWB to CSC and intended for Mt Larcom. When account is taken of the

arrangements involving Cement Australia, the inclusion of Mt Larcom adds less than 1% to the price that would otherwise apply.

Conclusion

The Authority is generally predisposed to prices reflecting cost differences necessary to service different customer groups where these can be clearly identified. Differential pricing meets the objective of economic efficiency by providing appropriate pricing signals to different groups and ensures that costs related to other customers are not imposed on others.

So far as the Authority is aware, no written price equalisation or pooling agreement exists. GAWB has noted that, to the best 'of their knowledge, there has been an on-going agreement and understanding that the two Councils would pay the same price. All parties have been operating in accordance with that understanding for a considerable time. It is a matter of record that GAWB has built major sections of Calliope Shire's reticulation system and that it has historically not differentiated between the Councils in pricing matters.'

At the same time, the Authority notes the currently contradictory views held by the two Councils.

The Authority has therefore concluded that the pooling of Council treated water prices is a matter for the relevant parties to agree. The Authority will support whatever arrangements are agreed between those parties. At the same time, the Authority is of the view that, on the balance of probabilities, there is an agreement to pool prices between GCC and CSC.

So far as water supplied to Mt Larcom is concerned, based on the 'understandings' reached in November 2002, water supplied to Mt Larcom should not be priced separately but should be incorporated into the treated water price paid by CSC. When account is taken of the arrangements involving Cement Australia (Chapter 6), the inclusion of Mt Larcom adds less than 1% to the price that would otherwise apply.

However, this recommendation has no implications for the price of water to Mt Larcom residents. Neither the Authority nor GAWB sets the price to Mt Larcom residents. It is CSC which sets the price for Mt Larcom residents who are their customers.

Under the current Ministerial reference, the Authority has no power to review or establish the prices or pricing practices of CSC or GCC, nor review the appropriateness of CSC's decision to charge Mt Larcom residents a higher fixed cost charge for water than it charges other residents despite the fact that it is not paying a higher price to GAWB for that water.

Mt Larcom residents currently pay a tariff for 2004-05 comprising a fixed cost charge of $428 plus a volumetric charge of 65c/kL for the first 312kL, compared with a tariff comprising a fixed cost charge of $154 plus a volumetric charge of 65c/kL for the first 312kL for the main areas of Calliope Shire.

Under the *Local Government Act 1993*, CSC has the broad discretion to set utility charges on any base it considers appropriate. Hence, CSC could apply postage stamp tariffs across the Shire.

GAWB is currently identifying the cost of delivery to each Council including to Mt Larcom in invoices even though it charges a pooled price. This practice is considered to be a matter for GAWB and the Councils.

The Authority considers that the issue of price pooling is a matter for the relevant parties to determine. The Authority will support whatever arrangements are agreed between those parties. At the same time, the Authority is of the view that, on the balance of probabilities, there is an agreement to pool prices between GCC and CSC.

Based on the information supplied since the Draft Report was released, the Authority recommends that CSC be charged only one price for treated water, including water supplied to Mt Larcom residents, and that the price take account of the capital contributions made by Cement Australia as well as the arrangements with Cement Australia regarding operating and maintenance cost of the relevant infrastructure.

Differentiation between Existing and New Customers

Depending on the rate of growth in demand and the availability of augmentation options, augmentation may result in a significant level of excess capacity being present for a lengthy period of time.

GAWB, being a bulk water supplier primarily to large industrial customers, must manage potentially large demand increments. GAWB can respond to such demand growth in many ways. For example, it can expand capacity in anticipation of demand growth, adopt a just-in-time approach to capacity augmentation or adopt a lagged growth strategy with augmentation delayed until the costs of excess capacity are minimised.

Two key issues are:

- who should bear the costs of the augmentation - users of existing capacity (existing users), users of new capacity (new users), all users, the shareholders of GAWB or other sponsoring authorities (such as the Queensland Government which may wish reserve capacity to be held for development purposes); and

- how those costs should be allocated.

Stakeholder Comments

In its initial submission, GAWB agreed with the Authority's previous recommendation that pricing should not differentiate between new and existing customers.

GAWB also proposed a mechanism to offset the infrastructure risk associated with new customers in the form of a requirement to pay access charges to secure an allocation prior to commencement. GAWB proposes to charge 'perhaps 25% of the associated access charge' where spare capacity exists, to avoid the situation where customers can take 'speculative free options over future capacity (and increase uncertainty about actual future requirements for capacity)'.

GAWB submitted that it 'will not commit to providing future water availability or delivery capacity without compensation for the development costs of providing the additional resource; and/or the opportunity costs of not selling the water availability or delivery capacity to other customers'.

As an alternative, GAWB proposed that customers could lodge a formal request for future water availability or delivery capacity, which will be entered into a queue, with priority based on the order of receipt. GAWB submitted that customers would be removed from the queue if they did not enter into contracts (attracting access charges) when GAWB is required to spend money to

develop additional capacity; or have a request from another customer willing to pay the access charges.

CSC's view in its initial submission was that 'if one customer can cause a major augmentation of the Board's infrastructure, it would seem unrealistic that they should not be called upon to pay some form of premium for the impact they have had on the Board's other customers.'

GCC and CSC proposed that potential future prices be compared under two scenarios - one for existing customers only, and without the demand and associated infrastructure of new customers (i.e. optimize out excess capacity), and the other with the demand and infrastructure of both new and existing users. They proposed existing customers should only pay the lower of these two options.

CSC also noted that:

- as the Authority's role is in pricing models, not in establishing new industry, Government could subsidise the water costs of new industry, thereby not impacting on the water price for existing water companies; and

- the cost per ML of each subsequent augmentation is likely to be higher than the previous augmentation, which means that the LRMC of water will increase as a result of each augmentation. These new customers should pay some form of premium or headworks charge to offset the negative impacts on existing customers.

Comalco's initial submission noted that Government policy to establish Gladstone as a major regional industrial base should not be at the expense of generating risk to established and new users over essential supply items such as water. Comalco argued that, to the extent that it is required to sustain their own business through organic business growth, augmentation of existing water capacity should be paid for by existing users, ,but that existing users should not fund augmentation for potential future users.

In response to the Draft Report, the Member for Gladstone, Mrs Liz Cunningham noted that, in order to 'ensure equity between residential and commercial consumers (current and future), a further 'customer' needs to be added to GAWB's customer base. That customer should be the Department of State Development who could/should stand in the market to pay the holding costs of this augmentation on a pro rata basis'.

CSC further submitted that, where there are new industries consuming a large percentage of the spare capacity of the existing network, there is a legitimate argument for either a headworks charge or a different pricing regime for these new customers. CSC noted that every council water business in Queensland charges developers a headworks contribution to offset the impact that their subdivisions have on the capacity of the water infrastructure and that these costs are recognised by local government, the State Government and developers as the most equitable mechanism to minimise the effect that new entrants have on existing customers. CSC submitted that some form of headworks charge would be a simple mechanism to recognise and mitigate the impact that new customers have on the capacity of the Board's infrastructure and the water price to existing customers.

The Mt Larcom and District Chamber of Commerce sought clarification of the impact of future customers on the pricing for existing customers, particularly in relation to the raising of the dam wall, construction of Mt Miller pipeline and the operating expense of pumps.

A number of submissions from residents noted that GAWB has entered into long term supply contracts with large industrial customers whereby water is provided at below full cost. The submissions stated that residential customers should not be required to subsidise pricing to

current or future industrial customers. Mrs Cunningham also indicated that, in response to the drought, the two Councils successfully reduced water consumption and are now being penalised for the savings. Her understanding is 'that commercial contracts will not or cannot be revised therefore the community will carry the full cost of the loss of revenue given that industry contracts will be honoured'.

In a similar vein, Mr Garry Ross submitted that most water consumption savings achieved during the recent drought resulted from permanent changes in industrial processes and the use of alternative supplies. He submitted that residential customers are being required to compensate for revenue foregone as a result of these savings.

GCC noted the Authority's comments that, where the Queensland Government requires capacity to be available for regional development, it is open for the Government to fund such an arrangement through a CSO. GCC sought confirmation that this decision will in fact be implemented.

QCA Analysis

The Authority has previously recommended that new and existing users pay the same price for the common infrastructure costs of providing water. The rationale was that it would be inequitable to charge a different price for the same service, and further that regional development would be promoted by such an arrangement.

The Authority notes CSC's comment that the Authority's role is in pricing and not in establishing new industries. Nevertheless, the Authority is required to take into account regional development effects of its pricing decisions.

To further expand on its previously stated position, the Authority considers that, where a facility requires expansion because of the demand of new users, both the existing and new user are in a position to adjust their demand to minimise the extent of augmentation required. Thus, to the extent that they utilise common infrastructure, both should receive the same price signal to review their requirements. Under the current contractual proposals, a reduction in demand by an existing user in response to prospectively increased costs should result in a reduction in their access charge, as GAWB would be able to on-sell the associated surplus capacity to those users whose demand could otherwise create the need for the additional capacity. In this way, regional development is promoted because costs are kept at a minimum.

In regard to Comalco's concern that existing users should not fund augmentation for potential future users, the Authority has previously noted its preference for supply risks to be managed through contractual arrangements to avoid such a possibility. Should the Queensland Government require greater capacity to be available for regional development purposes than GAWB would wish to install for commercial reasons, then it is open to the Queensland Government to fund such an arrangement through a CSO or some alternative arrangement. As observed by Mrs Cunningham, Member for Gladstone, if the Department of State Development sought to secure an allocation, it would effectively be another customer. However, it would need to meet GAWB's costs commensurately.

It should be noted that, in some instances, augmentation may result in the average cost to both parties being lower than would be the case in the absence of the augmentation (for example, where pumps might be used to increase flow rates). For this reason, it is critical that GAWB ensures that the augmentation is the least cost option consistent with possible commercial outcomes.

The approach suggested by the two Councils of generating two sets of prices for existing customers, one including the augmentation and one excluding the augmentation, and taking whichever is lower, fails to signal the true resource costs to all users.

GAWB's proposal of an ongoing access charge to secure an allocation is considered to be a legitimate commercial practice. GAWB has also proposed, as an alternative, queuing arrangements as a strategy for managing uncertain demand risk relating to prospective customers. The Authority recognises that queuing principles are appropriate commercial practices for determining customer priority and level of commitment.

In relation to the issue raised by GAWB that prices should reflect average asset utilisation, such an approach accords with the Authority's recommended cash flow approach over the appropriate planning horizon. Provided the capacity represents the least cost option in present value terms, customers' prices should incorporate efficient surplus capacity. The Authority's analysis of the regulatory asset base is in Chapter 6.

The Authority notes the issues raised by CSC in relation to headworks charges applied by Councils. CSC is correct in its observation that headworks charges, also referred to as 'developer charges' or 'infrastructure charges', are used to recover fixed costs in many cases. However, infrastructure charges are not just applied to the new customers and are not necessarily used to differentiate between the impact of new customers and old customers on system augmentation costs.

Infrastructure charging regimes are designed to provide an equitable contribution to infrastructure development costs (ie, no differentiation between the structure of existing and new users' contributions) and to provide signals regarding locational costs for development to encourage development where it is less costly. For example, the IPART (2000) determination on developer charges observed that developer charges provide a source of funding for the infrastructure required for new urban development and provide signals regarding the [locational] costs for urban development to encourage development where it is less costly.

Similarly, the *Integrated Planning Act 1997* includes the provision that infrastructure charges are to be equitably apportioned among all users of infrastructure. The *Queensland Infrastructure Charge Schedule Guidelines*, which were prepared in accordance with the requirements of the *Integrated Planning Act 1997*, state that this will ensure that development collectively contributes to the need to supply trunk infrastructure, and that those developments which trigger the need for additional network capacity are not unfairly required to pay more than their reasonable share of costs'.

In addition, the Victorian ESC (2004) specifically stated that augmentation costs should not be factored into developer charges, stating that 'it would be inappropriate to include in costs and subsequently tariffs [ie, developer charges] … shared network augmentation costs, as this investment is driven by system-wide demand and it will not be appropriate for these costs to be imposed on the incremental user'.

In response to CSC's comment, the fact that existing users may have used water in the past when capacity was less constrained has no bearing on future supply costs per unit of current demand. Therefore, an efficient pricing regime would not incorporate higher capital charges for new customers than those applicable to existing users, as this would be inconsistent with the intended use of infrastructure/developer charges (as noted above).

On the matters raised by other submissions including those from Mr Ross and Mrs Cunningham, where existing contracts are locked in to lower levels of cost recovery, under the Authority's recommended approach, the foregone revenues are borne by GAWB and are not

allocated to other customers or residential users. The foregone revenue to GAWB represents about 0.5% of total revenue.

Where demand is reduced by a particular customer, as was the case following the recent drought, all customers benefit through the deferral of augmentation. In addition, there are potential savings in capital and operating costs. Combined, this would normally lead to a lower price for all customers. However, in GAWB's case, this has been offset by changes in the historic no failure yield of Awoonga Dam. Also worthy of note, is that the reductions in demand were not confined to local government customers but also occurred with some major industrial customers. The Authority's revised analysis of the asset base and operating cost has taken these reductions into account.

GCC sought confirmation that a CSO would be implemented for regional development purposes. The question of applying a CSO is a matter for Government outside of the responsibilities of the Authority or GAWB. Under the Government's *CSO Policy Framework* (Queensland Treasury, 1999), to qualify as a CSO, an activity must satisfy three elements:

- it should be clearly established that a CSO relates to the provision of non-commercial products or services, that would not otherwise be undertaken by a commercial entity;
- the product or service needs to be clearly purchased by the Government to achieve a specific social or economic objective. Commercial business entities cannot simply argue that certain services automatically qualify as a CSO; and
- the product or service must be purchased from an appropriate commercial business entity.

Issues related to differences in prices as a result of differences in customer risk are addressed in Chapter 7 relating to WACC.

The Authority considers 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.

The Authority considers that access charges and queuing strategies proposed by GAWB are, in principle, valid commercial arrangements.

Differentiation on the basis of Supply Reliability and Service Standards

GAWB's contracts with customers reflect the 'historic no fail yield' of Awoonga Dam. The contracts do not currently incorporate any provision for different product specification which could be reflected in prices or, indeed, a standard level of service which may be used as a basis for pricing.

For regulatory purposes, specification of service standards and product descriptions are necessary as the service provider may exert its monopoly power by allowing service standards to decline in order to save costs in the short term.

Stakeholder Comments

In initial submissions, GAWB proposed that the Authority approve 'reference tariffs' for GAWB's standard reliability and quality products. GAWB proposed that it 'should be free to negotiate different prices for different products' with its customers and that prices for non-standard reliability and/or quality products delivered through monopoly infrastructure should be

negotiated between GAWB and its customers with the Authority's role limited to dispute resolution. Where prices can be determined through competitive markets, there would be no requirement for regulatory pricing.

CPM submitted that some users may be prepared to accept a 'standard' water supply arrangement, with supply from Awoonga Dam only, whereas others may be prepared to pay for a 'premium' service where supply reliability is bolstered by an alternative supply source.

CSC submitted that customers should pay a water price that reflects their individual risk profiles, rather than a generic 'postage stamp' price for all customers that use each defined component of the network'. CSC argued that the Authority has not considered that some 'customers bear an increased risk profile than others', particularly where a higher level of drought supply restrictions are applied to Council customers than to industrial customers. GCC also noted that Council customers face earlier and more severe restrictions during droughts than industrial customers. In order to be equitable, those customers who demand higher reliability should pay a premium for bulk water supply.

CS Energy submitted that, rather than vary reliability with regard to changes in hydrology, a scale of reliability with appropriate pricing will drive the customers to make their decisions on the basis of importance of continuity of water supply.

In response to the Draft Report, CSC suggested that infrastructure duplication costs intended to minimise reliability risks for only one or some customers should not be shared by all customers. CSC supported the Authority's approach but would like to see the recommendations implemented, that is, prices should reflect the service quality and service standards to the extent this involves cost differentials, and that GAWB should develop full product descriptions for contractual purposes.

GCC submitted that customers with lower levels of reliability during drought periods should benefit from lower charges when tariffs are set. It noted that, in the last drought, Council customers reduced consumption by 35% initially then a further 15%, while industrial customers reduced consumption by 10% initially and then a further 15%.

QCA Analysis

The Authority is aware that GAWB is examining options for alternative water products based on reliability of supply as part of its Strategic Planning Process, which includes the development of a Drought Management Plan (DMP). However, details of such water products and proposed arrangements to apply during periods of drought are not expected to be available for some time, and therefore cannot be considered in this investigation.

In principle, provided that proposed differences in reliability reflect differences in the cost of supply, differences in prices are appropriate.

Consistent with the above, the Authority considers that there is merit in the arguments submitted by GCC, CSC, CPM and CS Energy, that customers should pay a price that reflects the risk profiles and reliability tolerances required by individual customers. CSC's comments in response to the Draft Report are also supported as a general principle. However, the Authority is unable to incorporate these cost differentials in its pricing model until GAWB and its customers can reach agreement in relation to service standards and reliability.

To provide a basis for such negotiations, the Authority considers that GAWB should, in conjunction with its customers, identify relevant characteristics suitable as a basis for contractual purposes. These could include:

- continuity of service, and the level of reserve or back-up supply where system outages or breakages occur, for example, hours of supply available;
- water quality and level of chemicals in treated water;
- pressure requirements for customers' needs and specialised purposes such as fire-fighting; and
- capacity and time taken to respond to system breakages and failures, such as lightning strikes and pump or pipeline failure.

The Authority considers that prices should reflect service quality to the extent this involves cost differentials, and that GAWB should develop full product descriptions for contractual purposes, in conjunction with its customers.

Other Price Differentials

Stakeholder Comment

In its initial submission, GAWB proposed additional potential price differentiation to be negotiated on a customer basis. These included:

- charges to reflect counter-party risk, and the greater probability of certain customers not fulfilling their obligations to pay future capacity charges. GAWB argued that customers with a 'poor credit rating' should have a choice between paying higher annual charges (which include the cost of insuring against default), prepaying charges or lodging a bond;
- price differentiation to reflect contract lengths varying from 20 years, as 'long term contracts provide foundation revenue for GAWB'. GAWB proposes that customers requiring a contract duration shorter than (more than) 20 years would attract a price premium (price discount); and
- 'contracts for differences' (CFDs) proposed to be offered to customers as an option to guarantee price certainty through the term of a contractual arrangement. While the contract would specify the tariff to apply, the separately negotiated CFD would set out how changes to the tariff would be accommodated for the customer. GAWB argues that the CFD would constitute a privately negotiated financial mechanism outside of the regulatory process.

In response to the Draft Report, QAL recommended that GAWB should not be allowed to differentiate prices based on contract length. QAL also suggested that 'based on volume taken, high-volume users should be given credit for the sales security provided to GAWB as well as lower GAWB overhead and administration costs compared to having to service multiple customers'.

GCC sought comment on how the proposed premium for contract periods of less than 20 years would be levied and whether the additional revenue above the MRR would be retained by GAWB.

QCA Analysis

GAWB's proposals for price differentiation on the basis of credit risk reflect established commercial practices, involving the use of security deposits or pre-payments, to deal with

potential credit risk. The Authority accepts that there may be circumstances where such action is appropriate, so that the expected costs of providing services are recovered.

In relation to contract length, the Authority considers that any departure from a 20-year contract should reflect any differences in cost and risk to GAWB. However, such differences should be quantifiable in terms of the impact, if any, on operating and capital costs. The issue of volume or customer size may also be a basis for contract variation, as noted by QAL. However, to some extent, the Authority's pricing model recognises the cost savings to GAWB of serving a large customer through the method used for allocating common costs. As noted below in Chapter 9, a proportion of general administration costs is allocated on a per customer basis. In general, the Authority supports price differentiation on the basis of contract length where there are differences in identifiable risks and costs, as part of the commercial process.

In regard to CFDs, while it remains unclear how the negotiated price would be determined, if customers voluntarily elect to negotiate such arrangements, these would be a commercial matter between the customers and GAWB.

Nevertheless, as there is potential for price differentiation on the basis of credit risk, contract length and CFDs to result in monopoly pricing behaviour, they should remain subject to the overall regulatory arrangements.

The Authority recommends that price differentiation on the basis of credit risk, length of contract and for other differences is appropriate to the extent that the proposed response is commensurate with the cost/risk of service provision and that any such arrangements should be subject to regulatory oversight.

4.5 Adjustments for Capital Contributions and Contributed Assets

Contributed assets are those assets that are funded or otherwise provided by a water user, or group of users, for their own benefit, or for the collective benefit of water users associated with a particular supply system. Recognition of past capital contributions for pricing is proposed by users on the basis of equity, as contributors of assets should not be required to pay a price for water that includes a return on capital for assets that they have funded. Recognition is also justified by its proponents on the grounds of economic efficiency in that future investment could be discouraged if those water users who are required to make capital contributions do not receive a benefit proportionate to their contributions.

The general principle that 'double-charging' should be avoided is recognised in the National Electricity Code (NEC) and the National Gas Code. It is also reflected in the Local Government Guidelines for Full Cost Pricing in Queensland, which states that councils should not double-charge for the capital component of servicing new development areas.

GAWB has received various forms of funding contributions over the years. These include:

- capital contributions towards specific assets such as Awoonga Dam;
- funding to cover operational deficits;
- security deposits for construction of spur-lines to supply individual customers; and
- capital grants and subsidies from the State Government.

The Authority previously recommended that:

- capital contributions be recognised where there is evidence that the contribution was made with the intent of obtaining future price benefits;
- contributed assets be included in the asset base for the purpose of determining the revenue requirement; and
- rebates be incorporated in the prices for the relevant customers equal to the return on capital for the contributed assets, and be deducted from GAWB's revenue requirement.

Spur line infrastructure costs are directly attributed to individual customers, and are excluded from the regulatory asset base in determining other customer prices in that segment.

Stakeholder Comments

In initial submissions, GCC proposed that contributed assets should continue to reduce the net price for Councils.

Comalco submitted that the Authority's pricing principles have not fully recognised capital contributions made in the past by some customers to GAWB and that mechanisms should be established to recognise these contributions. However, Comalco acknowledges that past contributions have in some cases been directed to meeting GAWB's operating costs rather than capital costs.

GAWB supported the Authority's previous recommendation in relation to contributed assets, but sought clarification of whether capital contributions should be treated on a:

- 'physical' basis – valued in terms of service potential and subject to depreciation over the economic life of the assets; or
- 'financial' basis – valued in terms of the purchasing power of the original contribution.

GAWB sought clarification of the tax effect of recognising capital contributions on allowed revenue. GAWB also requested that the QCA revisit the methodology used to value each current capital contribution, determine the current price impact of each capital contribution and a mechanism for regulatory (asset base and pricing) treatment of each capital contribution going forward.

CSC noted that there still is a need to rationalise the ownership of assets between CSC and GAWB as no resolution has been reached and discussions are set to continue between the two parties. In this regard, CSC argued that the previous investigation set a 'third party access' charge for the use of the CSC's assets (the treated water pipeline from Mt Miller to Fishermans Landing which is owned by CSC but services GAWB's customers) for GAWB to provide water to its own customers. CSC questioned the Authority's mandate in this respect and believes that any access fee should be negotiated between the owner of the infrastructure and those seeking access. CSC argued that the Authority's role is to adjudicate on disputes relating to market power only.

In response to the Draft Report, QAL supported the Authority's proposal that rebates for contributed assets should include both the return on and return of capital components.

GAWB generally supported the Authority's approach but indicated that it did not have access to the Authority's valuation and interpretation of each contribution. GAWB also requested confirmation that it retains a return of capital on historical capital contributions not remitted to

the customer. GAWB proposed to limit the utilisation of customer capital contributions in the future.

QCA Analysis

In its previous investigation, the Authority recommended that the value of contributed assets be included in the regulatory asset base, but with a corresponding rebate provided to the contributor to reflect the return on capital component in prices applicable to the relevant DORC value of contributed assets. A rebate was not provided for the depreciation component as available contractual information only provided for the return on capital component to be rebated.

In the previous investigation, the Authority also identified relevant considerations as being whether:

- there is any evidence that the contribution was viewed as a prepayment for future services;
- past price reductions have compensated the contributor for that contribution (determined by whether any past price reductions have exceeded the return on capital); and
- the contributed asset has been consumed and replaced.

In some instances, formal agreements attesting to the quantum of the capital contribution, its nature, or its purpose, were not available or there was a lack of clarity regarding those arrangements. In these circumstances, evidence of a capital contribution was sought from:

- the nature of the pricing arrangements evident from other sources, such as stated pricing policies and/or tariff schedules;
- the management arrangements as they relate to responsibility for certain risks and costs;
- the financial accounts of the contributor which may indicate a right, claim or expectation of future benefits; and
- the existence of capital development or other such charges, details of which may indicate that they are of the nature of a capital contribution with certain price benefits.

The Authority proposes to continue with this approach to past capital contributions where guidance is available from previous arrangements. Otherwise, and particularly for future capital contributions, rebates may include both the return on capital and the return of capital components. The Authority's analysis indicates that, unless the rebate includes both the return on and return of capital, contributors would not be fully compensated for all capital costs, - provided their contribution was intended to reduce prices in this manner.

The Authority notes Comalco's concerns that some past payments have not been recognised. However, the absence of relevant information or written agreements means that the nature of these payments and their purpose is unclear. The Authority is, therefore, unable to recognise them as capital contributions for pricing purposes.

In relation to other specific issues raised in submissions on the Authority's Issues Paper:

- GAWB's description of a 'physical' basis for the treatment of contributed assets more closely aligns with the Authority's proposed approach, than GAWB's description of a 'financial' approach. The former is more closely related to cost reflectivity;

- in relation to tax implications, the Authority considers it consistent that, where the capital contribution attracts a tax liability to GAWB, the net cost should be recovered in the relevant customer's prices; and

- with respect to CSC's 'third party access' comments, the Authority previously recognised that some of CSC's treated water distribution assets were being used to service GAWB's customers in the northern industrial area. The costs attributed to these assets were included in maximum prices on the basis that ownership of the assets would be rationalised and that the assets were to be sold to GAWB. This has not yet occurred.

  The Authority considers that, until such a transfer is achieved, GAWB should provide a rebate to CSC equivalent to the capital charges for the relevant assets. Any such arrangements between CSC and GAWB were and remain a contractual matter for negotiation between the two parties.

The Authority also proposes that, where agreements in regard to capital contributions are re-negotiated between GAWB and customers, this would be treated as a commercial arrangement and would be recognised for pricing purposes. GAWB's proposal to limit the use of customer capital contributions in future is a commercial decision.

In relation to other matters raised by GAWB, the Authority has in its previous investigation provided GAWB with details of proposed contributed assets in an email of June 2001 and acknowledged by GAWB in July 2001. These arrangements have simply been carried forward.

In some cases, spare capacity in contributed assets may be available for new customers. Under these circumstances, the Authority considers that, subject to contractual arrangements between GAWB and the contributor of the asset, GAWB can set prices to cover the full return on and return of capital for the new customer. Operating costs should be shared between the customers using the asset. Such charging would be consistent with competitive market outcomes.

Issues relating to the identification of specific capital contributions are reviewed in Chapter 6.

The Authority recommends that:

- **contributed assets should be recognised where there is appropriate evidence of a contractual or policy nature, and provided the contribution is not a prepayment for services, has not been fully repaid or rebated, and the associated assets have not expired or have been replaced at the service provider's expense;**
- **where contributed assets are recognised, they be included in the asset base for the purpose of determining the revenue requirement and prices;**
- **unless otherwise specified, rebates for future contributed assets should include the return on capital and return of capital components, provided their contribution was intended to reduce prices in this manner;**
- **in some circumstances, particularly where contracts stipulate, the rebate may be equal to the return on capital component only; and**
- **where the capital contribution attracts a tax liability, this would be included in customers' charges.**

4.6 Pricing for Exceptional Circumstances (including drought)

The previous investigation recommended that:

- the cost of insurance premiums for insurable force majeure events and administration and contract management costs associated with force majeure events should be incorporated into cash flow estimates;
- the potential cost of uninsurable force majeure events should not be incorporated into cash flows given they cannot be estimated with accuracy, but that when such events occur, prices may be renegotiated; and
- a consistent approach to force majeure should be adopted in customer contracts.

In relation to drought, the Authority recommended that the cost impacts of drought should be included in the revenue requirement and that GAWB, in consultation with its customers and the Authority, should review the drought management options available, with the results to be incorporated into prices as appropriate.

A key issue in terms of the pricing framework is what costs of drought management should be included in prices, particularly whether foregone revenues arising from supply restrictions should be included, and the appropriate method for including legitimate costs in prices.

The Authority has also reviewed these issues in its investigation of pricing practices in response to extraordinary circumstances. Although the Final Report is yet to be released by the Ministers, relevant issues identified in that report are discussed below.

Stakeholder Comments

In initial submissions, GAWB noted that it is presently revising its Drought Management Plan (DMP). GAWB submitted that its drought warning and demand restriction levels will be based on 'forward looking projections', reflecting seasonal considerations, and 'take as much account as practical of the lead times required by the customers to respond' as the majority of low cost, short lead time responses have been implemented as permanent measures following the 1996-2003 drought.

GAWB submitted that it has not determined whether the DMP will contain a trigger for a 'contingency response' to source alternative supply, but does argue that, if this is pursued, any 'preparatory expenditure should be included in operating or capital expenditures' for pricing purposes.

DSDI's initial submission raised security of supply as an important issue, given the extended drought endured in Central Queensland and the impact of climate change on management practices and long term water planning.

DSDI argued it needs to be recognised that any development in respect of enhanced security of supply or alternate sources of supply by GAWB may not be consistent with the 'just-in-time' planning and development strategies upon which the current asset valuation methodology establishes maximum price setting.

Further, DSDI suggested that consideration could be given for the inclusion of excess capacity within the regulated asset base for prudential management reasons, with the additional infrastructure priced to reflect the enhanced security of supply to users.

CPM submitted that GAWB should not be able to increase charges to water customers if supply was constrained due to drought. CPM also noted that the DMP should be negotiated between GAWB and customers. CPM suggested that the DMP should consider the extent to which different customers can restrict their demand and the costs of doing so and apply restrictions with these in mind, and where the costs of supply curtailment are to fall disproportionately on certain customers (or groups of customers) then pricing should be adjusted to reflect this.

CS Energy submitted that, in the recent drought, GAWB did not adhere to its DMP, by invoking reductions ahead of schedule and restrictions were not lifted as soon as possible.

Queensland Energy Resources' (QER) initial submission stated that:

- there was a lack of consultation with major industry prior to introduction of restrictions during the 2001-02 drought;
- alternatives offered by GAWB were not practicable and inadequate; and
- the preferred approach is to have GAWB provide maximum possible lead time in advance of restrictions implemented and that restrictions should be incremental so as to reduce the initial impact upon industry operations.

In response to the Draft Report, DSDI sought further explanation in regard to the Authority's proposal that higher prices are justifiable during droughts to promote efficient resource use. In particular, DSDI considered that, where such additional charges are not related to costs or other resource rent arrangements, the revenues should be returned to users at a later stage. DSDI suggested that the practice could reduce the incentive for users to improve water use efficiency. DSDI also submitted that penalty pricing in times of drought is not a substitute for an ongoing program to promote improvements in efficiency of water use.

DNRM agreed that charging higher water delivery charges during drought periods promotes efficient water use. However, DNRM submitted that the effectiveness of such a demand management measure is likely to be reduced should this revenue be returned to users through reduced access charges in later years.

DNRM also agreed that where spare capacity reflects the least cost option, the cost should be passed through to existing customers based on the current level of demand.

GAWB indicated that it generally supported the Authority's proposed treatment of exceptional circumstances and drought risk. However, it noted that:

- there are direct costs associated with GAWB's drought contingencies which should be included in the revenue requirement;
- the direct cost of implementing drought mitigation should be handled on an ex post basis;
- the imposition of formal restrictions should trigger a change in pricing arrangements; and
- GAWB should be compensated for revenue foregone as a result of supply restrictions, preferably on an ex post basis.

CS Energy submitted that prices should include an allowance for drought costs based on historic information. It stated that alternative water arrangements should be estimated in advance of any event and, that the cost of such work is a reasonable part of GAWB's operating costs.

QCA Analysis

In regard to exceptional circumstances, the Authority notes, in its draft *General Pricing Principles for Investments made in response to Extraordinary Circumstances* (QCA, 2004), that prices should incorporate the costs of investment, operational and managerial responses where:

- the risk is commercially relevant;
- the service provider has acted prudently and could not have acted any earlier to address the risk at lower cost;
- the service provider is the most appropriate party to manage the risk; and
- the response is the most cost-effective.

In general, the Authority considers that drought risk is best managed by GAWB. GAWB is best placed to manage aggregate consumption to prolong supply and to determine the viability of alternative supplementary options or investments in more efficient water use practices. GAWB is therefore entitled to pass on the cost of managing this risk to customers.

With respect to infrastructure damage, GAWB is yet to assess all the relevant risks and estimate insurance costs associated with these risks. Where prudent and commercially relevant to do so, these costs should be incorporated in the cash flows for pricing purposes. Where it is inappropriate for an ex ante provision to be made, ex post responses that form the least cost response would be incorporated in approved prices as appropriate. In some instances, there may be insufficient time available for undertaking detailed investigation, and consultative processes may need to be truncated.

The Authority's observations in relation to the costs of lost revenue from supply restrictions are that:

- if GAWB is not compensated for prudent drought supply restrictions, there is no incentive for GAWB to apply such restrictions in order to prolong supplies for the benefit of customers;
- supply restrictions are desirable to provide signals for customers to implement efficient water use practices and seek substitution options; and
- without compensation for revenues lost through supply restrictions, GAWB would not achieve its expected return on its investment over time.

In respect of DSDI's concerns about inclusion of excess capacity for prudential management, this is primarily an issue of least cost response on which the views of GAWB, users and independent engineers would be required. The nature of water infrastructure investments is such that spare capacity is available most of the time, and full utilisation is achieved only for short periods before the next augmentation is required. Provided the spare capacity reflects the least cost option, it will be reflected in customers' prices.

GAWB and its customers do not require the maintenance of an additional capacity buffer for prudential reasons as suggested by DSDI in its submission on the Authority's Issues Paper. If a buffer is otherwise required by Government for regional development purposes, then a CSO or some other financial arrangement would seem appropriate, until customers utilise the capacity.

The scarcity value of water can provide a means of allocating water to those most requiring it and able to pay. To the extent that prices reflect anticipated conditions and thus full cost

recovery, no further compensation is required for GAWB. If further costs need to be incurred because of the unexpected nature of the prevailing conditions, then these costs should also be recouped by GAWB, potentially through higher short term prices.

Prices in excess of full cost recovery could also be imposed in the short term to reflect scarcity values and to ensure that available supplies are allocated efficiently. However, unless other resource rent arrangements are in place, there would seem to be a case to rebate the excess revenues received back to users at a later stage. One option is to rebate the revenues on the basis of a proportional reduction in the access charge. Such an approach would remove any incentive for GAWB to intentionally limit infrastructure capacity.

Concerns related to the implementation of drought restrictions and adherence to the agreed drought management practices, are not a matter for the Authority.

In response to submissions from DSDI and DNRM on the Draft Report, the Authority's comments on the rebate of any scarcity rents were intended to ensure that GAWB does not have any incentive to artificially induce shortages by restricting augmentation of infrastructure or poor infrastructure planning. Funds could then be returned in a lower access charge in a future period.

In response to the issues noted by GAWB:

- the Authority accepts that the direct costs of GAWB's drought contingencies should be included in the revenue requirement as they represent a real cost to GAWB, provided risks to which they relate are commercially relevant, GAWB has acted prudently and is the most appropriate party to bear the risk and the response is cost-effective;

- where drought mitigation costs are capable of being reasonably quantified, having regard to the above criteria, they should be addressed prior to the occurrence of an event. Where this is not possible, and subject again to the same criteria, they may need to be provided for ex post;

- in the absence of a specific proposal, it is not evident whether a change in pricing arrangements is warranted; and

- GAWB should be compensated for revenue foregone in a manner consistent with the above considerations.

As GAWB is yet to finalise its review of drought management options and has not proposed relevant cash flow estimates associated with drought, the Authority is unable to provide further comment (or incorporate any provisions in its estimates of maximum indicative prices).

The Authority recommends that:

- **prices should incorporate the costs of investment, operational and managerial responses where:**
  - **the risk is commercially relevant;**
  - **GAWB has acted prudently and could not have acted any earlier to address the risk at lower cost;**
  - **GAWB is the most appropriate party to bear the risk; and**
  - **the response is cost-effective;**
- **higher prices are justifiable during droughts to promote efficient water use. However, where they are not cost related, and other resource rent arrangements are not applicable, the revenues should be returned to users at a later stage on the basis unrelated to the volume actually saved by a customer; and**
- **until GAWB releases its Drought Management Plan, no provision be provided in prices for related costs.**

4.7 Transitional Pricing

It is possible that price resets, particularly those associated with significant changes in circumstances, such as hydrology and demand expectations, may be accompanied by significant price increases.

In its previous investigation, the Authority recommended that, for existing customers not subject to contracts, new prices be transitioned over three years (2002-03 to 2004-05).

For future price reviews, a number of issues need to be considered in determining whether price transitioning should apply, including:

- the trigger level or threshold sufficient to warrant transitioning;
- the period of time over which transitioning should occur; and
- the impact on the financial viability of customers and the service provider.

Other Jurisdictions

IPART's (2003) decision making process includes consideration of the likely impacts of prices on the affordability of services for different groups of consumers. For the 1 July 2003 to 30 June 2005 review, the final price determinations for NSW water suppliers required only a minor real increase in charges and hence a consideration of price transitioning was not required.

The ESC (2004) notes that, to the extent that customers and other stakeholders consider that proposed price increases are likely to be onerous in terms of the impact on customer bills, the business may need to consider:

- phasing in or reducing some service requirements or obligations;
- limiting the amount by which prices can increase on an annual basis; and

- applying concession arrangements and special policies for customers facing financial hardship (including delayed or waived payment terms).

Stakeholder Comment

GCC submitted that a transition period should be considered, particularly for Council customers.

QCA Analysis

Where significant changes in prices occur, there is a need to consider the impacts on customers of an immediate pass-through versus the impact on GAWB's financial viability if it does not implement the full increase immediately.

While some customers may have a capacity to absorb significant price increases, particularly where water is only a small component of total production cost, such increases may be problematic for smaller industrial and some Council domestic customers. It may also be an issue for industrial customers subject to intense world competition.

The Authority considers that prices should be transitioned where there is a significant increase, and particularly where:

- in the absence of transitioning, there are issues regarding customers' ability to pay the increased price or matters of public interest; and

- the service provider's financial viability and cash flows will not be significantly impacted by the transitioning arrangements.

The precise nature of the transition arrangements needs to be considered against the background of these considerations. The implications of the recommended pricing practices are reviewed in Chapter 11.

The Authority recommends that price transitioning is appropriate for significant price increases, having regard to the provider's financial viability and users' capacity to pay.

5. GAWB'S WATER SUPPLY AND DEMAND

Summary

The expected supply of water and forecast demand are significant determinants of GAWB's costs of providing water, and thus, its price.

GAWB's water supply is subject to periodic external review of the historic no fail yield (HNFY). Although the Awoonga Dam's HNFY has been revised downwards three times, the most recent occurring in 2003 after the drought, it is not possible to predict whether there will be any future revisions. Accordingly, the Authority recommends that the revised safe yield of Awoonga Dam of 78,000ML be adopted for pricing purposes.

The Authority commissioned Marsden Jacob Associates (MJA) to assess GAWB's demand forecasts. The MJA demand estimates, with adjustments advised by individual customers since the Draft Report, were adopted for the purposes of estimating maximum indicative prices as these most closely represent likely contractual demand. Estimates of demand also allow the amount for future demand nominated by GAWB which is also supported by MJA.

5.1 Supply

GAWB presently sources all of its water from the Awoonga Dam. Over 2000-02, GAWB raised Awoonga Dam by ten metres in response to growth in projected demand. The augmentation increased storage capacity from 283,000ML to almost 800,000ML with a corresponding increase in the then assessed historic no fail yield (HNFY) from 49,400ML to 87,900ML.

The HNFY identifies the maximum annual supply available for consumption on a sustainable basis. It is based on historic rainfall, runoff, storage capacity, evaporation and seepage, and environmental flow requirements. According to the *Boyne River Basin Resource Operating Plan (2003)* (ROP) and *Water Resource (Boyne River Basin) Plan 2000*, the HNFY of Awoonga Dam is based on a computer simulation using historic monthly rainfall and estimated monthly flows in the Boyne River from 1891 to 2004. The estimated HNFY is the volume of water available annually from the Dam with 100% monthly reliability over this historical period.

Following the severe drought in 2002-03, DNRM revised downward the yield of Awoonga Dam in the Resources Operations Plan (ROP) by 11.3%. Details of Awoonga Dam's revised total HNFY after the 2000-02 'Stage 1' raising and a potential further 'Stage 2' raising are shown in Table 5.1.

Table 5.1: Change in Awoonga Dam Supply Potential (based on monthly HNFY)

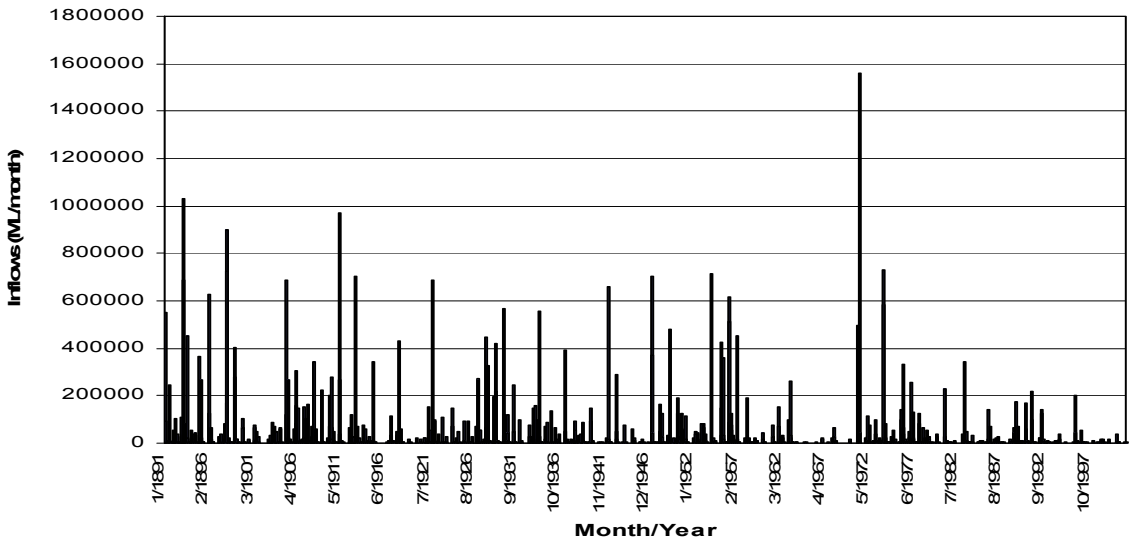
Augmentations	Previous Yield[1] (ML)	Revised Yield[2] (ML)	Percentage change
Stage 1 raising (2000-02)	87,900	78,000	-11.3%
Stage 2 raising (potential)	113,000	97,000	-14.2%

Source: *1. GAWB 2000; and*
2. Boyne River Basin Resource Operating Plan (July 2003), DNRM.

The reduction in the Awoonga Dam HNFY is supported by research by the Climate Impacts and Natural Resource Systems (CIRNS) group of DNRM which found that rainfall over the last 25

summers has been, on average, 23% below the 1891-1978 average. The frequency and duration of droughts appear to have increased since 1972 and a noticeable drop in inflows has occurred since that time. Awoonga Dam's historical pattern of inflows is shown in Figure 5.1, demonstrating the absence of major inflows over the last 30 years.

Figure 5.1: Awoonga Dam Monthly Inflows



Recent evidence of climatic changes includes changes in relative air pressure between southern Australia and Antarctica, which have resulted in fewer tropical cyclones than expected. The augmented Awoonga Dam relies on major cyclonic rainfall events to provide the major inflows. The evidence of climatic change is shown in Figures 5.2 and 5.3, which shows that cumulative flows over approximately 40-year periods have been gradually declining.

Figure 5.2: Comparison of Cumulative Inflows

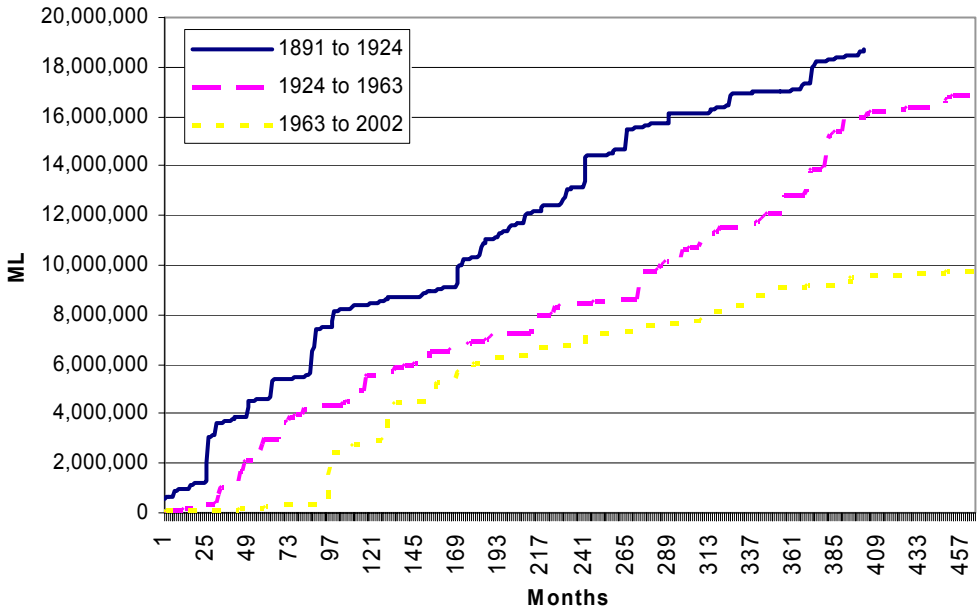
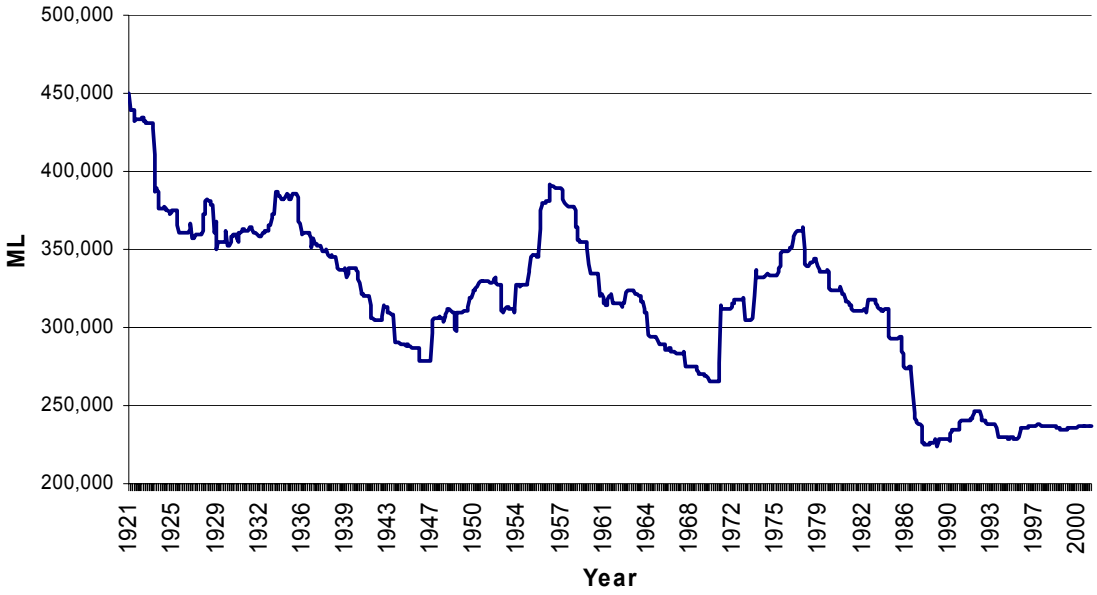


Figure 5.3: Cumulative Inflows, 40-year Moving Average, Awoonga Dam



The HNFY of Awoonga Dam is generally accepted as the measure of water available for use. However, it does not represent 100% daily reliability as there may be periods within a month when inflows are insufficient to meet an average daily yield. Further, as HNFY is historically based, it will change in response to actual rainfall patterns over time.

Where an estimate of 100% future daily reliability of supply is required, modelling on a daily basis with some adjustment to reflect any apparent climate change may be more appropriate. Preliminary analysis by GAWB indicates that, to achieve 100% reliability of supply, based on an historic daily flow approach, the yield of Awoonga Dam may need to be reduced to 57,500ML. However, any consideration by GAWB to offer supply at a level of reliability in excess of that implied by HNFY would require more detailed analysis, including assessment of implications for pricing, in consultation with customers. This is a matter for GAWB and individual customers, and is subject to the Authority's recommendations in regard to monitoring.

The ROP places a constraint on GAWB's ability to commit to supplying water during the first filling phase of the upgraded Awoonga Dam. The ROP stipulates that, until Awoonga Dam has filled to its new full supply level (FSL) of 40m, GAWB may only commit to future water supplies of an amount determined by the Chief Executive of DNRM. Currently, an interim ceiling of 67,800ML has been imposed on GAWB's allocation from the dam, some 11,000ML below the rated HNFY of 78,000ML.

Stakeholder Comment

In initial submissions, GAWB noted that the DNRM has revised downwards the HNFY of Awoonga Dam three times since 1985, including following the recent drought conditions in 2002-03. GAWB submitted that it is 'practically certain that the HNFY of Awoonga Dam will be revised downward again sometime in the future'.

GAWB argued that 'all options to gain a significant overall (as opposed to customer specific) improvement in reliability' will involve the development of an additional source of supply as 'a more conservative' utilisation of current capacity (ie at higher reliability) will bring forward the

need for new capacity and that a second source itself will be 'inherently more reliable' than Awoonga Dam with 'the diversity effect of multiple sources' improving reliability.

GAWB advised that it is preparing a Strategic Water Plan in which various options for additional water supply or saving will be addressed. Details are not yet available to the Authority.

Callide Power Management (CPM) stated that 'GAWB should be permitted to recover the cost of its water storage infrastructure from the reduced yield provided the revised Awoonga Dam remains the least cost option'. CPM's view was that the interim yield of 68,000ML (*sic*) should not be used for pricing as it is a 'temporary phenomenon'.

DNRM suggested that the Authority should take into account the impact of the Central Queensland Regional Water Supply Study and the revised GAWB Strategic Water Planning Process, in particular on the timing, scale and type of planned augmentations and/or alternative water supply infrastructure investments.

In response to the Draft Report, the Mt Larcom and District Chamber of Commerce questioned why the Awoonga Dam safe yield is becoming less when the capacity has doubled.

CS Energy recommended that HNFY be reviewed immediately prior to each 5 year review. However, it accepts 78,000 ML for the purposes of the current review.

QCA Analysis

In general, changes in hydrology are externally imposed upon GAWB and are beyond GAWB's control. Accepting the view that the current interim ceiling is only a temporary measure, the Authority proposes to adopt the revised HNFY of 78,000ML as an appropriate basis for planning and pricing.

The Authority also concurs with GAWB's view that the Awoonga Dam hydrology may again be revised in future years if climatic change continues along present trends. Where such changes are predictable and quantifiable, it is desirable that they be incorporated into cash flows for pricing purposes, particularly where longer planning periods are being adopted, as previously proposed for GAWB. However, hydrological revisions occur infrequently and cannot be predicted, so generally ex post responses are more appropriate. In GAWB's case, a hydrological revision has only recently been made. It is therefore proposed not to incorporate any potential future changes.

The Authority also notes GAWB's comment that a second source will lead to greater reliability and diversification of water sources. The Authority is aware that DNRM is currently undertaking a Central Queensland Water Supply Study which is expected to identify a preferred supply augmentation option for GAWB. GAWB is also undertaking its own planning process. Until these studies are completed, the Authority is unable to take account of them in its analysis.

In response to comments from the Mt Larcom Chamber of Commerce, the Authority notes that the safe yield of Awoonga Dam has increased substantially since the augmentation. However, the original expectations of the increased yield have had to be revised downwards, as a result of revised hydrology. That is, the dam raising lifted the potential yield from 49,400ML to 87,900ML but this has subsequently had to be revised downwards to 78,000ML. This is obviously outside of GAWB's control.

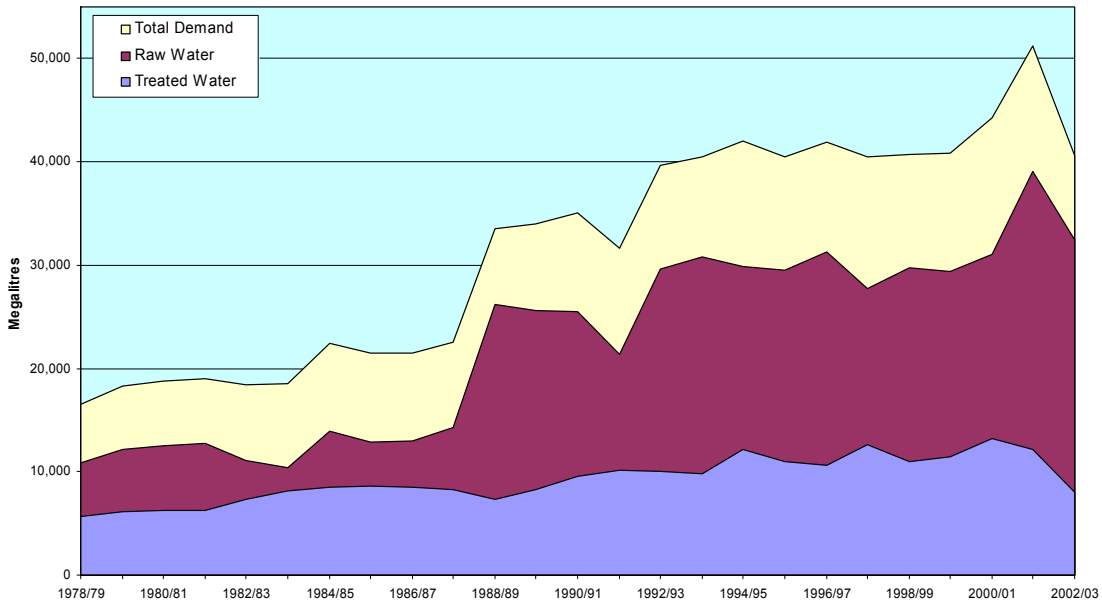
The Authority recommends that planning and prices for services provided by Awoonga Dam be based on the most recently established HNFY of 78,000ML.

5.2 Demand

History of Water Demand

Since 1978, consumption of water in Gladstone has more than trebled, with an average annual growth rate of 4.8% to 2001-02 (prior to drought restrictions). Annual growth in raw water averaged 5.3%, while growth in treated water averaged 3.2% (Figure 5.4 refers).

Figure 5.4: Consumption of GAWB's Water 1978-79 to 2002-03



Source: QCA 2002.

Previous Estimates of Demand

In its previous investigation, the Authority recommended that, in setting prices, GAWB take into account relevant demand scenarios, including demand side management and alternative supply options.

Demand projections were independently established by SMEC based on interviews with GAWB, the Councils, key industrial customers and the Gladstone Industry and Economic Development Board (GIEDB). SMEC also established low, medium and high risk categories on the basis of the status of project planning, proximity to start-up and specific sensitivities such as environmental issues and market uncertainty. SMEC also sought to incorporate achievable demand management savings and noted that:

- for many larger industries which have already achieved efficiency savings, future savings from expected advances in water use efficiency were already built into forward projections;
- efficiency gains of between 5 and 15% were identified by some existing smaller customers;
- for the CSC, savings of 3% in 2005-06 rising to 8% by 2019-20 were expected to be achieved through reductions in system losses and demand management strategies; and

- for the GCC, savings of 5% in 2005-06 rising to 12% in 2019-20 were expected due to reductions in system losses and the introduction of a two-part tariff.

The preferred planning scenario used by the Authority in the previous investigation is summarised in Table 5.2.

Table 5.2: 2002 Final Report - Preferred planning scenario (ML)

Type of Supply	*2002-03*	*2003-04*	*2004-05*	*2005-06*	*2009-10*	*2014-15*	*2020-21*
Raw water	42,276	44,529	49,306	52,162	58,534	62,853	62,736
Treated water	14,741	15,353	16,409	16,610	17,597	18,446	19,689
Total demand	**57,017**	**59,882**	**65,715**	**68,772**	**76,131**	**81,299**	**82,425**

Source: QCA (2002)

Current Demand

Since completion of the Authority's Final Report in 2002, GAWB has experienced a major drought during which severe water restrictions were imposed. As a result, some customers implemented permanent water use efficiency measures and some have substituted part of their supply. The total volume supplied during 2002-03 was only 40,593ML, reflecting a 29% shortfall against the preferred planning scenario expectations of 57,017ML (Table 5.3 refers).

Table 5.3: Summary of Demand – raw and treated water for 2002-03 (ML)

Type of Supply	*Preferred Planning Scenario*	*Actual Demand*	*Variation*
Raw water	42,276	32,614	-23%
Treated water	14,741	7,979	-46%
Total demand	**57,017**	**40,593**	**-29%**

Source: QCA (2002) and GAWB

In response to these changes, GAWB has revised its expectations of future demand. GAWB's estimated demand is outlined in Table 5.4.

Table 5.4: GAWB's Demand Projections (ML)

Type of Supply	*2005-06*	*2006-07*	*2007-08*	*2008-09*	*2009-10*	*2014-15*	*2020-21*	*2024-25*
Raw water	36,426	41,102	42,336	47,291	52,276	60,578	63,518	65,470
Treated water	10,036	10,026	10,186	10,348	10,514	11,393	12,568	13,432
Total demand	**46,462**	**51,128**	**52,522**	**57,639**	**62,790**	**71,971**	**76,086**	**78,902**

Source: GAWB 2004

Stakeholder Comment

In initial submissions, GAWB noted that it has 'developed and refined its methodologies for demand forecasting'. GAWB submitted that, in the past, its demand forecasts were prepared principally for infrastructure planning purposes and that demand was over-estimated as 'it is generally better to ensure that a conservative view of future water demands can be satisfied than constrain the region's growth through lack of infrastructure provision'.

GAWB submitted that, as its demand is dominated by large projects, forecasts must be based on estimates of the demand of specific future projects. GAWB proposed that demand forecasts be adopted for pricing purposes based on customer's reported intentions for water use which is 'likely to occur'. This demand scenario is less than customer's reported intentions of usage which 'might possibly occur' but greater than that which is 'practically certain' to occur.

GAWB proposed to apply different demand estimates under a revenue cap to those under a price cap form of regulation, due to remaining concerns that the 'inherent optimism of project proponents (and appropriate support for these projects by government agencies)' will lead to an overstating of likely future demand. GAWB submitted that, if a price cap form of regulation is recommended, it will 'investigate modifying its forecasts by a factor reflecting past differences between forecasts and outcomes'.

CPM's initial submission raised concerns over adopting a too-conservative position on future demand, or projections of an overly-strong demand growth. CPM also stated that the regulator's pricing calculation must be based on the higher of contractual or actual volumes on the basis that prices should reflect the capacity that GAWB is required to make available to a customer.

In response to the Draft Report, GCC provided a revised demand projection, comprising an increase in demand from that provided in the Draft Report on the basis of a recent study. CSC also provided a revised increased demand schedule.

CSC also advised that consumption in the northern industrial area (Comalco and Orica) was quite high and that it may have been underestimated by the Authority.

The Mt Larcom and District Chamber of Commerce questioned the assumption that demand for Mt Larcom would remain at the same level for the next 20 years. The Chamber noted that the town had grown slowly over the last 10 years.

GCC also expressed concern that the high proportion of the volumetric charge in the total indicative charge for water delivery may be related to the potential underestimation of demand growth. GCC suggested that the validity of demand projections should be tested.

DNRM noted that GAWB bases its water demand estimates on usage projections provided to the Board by customers. It suggested that the effect of underestimation will be offset by delaying future augmentations, whereas the effect of overestimation will be offset by bringing augmentations forward.

QCA Analysis

The Authority concurs with GAWB's comment that there has been a tendency in the past to over-estimate likely demand.

In recognition of the lumpiness of demand, uncertainty involved, and past propensity for overestimation, the Authority has noted the importance of contractual arrangements. Basing

demand on estimates of likely demand independently of customers' proposed contractual amounts is not sound and errors could impose high costs on users and the community.

Such an approach was also supported by Marsden Jacobs and Associates (MJA) who noted that, in a commercial environment, where there are large sunk costs in infrastructure, relatively few customers and lumpy demand increments, suppliers would require contracts to support new investment.

Accordingly, estimates of demand adopted by the Authority are those that reflect the most likely amount customers can be expected to contract.

To determine these amounts, and any other relevant matters, the Authority commissioned MJA to audit estimates of demand provided by GAWB. MJA's audit of demand found that some estimates of individual customers demand by GAWB did not correspond with those provided to the Authority by those customers.

MJA noted that, since the last assessment by SMEC, a number of the then expected new projects, that were previously considered likely, have not proceeded and it was considered that some anticipated expansions were too uncertain. It is unlikely that customers would seek to commit themselves contractually to these projects at this time.

In any assessment of future demand, MJA recommended that risks should be assessed in terms of size of demand, volatility of expansion triggers (such as input and output prices, production technology, world growth and exchange rates), progress in planning and procuring other input contracts and history of previous delays.

MJA also noted that the drought promoted adoption of water use efficiency measures to an extent that had not previously been envisaged. MJA found that on-site water use efficiency measures by the large industrial customers such as leakage reduction and water recycling have largely been exhausted at this stage. GAWB's forecasts for demand management implemented by the two Councils were considered to be robust.

MJA considered that further savings by GAWB, driven by social and environmental objectives, have largely been reflected in GAWB's projections. These include the proposed Stag Creek pipeline to reduce delivery losses to the CS Energy and Callide Power Management power stations. Large scale substitution options by customers (such as desalination, seawater cooling and installation of air cooled condensers at Callide Power Station) were generally not considered viable at this stage. However, MJA's view was that some substitution possibilities could become significant within the planning horizon and should be monitored rigorously.

GAWB has proposed that forecast demand incorporate an amount of 300ML in year 2013-14 increasing annually to 3,600ML by 2024-25 to allow for 'undetermined' projects. MJA recommended that this demand for undetermined projects commence earlier, in 2010-11. Under the proposed pricing framework, GAWB would be responsible for the associated commercial risks of incorporating this demand volume. For this reason, the Authority has incorporated GAWB's estimate in the forecast demand, rather than MJA's estimate.

GAWB's demand projections included a 45% growth in CSC's water demand and a 46% increase in GCC's demand over the 20-year period. However, these have been revised recently by Councils and, as the revised demands are to form the basis of future contracts, these have been adopted.

In relation to CSC's comment regarding northern industrial area demand, the Authority sought additional comment from Comalco. As a result, treated water demand in the northern industrial area was adjusted to reflect expected long term changes in demand.

The demand projections for raw and treated water, as revised by MJA, but incorporating GAWB's estimate for undetermined projects and the revised estimates for GCC, CSC and Comalco, appear in Table 5.5. A comparison is also provided with Draft Report estimates. Compared to the Draft Report estimates, total demand in 2005-6 is about 2.3% higher.

Table 5.5: Revised Demand Scenario (ML)

Type of Supply	*2005-06*	*2006-07*	*2007-08*	*2008-09*	*2009-10*	*2014-15*	*2020-21*	*2024-25*
Raw water	36,446	37,632	38,546	41,028	46,032	50,500	53,362	55,314
Treated water	11,160	11,175	11,360	11,736	12,145	13,128	14,400	15,307
Revised Total Demand	**47,606**	**48,807**	**49,906**	**52,764**	**58,177**	**63,628**	**67.762**	**70,621**
Draft Report Total demand	**46,513**	**47,689**	**48,763**	**51,407**	**56,577**	**61,924**	**65,961**	**68,777**

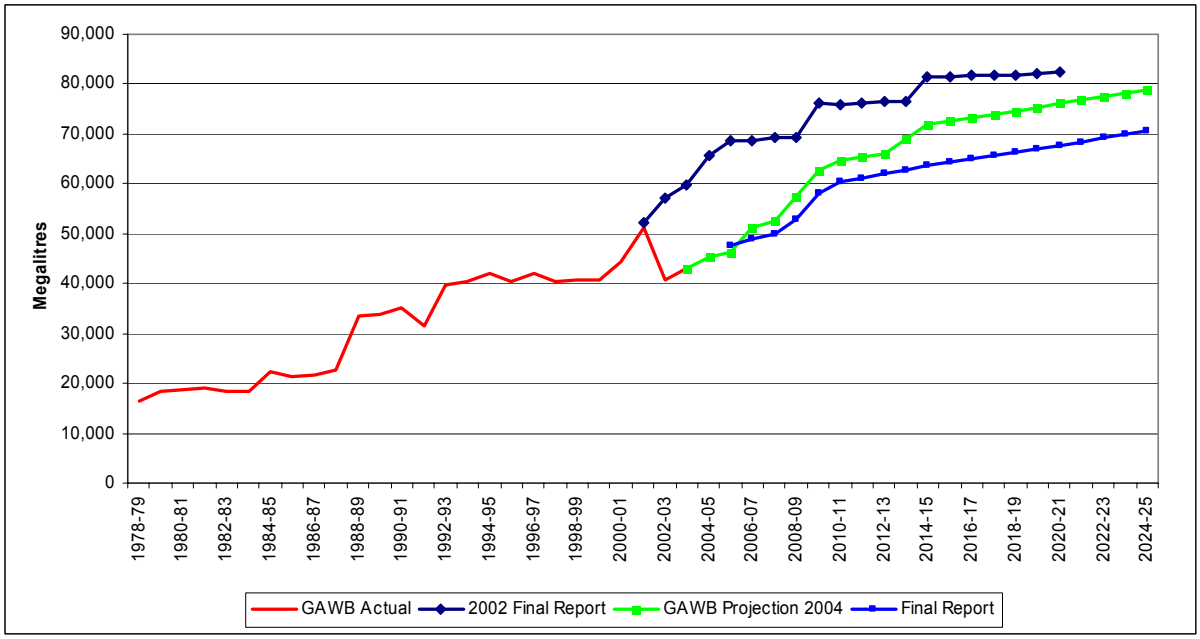
Source: Marsden Jacob Associates, GAWB, CSC, GCC, Comalco Limited

Table 5.6 and Figure 5.5 compare the preferred planning demand scenario from the previous investigation with GAWB's current demand projections and those recommended by MJA, the latter being adjusted for the changes noted above.

Table 5.6: Comparison of Alternative Demand Projections (ML)

Type of Supply	*2005-06*	*2006-07*	*2007-08*	*2008-09*	*2009-10*	*2014-15*	*2020-21*	*2024-25*
Previous Investigation	65,715	68,772	68,789	69,241	69,419	81,299	82,095	na
GAWB's Projections	46,462	51,128	52,522	57,639	62,790	71,971	76,086	78,902
Final Report	**47,606**	**48,807**	**49,906**	**52,764**	**58,177**	**63,628**	**67,762**	**70,621**
Difference (Final to Draft Report	**+2.3%**	**+2.3%**	**+2.3%**	**+2.6%**	**+2.8%**	**+2.8%**	**+2.7%.**	**+2.7%**
Difference (Final to 2002 Investigation)	**-30.7%**	**-29.0%**	**-27.9%**	**-24.0%**	**-23.6%**	**-21.7%**	**-17.8%**	**na**

Figure 5.5: Comparison of Alternative Demand Projections (ML)



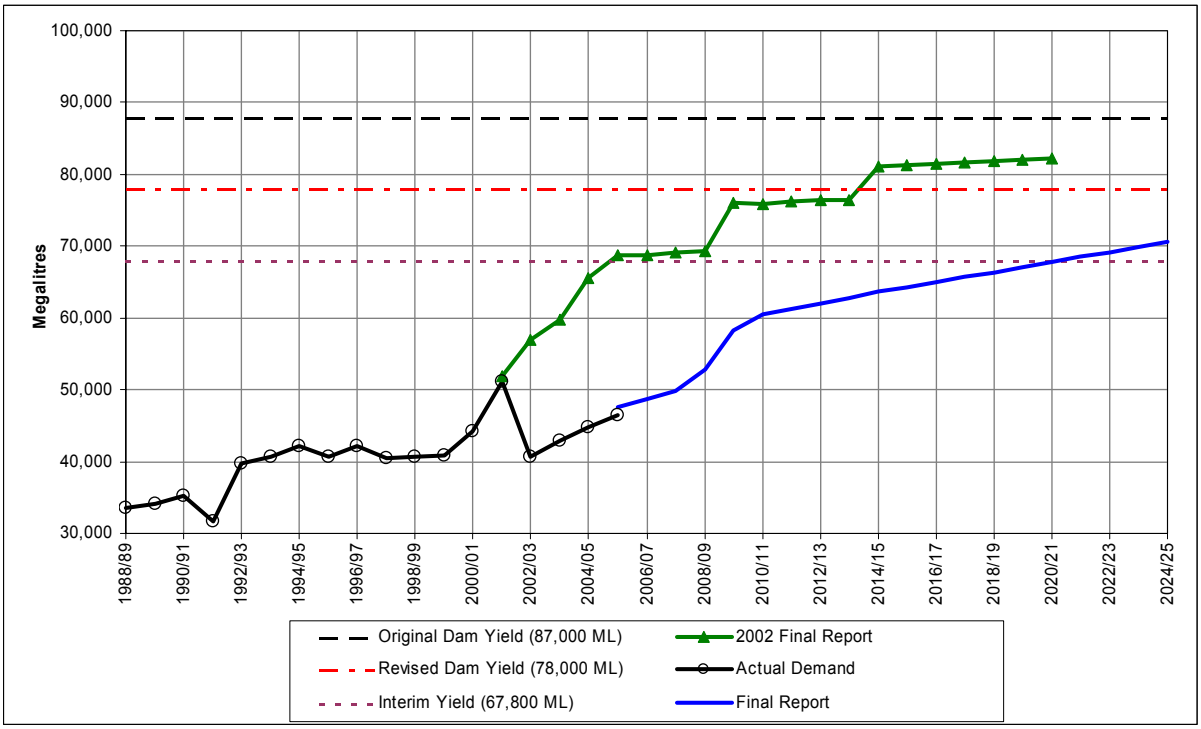
The Authority recommends that, for pricing purposes, the demand scenario for the regulatory pricing period commencing 1 July 2005 should reflect anticipated customer contractual requirements, and allow an amount for future demand nominated by GAWB. The Authority has adopted the demand estimates provided by MJA, with adjustments as advised by individual customers since the Draft Report, for the purposes of estimating maximum indicative prices.

5.3 Supply and Demand

Based on current yield and demand projections, GAWB has sufficient supply capacity to meet projected demand for the next 20 years. Even under the interim yield ceiling of 67,800ML (pending the filling of the raised dam) GAWB has sufficient capacity to meet the revised projected demand until 2020-21.

The extent of the changes in GAWB's demand since the Authority's previous investigation in 2002 is demonstrated in Figure 5.6.

Figure 5.6: Summary of GAWB's Supply Capacity and Demand (ML)



6. ASSET BASE

Summary

The Authority recommends the asset base be valued on the basis of DORC. The Authority recommends that GAWB's asset base be revalued due to the material changes to the key assumptions underpinning the prior.

The Authority also recommends that, where optimisation is considered appropriate, DORC be estimated using an incremental optimisation approach taking into account redundant assets, excess capacity and over-engineering. In addition, the Authority recommends that land should be valued at market value and easements be valued on the basis of indexed historic cost. An allowance for working capital should be determined on the basis of debtors less creditors plus inventories.

An independent assessment of GAWB's DORC was provided by SMEC. The key findings were that:

- *the additional dam wall height previously optimised out is now needed to meet maximum possible flood requirements;*
- *the Calliope River dam site land continues to be optimised out; and*
- *the Mt Larcom, Calliope and Wurdong/Benaraby treated water pipelines are optimised to smaller capacity pipelines.*

Pricing benefits attributable to previously identified contributed assets continue to be recognised on the basis of their DRC values.

The estimated DORC as at 1 July 2005 is $355.6 million.

6.1 Background

The value of the regulatory asset base underpins the return on capital and the return of capital, both components of regulated prices. GAWB's key assets include the Awoonga Dam, pipelines, treatment plants, reservoirs, pump stations, buildings, land and easements.

6.2 Approach to Asset Valuation

There are a variety of methodologies available for valuing assets. However, in the context of regulatory valuations, asset valuation methods may be categorised under two main approaches – cost-based and value-based.

Cost-based approaches relate the value of an asset to the cost of purchasing the asset or the service potential embodied in the asset, either at original (historic) cost or current replacement cost. The most common cost-based approaches include:

- depreciated historic cost (DHC), also known as depreciated actual cost (DAC) – which uses the original cost of acquiring the asset, adjusted by the proportion of the service potential which has expired. A variant of DHC is depreciated inflated historic cost (DIHC) which adjusts the asset value for inflation; and
- depreciated optimised replacement cost (DORC) – which measures the current cost of replacing existing assets with a set of assets that are adjusted for the proportion of the

service potential that has expired and optimised to provide the required service potential in the most efficient way possible. Asset values are adjusted for any excess capacity, over-engineering, sub-optimal design or poor location.

Value-based approaches determine the economic value of an asset from its net income earning capacity. Value-based approaches include:

- net present value (NPV) – which values an asset as the present value of the cash flows generated by the asset; and
- net realisable value (NRV) or fair market value – which is the price that the asset would achieve in an open market.

A hybrid approach, referred to as the optimised deprival value (ODV) method, values an asset as the loss that might be expected if the entity was deprived of the asset. ODV is the lesser of the depreciated optimised replacement cost (DORC) and the Economic Value (EV) of an asset, where the latter is the maximum of the asset's net present value (NPV) or net realisable value (NRV).

ODV has been endorsed by COAG as the preferred approach for valuing network assets for public reporting processes (performance monitoring) and by the Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) as a basis for water pricing, unless specific circumstances justify another method.

In the previous GAWB investigation (2002), the Authority adopted the depreciated optimised replacement cost (DORC) approach.

Other Jurisdictions

Generally, Australian regulators have used DORC to establish opening regulatory asset values. However, in determining maximum prices for NSW water agencies, IPART (2000a) calculated the net present value of existing cash flows projected into the future. IPARC's (1999) price determination for ACTEW's water and sewerage business was based on the net present value of existing cash flows, but it applied DORC to value electricity assets.

Stakeholder Comments

In its initial submission, GAWB supported the use of DORC for determining the initial value of the regulatory asset base. GAWB continued to endorse DORC in its comments on the Authority's Draft Report.

QCA Analysis

In competitive markets, asset values are determined by the income earning potential of the assets. That is, market forces determine prices for goods and services, which in turn determine, at the market rate of return, the value of the assets which provide those goods and services.

In non-competitive or monopoly markets, there is the problem of circularity. That is, the price charged for a good or service will determine the economic value of the assets used to produce the good or service. However, the economic value of the assets is needed by the regulator to determine the price.

The circularity problem effectively rules out using value based approaches in valuing regulated assets. Although the hybrid ODV approach provides an appropriate method for valuing assets,

the circularity problem remains an issue where EV is selected for regulated industries. While there are a range of cost-based approaches available, debate centres on whether an historical cost approach (DHC) or a replacement cost approach (DORC) is more appropriate.

A historic cost approach avoids the expense and subjectivity associated with determining current asset values and can be easy to establish where data are available. However, as historical cost values do not have any relation to current market values or current replacement costs, the Authority considers that they do not provide the appropriate economic signals for future investment or consumption of services by users. Even when historical cost is adjusted to reflect inflation, this fails to capture the effects of technological change or over-engineering. In addition, a lack of historic information is often a practical impediment to the use of historic cost.

The efficient use of resources requires pricing and investment decisions to be based on the real economic costs of usage in alternative activities (i.e. opportunity cost). In this regard, a current replacement cost valuation such as DORC is regarded as providing more relevant measures of value for the purposes of decision making than valuation based on historical cost.

DORC better approximates the actual cost of a new entrant into the market, more closely replicating the outcomes of a properly functioning competitive market. It also allows for technological change so that assets can be valued in a way that reflects current technology. Moreover, it allows the firm's financial records to be expressed in current terms and makes the relationship between costs are revenues more meaningful. The disadvantages of DORC include its complexity and the subjective judgements involved surrounding replacement costs and optimisation. These can be overcome through the use of independent technical experts and ensuring the process is transparent.

The Authority notes that DORC is applied in most regulatory asset valuations in Australia and, while there is a degree of subjectivity associated with its application, it provides a conceptually sound basis for regulatory price setting.

The Authority recommends that GAWB's assets should continue to be valued on the basis of DORC.

6.3 Approach to Revaluation

Given the Authority established a DORC asset value for GAWB in its previous investigation, a key issue for this investigation is whether this value should be simply rolled forward or the assets revalued. A rolled forward asset value simply indexes and depreciates the prior asset value to the start of the next regulatory period, with adjustments for new assets and redundant or de-commissioned assets.

Other Jurisdictions

For subsequent regulatory periods, most Australian regulators have opted to roll forward the opening asset value, rather than revalue these assets. For example, in its 2004 investigation of water and wastewater services in the ACT, ICRC decided to roll-forward the ACTEW's 1998 regulatory asset base. The ACCC (August 2004) has expressed a preference to roll forward asset values in electricity transmission.

OTTER (2004) adopted a roll-forward of the previous asset base, but recognised that continually rolling forward the asset base may result in an increasing divergence between an asset value calculated on this basis compared to DORC and noted an intention to address the matter during the next regulatory period. It noted that factors that may cause differences between roll-forward and DORC valuations include:

- the impact of technological change on optimisation factors;
- movements in the foreign currency exchange rate which impact on the prevailing purchase price and, therefore, the replacement cost of assets;
- movements in the cost of commodities used in the construction of assets;
- changes in electricity demand which may impact on the assessed type, quantity or sophistication level of assets used in the DORC valuation to meet forecast demand; and
- changes in taxes which impact on the prevailing purchase price and value of assets.

Where regulators have rolled forward asset values, the prevailing demand for regulated services has typically been greater than that existing at the time of the initial asset valuation.

Stakeholder Comment

In its initial submission, GAWB accepted that, given the lumpy nature of demand and other factors, periodic revaluation (at perhaps 10 year intervals) may be appropriate. However, GAWB argued that re-valuing assets after only 3 years is 'unusual from an Australian regulatory perspective and provides poor incentives for future investment'.

GAWB submitted the following benefits of roll-forward:

- consistency with the approach adopted in other jurisdictions and delivering the lowest long-run sustainable prices;
- stable technology and cost, and low risk of bypass, reduces the importance of a revaluation to ensure that the regulatory asset base represents an economically efficient level of cost; and
- no loss in pricing efficiency as variable rates based on an externally verified estimate of the LRMC of supply will be unaffected.

GAWB therefore proposed a roll-forward of the 2001 valuation, with appropriate adjustments for cost inflation, depreciation and capital expenditure (at the minimum of the 2001 forecast or actual spend, except where GAWB makes a specific case to justify higher expenditure).

In other initial submissions, customers preferred assets to be revalued at each regulatory review (CSC, GCC, CPM and Comalco):

- CSC and GCC submitted that the Authority should revalue the asset base rather than roll forward the previous asset value, due to recent shifts in both demand and supply. However, CSC also recognised GAWB's concerns relating to Authority reviews of GAWB investment decisions, and proposed that (in future) a procedure should be put in place that ensures investment certainty before a project commences;
- CPM submitted that GAWB's asset value for this price review should be subject to a full revaluation, as circumstances have changed substantially since the last review, with regard to water supply and demand projections. CPM submitted that, if existing assets no longer represent the least cost supply option, their value should be revised downwards and GAWB's revenue requirement reduced. However, if existing assets remain the least cost supply option, prices may have to rise to meet that revenue requirement from a lower demand; and

- Comalco stated it had no objection to pricing based on an installed capital base valued using DORC, and that GAWB's overhead base should be reduced over time and the benefit passed through to customers, as many of GAWB's customers are price takers that need to constantly reduce costs to globally compete.

CBP&RA did not submit a preference for roll forward or revaluation, but stated that an appropriate DORC asset valuation should consider meaningful benchmarking of system utilisation against enterprises in similar climactic conditions, end use patterns, demand growth and service standards.

No comments were received on this issue in response to the Draft Report.

QCA Analysis

The Authority notes that, while DORC is used for most initial regulatory asset valuations in Australia, roll forward of those values is generally adopted in preference to revaluation.

The Authority is generally supportive of the principle of roll-forward of asset valuations, on the basis that:

- rolling forward asset values is simpler and less costly. In many cases, the revaluing of assets is not justifiable on cost-benefit grounds; and

- if regulated assets are subject to an ongoing risk of being revalued downwards, this can affect the incentive to efficiently invest. Provided an investment in an asset is prudent and cost efficient at the time of installation, and continues to be so, it should remain in the asset base.

Where revaluations result in reductions, this can be addressed, at the regulator's discretion, by compensating the provider through accelerated depreciation or other mechanisms, or by ensuring the regulatory framework provides some upside potential to offset the risk of downwards revaluation. Such compensation may be limited if it was found that the service provider had previously misled the Authority, if there is an actual threat of bypass, if users as a group are found to no longer have the capacity to pay the relevant charges, or in order to promote outcomes in downstream or upstream markets that were consistent with those of properly functioning competitive markets.

As noted by OTTER, a process of continued roll-forward can, however, lead to an ever increasing divergence between an asset value calculated on this basis compared to DORC.

The Authority notes that in respect of GAWB:

- there have been significant changes in GAWB's circumstances following the 2002 drought, particularly in relation to revised dam hydrology and permanent reductions in demand by major customers, which could affect asset values; and

- the aggregate demand projections upon which the original valuation was based have proven to be significantly too optimistic. GAWB's actual demand for 2002-03 was 17.5% less than the demand envisaged as part of the original valuation. Moreover, GAWB's projected demand for 2005-06 is about 30% below that forecast under the original valuation.

Arguably, therefore, the current investigation is setting the first asset valuation which fully reflects the circumstances within which GAWB must operate.

While a revaluation after 3 years is unusual in regulatory terms, the Authority considers that the circumstances indicate that a revaluation is appropriate. In response to GAWB's particular concerns:

- it is acknowledged that the timing of the current investigation is at a shorter interval than normally would be expected. However, it is designed to coincide with GAWB's proposed contractual pricing reviews and is therefore appropriate. The Authority has proposed a five year future regulatory review period which is consistent with stakeholder preferences and more typical regulatory periods; and

- while technological and bypass risks are currently relatively low, these are outweighed in this instance by other changes in GAWB's circumstances.

The Authority therefore generally concurs with the views expressed by CSC, GCC and CPM that changes in circumstances warrant a revaluation of GAWB's assets with a view to ensuring that the effects of the changes to hydrology and changes in demand are reflected in the asset base.

On the matter raised by CBP&RA, the Authority's valuation is based on SMEC's analysis of the optimised asset base, which takes account of such factors as the climatic and demand characteristics of GAWB.

While the Authority anticipates that a roll-forward approach should be appropriate in future, the case for revaluation should be examined at each regulatory review in order to determine whether the relevant circumstances justify the complexity and cost of revaluation.

Due to significant changes in GAWB's circumstances, and given that the Authority's previous recommendations are not yet reflected in customer contracts, a revaluation of GAWB's asset base is recommended. It has been adopted for the purposes of determining maximum indicative prices for individual customers.

6.4 Optimisation

A key issue in establishing DORC is the basis for optimisation. In general, optimisation may be undertaken from two general perspectives – brownfields or greenfields.

A brownfields, or incremental optimisation approach, is based on the premise that the existing assets would be replaced using fundamentally the same configurations as presently used, with adjustments introduced to ensure that only assets relevant to providing the desired level of service potential are included. That is, an incremental approach seeks to optimise out any over-capacity in assets, over-designed assets, and redundant or abandoned, but listed, assets.

Conversely, a greenfields approach to optimisation assumes a 'clean slate'. That is, the assets can be completely redesigned to develop whatever is believed to be currently necessary to deliver the services required.

The principles underlying optimisation of the asset base are of particular relevance to GAWB for a number of additional reasons:

- revaluation of the asset base as opposed to the adoption of a roll forward approach raises the prospect that some assets may no longer be necessary to deal with the lower levels of anticipated demand now envisaged; and

- from previous chapters, issues arose relating to how, under a price cap regime, investments undertaken by GAWB in the absence of contracted demand are recommended to be treated in the future if demand subsequently failed to materialise.

Stakeholder Comments

In its initial submission, GAWB proposed that, to reduce the risks associated with the future regulatory treatment of investments, and therefore to achieve lower prices, an ex ante test be applied to investments by an Investment Review Panel (IRP). GAWB proposed that future major investments ('perhaps greater than $5m') would be reviewed by the IRP for efficiency before construction, using criteria similar to the ACCC's regulatory test.[2] These investments would be rolled-in to the asset base at an ex-ante approved value, rather than actual cost, so that GAWB has the maximum incentive to reduce its costs.

In response to the Draft Report, GAWB supported the use of DORC with brownfields optimisation.

GCC questioned whether, given consideration of a bypass option by CSC, a greenfields optimisation approach would be more appropriate for pricing when such an issue is raised by a customer. A greenfields optimisation in meeting CSC's needs would produce the same result as if CSC were to construct and operate a separate system.

CPM considered the notion that the service provider should be compensated for optimisation adjustments is ill-conceived. It submitted that such compensation does not exist in any competitive market as a commercial supplier ultimately pays for errors of judgement through a write-down in the value of its assets. CPM contended that the proposed approach essentially allows GAWB unfettered recovery of its costs. It stated that GAWB should be given the opportunity to recover its costs, not guaranteed this income.

DSDI submitted that the Authority's Draft Report does not appear to indicate any support for GAWB's proposal for an ex ante test to be applied to investments by an Investment Review Panel. DSDI supports 'the use of an Investment Review Panel before an investment to remove the possibility of optimisation in the years after an investment'.

Comalco was also concerned that the Investment Review Panel did not appear to carry the support of the QCA. Comalco strongly recommended the Panel be established as a committee of the Board and chaired by a Government Minister.

However, CPM did not support the concept of an Investment Review Panel, indicating that responsibility for asset valuation, optimisation and findings on the 'reasonableness' of investment decisions must remain with the Authority. CPM considered that the Authority is delegating a function critical to its prices oversight role and remains of the view that any major investment decisions made by GAWB should be underwritten by firm contracts with customers.

QCA Analysis

The Authority has previously applied an incremental (brownfields) approach to optimisation on the basis that it more closely aligns with the process of decision-making over time. A greenfields optimisation approach would potentially penalise service providers for past decisions in regard to the essential system configuration that were prudent at the time, and may remove their incentive to undertake future augmentations.

[2] The ACCC's regulatory test consists of three limbs: an interconnector limb, involving NPV analysis; the reliability limb involving a cost-effectiveness test; and the market benefits limb which also involves NPV analysis (ACCC 2004).

In addition, from the regulator's perspective, a greenfields approach requires a comprehensive 'what-if' analysis of alternative configurations which could provide only subjective estimates of asset values, and would involve considerable cost. In regard to issues raised by GCC in response to the Draft Report, the CSC's by-pass option for treated water supply may not necessarily correspond to that of an independently assessed greenfields optimisation.

The Authority considers that the brownfields approach provides appropriate signals to the service provider to ensure that it is not rewarded for sub-optimal excess capacity, gold-plating of assets or redundant assets.

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 there is a need for other reasons to promote outcomes in downstream or upstream markets that are consistent with those of properly functioning competitive markets.

The Authority notes CPM's comments regarding the lack of compensation for ex post optimisation in competitive market. However, it is also noted that, relative to the market, regulated entities receive a low rate of return, with a lack of upside potential Hence, judgement will be required as to the extent of compensation that should be accorded in a specific instance. As outlined below, under the Authority's approach an absolute prohibition against compensation applies where the investment was previously considered not to be prudent. Accordingly, the supplier may in fact incur losses.

Under the Authority's approach:

- establishment of an Investment Review Panel would provide greater assurance that investments being proposed were prudent. The Authority notes, however, that determinations by such a panel could not be binding as GAWB would still be in the best position in terms of the information relevant to such decisions. In addition, as suggested by CPM, the Authority needs to retain its independent regulatory capacity to assess all investments consistent with its prices oversight responsibilities. Thus, the Authority could not be a member of such a Panel. However, the Authority also notes that the existence of such a Panel would provide substantial evidence that any investment was undertaken in a prudent manner; and

- the treatment of investments undertaken by GAWB in response to uncontracted potential future demand is a key concern. Investments of such a nature would, at least in the light of recent experience, not be considered to be prudent in the future (even though they may have been in the past) given associated significant costs and high uncertainty associated with the likelihood of the demand materialising - unless supported by contracts. A question arises as to how to treat such assets and, in part, that depends on their relevance to GAWB's capacity for future service delivery. A desired level of additional capacity was nominated by GAWB and accepted by SMEC. As noted in the Authority's previous report (2002), additional capacity may need to be incorporated in the asset base to meet a 'just-in-time' approach to asset planning. However, in current circumstances, with excess capacity evident at the dam, a sufficient capacity cushion, and therefore planning window, is in place before any further augmentation is necessary.

The Authority recommends that, where optimisation is considered appropriate, an incremental optimisation approach be adopted for the purpose of establishing GAWB's revised regulatory asset base.

6.5 Valuation of Other Assets

Land and Easements

A water business typically holds land for buildings, reservoirs and treatment plants, as well as the area submerged and adjacent to storages. Many water businesses also hold land for potential future dam sites. Easements are a right to construct and operate a pipeline and do not involve ownership of the land involved.

In the previous investigation, the Authority recommended that GAWB's land and easements be included in the asset base at historic cost indexed for inflation. The basis for this approach was the state of the then debate on land and easement valuation, and particularly the decision by the ACCC to adopt historic valuations for the Sydney Airport.

Stakeholder Comments

In response to the Draft Report, DNRM suggested that, given the recent appreciation of land values across Australia, it would be more appropriate for a recent valuation of land to be used rather than an outdated estimate from the previous investigation.

QCA Analysis

In March 2004, the Authority released its final decision on the consideration of an appropriate future valuation methodology to apply to easements for Queensland's electricity distributors. The Authority concluded that easements be valued for regulatory purposes on the basis of their historical acquisition cost maintained in real terms. The indexed historic valuation was considered to:

- maintain the incentive for operators to continue to invest in easements by ensuring that the real value of their past and future acquisitions are preserved over time;
- not create an incentive for inefficient bypass of the regulated network; and
- result in easement values being consistent with the real values for all other distribution assets.

On the basis of these conclusions, the Authority proposes to continue to value easements at indexed historic cost. The Authority's previous historic valuations for GAWB's easement assets, excluding the Castle Hope Dam site land were indexed to 30 June 2002 by applying the Brisbane CPI. When indexed to 1 July 2005 dollar values, these total $0.65 million.

The Authority has also previously applied indexed historic valuations to land assets including GAWB. However, in the Authority's draft decision on the Dalrymple Bay Coal Terminal, land valuations were based on fair value (market values) for land at the terminal and associated non-infrastructure improvements. Market value was considered to provide a better indication of opportunity cost to the owner of the assets and was more consistent with the asset value which would be faced by a new entrant to the market. Although land being used by GAWB cannot be separately traded, it remains a key component of the replacement cost of all assets and, for consistency with the treatment of other assets, a market value is appropriate.

In GAWB's case, it is also recommended that land be valued on the basis of market value as being more representative of opportunity costs. In the Draft Report, the Authority indexed forward the previous estimates of market value provided as part of SMEC's valuation of GAWB's assets in 2001. The indexed market value was $10.986 million to 1 July 2005.

The issue raised by DNRM in regard to recent trends in land values is relevant. The Authority engaged Herron Todd White to provide a revised estimate of GAWB's land valuation. Market value at 31 December 2004 was estimated at $18.77 million. When indexed forward to 1 July 2005, the land value is $19.02 million. This compares with an indexed historic value at 1 July 2005 of $18.29 million.

Herron Todd White's assessment of market value was based on the highest and best alternative use and excluded the value of all improvements other than fencing. In addition, for the purposes of valuing land submerged by and bordering Lake Awoonga, it assumed that the dam and associated improvements did not exist and that each lot would be marketed and sold individually as grazing land. This best represents the replacement cost of the land assets.

The Authority recommends that land be valued at market value and easements be valued at their historic cost indexed for inflation.

Work In Progress

In the Authority's previous investigation, capital expenditure involving work in progress for more than 12 months was accumulated and capitalised annually using WACC. However, it was not included as part of the asset base for pricing purposes until fully completed and able to contribute productive capacity to the system.

The Authority proposes to continue including the capitalised cost of work in progress. However, no work in progress was identified by SMEC for the Final Report.

The Authority recommends that work in progress be capitalised using WACC and be recognised in the asset base for pricing purposes once it is fully completed and able to contribute productive capacity to the system.

Other Assets

Recreational Facilities

In the previous investigation, it was recommended that the DORC of the recreational facilities be included in the asset base as a significant proportion of the capital involved in the provision of recreational facilities is required for the provision of water catchment and site management services (for example, dam operations management, care-takers' facilities, boat ramps and other facilities). Offsetting revenues from recreational facilities were incorporated in GAWB's MRR.

The Authority proposes to maintain this approach for the current investigation.

Environmental Assets

Environmental assets operated by a water business may include such structures as fish ladders and monitoring equipment. These assets are required to address the externalities or resource management requirements of operating water storages and managing catchment impacts.

GAWB has already addressed some of its externalities through the operation of its fish hatchery to maintain fish populations in Awoonga Dam.

In the previous investigation, it was recommended that the DORC of the fish hatchery be included in the asset base on the basis that the fish hatchery addresses the environmental impacts of storage activities. Offsetting revenues from the operations of the fish hatchery were recognized in the revenue requirement. This approach is proposed to be maintained for the current investigation.

Relocated Assets

GAWB's proposed capacity augmentation included capital costs for relocation of road, rail, telecommunications and electricity services.

Where there is no market for a relocated asset, but the owner has a genuine intention to continue to use the asset, the appropriate measure of compensation for the resumption of the asset is the cost of reinstating or replacing the asset, taking into account its condition. Where a market does exist market value is appropriate.

In the previous investigation, the Authority recommended that the cost of assets necessarily relocated should be incorporated into the asset base at their cost of relocation. The Authority proposes to maintain this approach.

The Authority recommends that:

- **the DORC of the recreational facilities and fish hatchery assets be included in the asset base; and**
- **the cost of assets necessarily relocated should be incorporated into the asset base at their cost of relocation.**

6.6 Estimating DORC for GAWB

In the previous investigation, the Authority identified the DORC of GAWB's assets to be $302.4 million as at 1 July 2002, after optimising out $25.8 million of assets, some of which re-entered the asset base in later years.

Replacement Cost of Assets

The replacement cost under DORC measures what it would cost today to replace the existing asset with an asset which can provide equivalent services at least cost.

For the Draft Report, the Authority engaged SMEC to determine the depreciated replacement cost of GAWB's assets as at 30 June 2004. SMEC was required to have regard to the regulatory asset base established by the Authority as at 1 July 2002, new assets incorporated into the asset base since 1 July 2002, assets de-commissioned since the 2002 review, and any changes to the remaining useful life of assets previously estimated by SMEC. In particular, SMEC was required to take into account the effects of the drought on the condition of the assets. SMEC's analysis did not involve a full revaluation.

SMEC reviewed price movements for various asset types from June 2002 to July 2004 and consequently applied a CPI index (for building materials other than housing) to dams, pumps, administration assets, plant and improvements. The Rawlinson's Construction Inflation Index was applied to buildings and the fish hatchery. SMEC identified specific price indexes for pipes, reservoirs and the treatment plant.

Optimisation of Assets

In the previous investigation, the Authority adopted an incremental brownfields approach, using estimates independently derived by SMEC. SMEC's optimisation was based on a 'just-in-time' approach taking into account the development timeframe, reasonable technical and economic considerations and the demand outlook. Specific recommendations made were that:

- in regard to storage infrastructure:
  - the current location and storage construction technology is considered appropriate;
  - the dam raising to FSL 40 represented the least cost supply option with the exception that $2.4 million in construction costs that were incurred in preparation for a raising to FSL 45, should be excluded from the asset base for pricing purposes; and
  - sufficient capacity cushion exists under the revised preferred planning scenario to defer the Stage 2 augmentation from current pricing considerations.
- with regard to the scale and timing of raw water distribution augmentation, capital costs of $23.1 million that have already been incurred for the Awoonga to Gladstone pipeline could have been deferred until 2004-05 and that $1.9 million in pipelines serving the Fishermans Landing area could have been delayed until 2002-03 if a 'just-in-time' approach were adopted. SMEC also identified the need for further expansion of the network as follows:
  - Awoonga to Toolooa: a third pump at Awoonga Pump Station in 2013-14 at a cost of $2.3 million;
  - supply to northern industrial area: the realignment of the Mt Miller pipeline from Gladstone, rather than Toolooa, at a cost of $14.96 million. A new reservoir and booster pump to be installed at Mt Miller tank in 2007-08 at a cost of $6.1 million, with a further booster to be installed in 2013-14 at a cost of $0.3 million; and
  - supply to Aldoga: the pipeline, boosters, pump and tank should be installed in 2003-04 at a revised cost of $7.62 million;
- the existing treated water system was either at or below optimum. SMEC recommended:
  - the Gladstone Water Treatment Plan be upgraded in 2002-03 at total cost of $1.5 million;
  - duplication of the Gladstone low-lift raising main in 2002-03 for $0.7 million;
  - upgrade of the rising main to Boyne Island/Tannum Sands in 2007-08 for $4.2 million;
  - duplication of the South Gladstone/Toolooa pipeline in 2002-03 at $2.85 million; and
  - expenditure on the Yarwun Water Treatment Plant of $0.3 million in 2002-03 to improve treated water quality and $0.39 million in 2002-03 to increase capacity.

Stakeholder Comment

In initial submissions, CSC submitted that a greenfields approach to optimisation should be considered, particularly given the reduced yield from the dam and demand implications from the drought. CSC stated its residents are being harshly and unfairly treated when they are being potentially asked to pay over 70% more for their water than Gladstone residents, who live over twice the distance from the source of the water.

CSC proposed two alternative options which it stated would result in a more optimal cost of supply to the Council, including:

- relocation of existing water treatment plant to Benaraby, before distribution to the two Councils, with raw water separately routed from Benaraby to Gladstone industrial customers; and

- establishment of a new water treatment plant at Benaraby to supply CSC, and the existing plant to supply GCC.

CSC's comments were made in the context of differential pricing to the two Councils. This issue is discussed further in Chapter 4.

DSDI stated that developments in relation to enhanced security of supply or alternative sources of supply may not be consistent with the 'just in time' planning and development strategies upon which the prior asset valuation method was based. It stated that excess capacity could be included in the asset base for prudential management, and prices to reflect increased supply security.

GAWB stated that a further review of the Mt Miller pipeline or other delivery assets is not justified so soon after they were accepted by SMEC and the QCA as prudent.

In response to the Draft Report, GAWB submitted its capital works programme for the next 10 years which proposed capital expenditure of $44.369 million.

CPM noted that Awoonga Dam has a safe yield of 78,000ML while projected demand over the 20-year period only reaches 68,772ML. CPM's view was that the QCA has not properly considered this matter given that the brownfields approach should optimise out any over-capacity. CPM considers that the QCA should do one of two things:

- establish the 'optimal' augmentation cost of a supply increment to 70,000ML and permit only this amount to be capitalised in the regulatory asset value; or

- incorporate in its cash flow modelling a residual amount for the future value of spare capacity that remains at the end of the modelling period.

The latter approach is recommended by CPM given the time frame.

QAL submitted that 'the asset base used to derive the GAWB revenue requirements should not include all the capital for the full 2002 dam wall raising and associated delivery infrastructure, as this capacity is not required for at least 20 years'. QAL further stated that 'with water demand in 2024-25 still about 10,000ML below capacity, this appears to be a clear indication of too much capacity added too soon'.

Mr Garry Ross, a resident of Gladstone, also suggested that GAWB's demand projections indicate that the recent Awoonga Dam augmentation was not necessary until well after 2010.

Mr Ross stated that the current customer base should not be expected to pay higher prices due to the early construction of the augmentation.

In addition, the Authority received numerous letters from Mt Larcom residents in relation to the maximum indicative price for the area. A key issue in regard to these concerns relates to the cost of the infrastructure involved in supplying Mt Larcom. GAWB suggested that the Mt Larcom pipeline and reservoir should have been optimised and a by-pass price established. They added that the pipeline can be re-optimised if Aldoga demand emerges.

GCC noted the Authority's comments that, where the Queensland Government requires capacity to be available for regional development, it is open for the Government to fund such an arrangement through a CSO. GCC sought confirmation that this decision will in fact be implemented.

QCA Analysis

CSC's proposal involves an alternative treated water distribution system which bypasses parts of the present distribution system. This issue is addressed in Chapter 4.

In regard to the issue of prudent excess capacity raised by DSDI in its initial submission, with a new augmentation in place, there is significant spare storage capacity in Awoonga Dam. Should there be any requirement for additional capacity for regional development purposes, it should be addressed through appropriate CSO funding to GAWB.

In general, as noted earlier, the Authority does not apply ex post optimisation. However, in GAWB's case, a re-optimisation approach is appropriate given the significant changes in circumstances in relation to supply and demand, and given that GAWB has not yet put in place new contractual arrangements for the new recommended pricing practices.

The Authority engaged SMEC to undertake an optimisation assessment of GAWB's asset base over the 20-year planning period, taking into account the previous optimisation, changes in GAWB's circumstances including hydrology and demand, and the impacts of other external requirements where identified.

SMEC was also engaged to review issues raised in response to the Draft Report, specifically in regard to:

- GAWB's claims for capital works of $44.369 million over the next 20 years. In the Draft Report, total capital expenditure of $12.08 million over the 10-year period was incorporated;
- the implications of the revised demand projections, mainly in relation to treated water supply; and
- the Mt Larcom pipeline.

SMEC's recommendations are outlined below.

Awoonga Dam

In regard to storage infrastructure, SMEC recommendations for the Draft Report were that:

- the current location and storage construction technology is considered to remain appropriate;

- the dam raising to FSL 40 remains the least cost supply option. Although demands are lower than predicted at the time of the augmentation, this is offset by the lower system yield. SMEC noted that, despite the changes in circumstances, the augmentation remains in the 'just-in-time' category and not too early; and

- at the time of the raising, GAWB built in provision for future raisings in the form of an additional 2.6m of embankment height, an investment of $2.4 million which was previously optimised out. Its current equivalent value is $2.8 million. SMEC indicated that this embankment is now required to meet a recent revision in the Probable Maximum Flood (PMF) level that Awoonga Dam is required to withstand. In this regard, the left abutment of the dam wall adjacent to the spillway remains lower than required for the PMF, but SMEC considers that the additional cost of this should not be included until further analysis is completed to ensure that it would be necessary.

In response to submissions to the Draft Report, SMEC's analysis confirmed that the recent raising of Awoonga Dam to FSL 40.0 m is considered within the 'just in time category' and not too early. The recommendation was made with regard to the lead times required for storage capacity augmentations, including allowance for filling.

In addition, SMEC recommended that, with an overall reduction in water demands offset by the reduced yields, anything less than a FSL 38.0 m for Awoonga Dam (corresponding, on a pro rata basis, to a HNFY of 70,000 ML/a), would not meet storage yield reliability level of service within the planning period (i.e. up to 20 years). SMEC commented that:

- whilst it could be argued that raising Awoonga Dam to FSL 38m may have been more appropriate, this would be based on hindsight; and

- given the potential for further reduction on system yield over the next 20 year period, no optimisation of the existing Awoonga Dam (FSL 40m) is considered appropriate.

SMEC also referred to their July 2002 report *Awoonga Dam Raising,* which noted that raising the dam to its present height (FSL 40m) as against the option of FSL 38m, was cost effective as minimal additional expenditure on the dam was required to gain an increase in historic no failure yield (HNFY) from 76,900ML to 87,900ML. Since that assessment, the HNFY of the raised dam has been reduced from 87,900ML to 78,000ML.

The Authority also notes that, following revised demand estimates for treated water (Chapter 5), the unused capacity of Awoonga Dam at the end of the 20-year planning period is now reduced from 9,200ML to 7,400ML.

On the basis of SMEC's analysis, notwithstanding the remaining excess capacity and given the uncertainties associated with the planning framework, existing dam storage is considered optimal and no further adjustment for remaining excess capacity is warranted.

In its submission, GAWB identified a total of $6.167 million in capital expenditure in the Awoonga Dam segment, the major components of which were $2.55 million for raising the left abutment of the Dam in 2012-13, $0.84 million for raising the outlet tower in 2011-12 and $1.29 million for relocating and upgrading the fish hatchery over a number of years. This claim from GAWB compares with capital expenditure of $0.152 million previously allowed by the Authority, primarily for safety related upgrades. SMEC considered that, of GAWB's claim, a total of $1.179 million over the 10-year period was justifiable, including the amounts previously accepted by the Authority, with $95,000 being incurred in the 2005-06 year. These expenditures included outlet works improvements, a gauging station upgrade and numerous minor expenditures, largely relating to work not completed as part of the original Awoonga Dam raising. In relation to the raising of the left abutment on dam safety grounds, SMEC's

view was that further investigations are required to define options and that, initially, only $130,000 should be allowed for this study and for geotechnical investigations.

The value of land held by GAWB for the Castle Hope Dam site on the Calliope River has been optimised out of the asset base.

Raw Water Distribution System

With regard to the scale and timing of raw water distribution augmentation, SMEC's recommendations were that:

- the duplication of the Awoonga to Gladstone pipeline to the Mt Miller offtake, previously optimised out and re-instated in 2004-05, is retained in the asset base from 2005-06. While demand is lower than in the previous investigation, the additional capacity in this segment is required to service the Mt Miller pipeline and the northern industrial area. SMEC also advised that, while an alternative specification would have involved smaller diameter pipes with higher pumping duties, there was no cost advantage in present value terms. The economic analysis showed that the minimum overall effective size of the duplicate pipeline was 1,290 mm diameter. However, the current overall effective size of the duplicate pipeline of 1,520 mm diameter was only marginally less cost effective as the cost of the larger pipeline was nearly offset by decreasing power costs. Based on the outcomes of the economic analyses and the marginal difference between the current overall effective size of the duplicate pipeline compared with the optimum effective size, it was not considered appropriate to optimise down the pipeline;

- the third pump at Awoonga Pump Station was previously optimised out until 2013-14, but is now considered necessary to manage the risk of lightning strikes or other breakdowns which could restrict supply. This pump has been retained in the opening asset valuation;

- various improvements and upgrades in the Toolooa pumping system, totalling $0.742 million were allowed. This compares with expenditure of $0.588 million incorporated in the Draft Report analysis and GAWB's proposed expenditure for this segment totalling $1.177 million. SMEC's allowed expenditure included raw water quality monitoring systems in 2006-07 ($120,000), a motor start cross-connection in 2005-06 ($72,000), fire protection upgrade in 2005-06 ($75,000) and lightning protection in 2005-06 ($62,000). SMEC did not accept GAWB's claim for $320,000 pump replacement on the grounds that it was not justified under revised demands;

- a new 20ML reservoir would be installed at Toolooa in 2019-20 at a cost of $2.37 million. This storage is required to maximise Awoonga pumping efficiency and provide some additional reserve storage. It was not included in the Draft Report asset base, and its timing was outside the range of GAWB's capital works programme. SMEC has identified it as being required to meet revised demands;

- a duplicate pipeline of 900mm diameter over 4.8km from Toolooa to the Mt Miller offtake is required in 2012-13 to provide sufficient flow into Gladstone and maintain supplies to Fishermans Landing ($4.6m). SMEC's hydraulic modelling confirmed that the most cost effective approach to meet increasing demands in the northern area is to maintain gravity supply for the 20 year planning period by progressively installing further pipelines between the Toolooa Reservoir and the Mt. Miller pipeline off-take and at the end of the Mt. Miller pipeline towards Boat Creek (Fisherman's Landing). SMEC also accepted GAWB's proposal of $328,000 in expenditure for removal of asbestos from the Toolooa reservoir roof, compared to a Draft Report allowance of $210,000;

- the Mt Miller pipeline supply to northern industrial area which was brought into operation in mid 2004 is considered by SMEC to be 'just-in-time' to meet northern area demands and has a valuation at July 2005 of $14.69 million, at a saving of $1.4 million against the valuation used in the previous investigation. SMEC found that the increased demand from the Comalco development in the northern area has taken the system requirement beyond the capacity of the Hanson Road pipeline. The installation of the Mt Miller pipeline has a domino effect which means that all previous raw water distribution upgrades from Awoonga to Gladstone become essential parts of supply to the northern area via the high level Toolooa Reservoir;

- a new storage is recommended by SMEC to be built at Mt Miller in 2010-11 at a cost of $3.215 million. This expenditure was included by SMEC in the Draft Report capital expenditure and was listed in GAWB's capital works programme. It takes the place of a 50ML storage previously proposed for Toolooa at a cost of $4 million. SMEC agreed with GAWB that the majority of additional reserve storage should be based in the northern area. SMEC assumed the storage to be located near the end of the Mt Miller pipeline to provide a capacity of 40ML to meet northern area needs for the next 20 years;

- a duplicate pipeline from the end of Mt Miller pipeline to Fishermans landing is required in 2020-21, at an estimated cost of $1.1 million. This was identified by SMEC in the Draft Report valuation, but was outside the timing of GAWB's capital works programme;

- the $1.9 million in pipelines serving the Fishermans Landing area, which in the previous investigation were optimised out and re-instated in 2004-05, are considered a necessary part of the northern area supply and no optimisation is required; and

- the pipeline, boosters, pump and tank which were to be installed for supply to Aldoga in 2003-04 under the demand scenario adopted for the Authority's previous investigation, are deferred indefinitely. This results in a reduction of $8.3 million compared to the previous investigation. GAWB's capital works programme included outlays of $6.94 million commencing in 2007-08 for the Aldoga pipeline and reservoir, and a further $8.1 million from 2014-15. SMEC did not accept these on the basis of current demand estimates.

Existing raw water distribution assets which were fully or partially optimised from the asset base in the previous investigation, and remain so for the current investigation, include:

- the original raw water Aldoga/Kirkwood offtake which was installed prior to the Mt Miller pipeline. The location of the offtake was subsequently changed and the installed offtake is no longer required; and

- Boat Creek Reservoir, which was previously excluded from the asset base, is currently redundant and not included in the asset base.

Treated Water Distribution System

In regard to the treated water system, SMEC's revised assessment recommends that:

- various upgrades and refurbishments of the Gladstone Water Treatment Plant (GWTP) are required for water quality reasons and to meet Occupational Health and Safety reasons. In the Draft Report, the Authority allowed $1.4 million for these works. However, GAWB's 10-year capital works programme identified $3.578 million in expenditures. Expenditures for flash mixers in 2005-06 ($135,000), plant roof and walls in 2008-09 ($80,000), soda ash gantry in 2005-06 ($167,000), emergency power supply in 2009-10 ($174,000) and fire protection system in 2005-06 ($122,000) were previously

accepted and carried forward. GAWB's claim for $560,000 in treatment plant quality upgrades to meet expected future quality requirements was not accepted given current levels of service. GAWB also claimed $1.02 million for a clear water balancing storage by 2009-10, but SMEC considered a lower cost of $300,000 deferred until 2017-18 more appropriate in view of current demand expectations. Expenditure of $360,000 was accepted for a chemical dosing building from 2008-09. With other minor adjustments, SMEC accepted a total of $1.588 million in upgrades over the planning period from GAWB's claims of $3.578 million;

- a general upgrade of the GWTP capacity which was not allowed for in the Authority's Draft Report was accepted. However, GAWB's capital works programme identified total expenditure of $6.14 million over three years from 2013-14. SMEC considered that, on the basis of revised demands, it would be more appropriate for the upgrade to be staged with an initial 25% capacity upgrade, deferred until 2017-18. SMEC's revised valuation was $2.76 million;

- duplication of the South Gladstone/Toolooa pipeline foreshadowed in the previous investigation was required to meet increasing demands and to improve reliability of supply during peak periods. This work has now been completed at a cost of $1.8 million more than that previously estimated. However, SMEC allowed an additional expenditure of $30,000 to upgrade the Glen Eden booster pipe cross-connection. This expenditure was also recognised in the Draft Report;

- the previously proposed upgrade of the rising main to Boyne Island/Tannum Sands in 2007-08 is no longer required due to reduced urban demand. GAWB's capital works programme included an expenditure of $4.34 million for this pipeline upgrade. However, SMEC noted that expenditure depends on QAL's red mud pond expansion which will require relocation of both raw water and treated water pipelines. On a like-for-like basis, QAL would be expected to meet some of the costs, so that the cost of any pipeline upgrade would be the incremental amount. SMEC suggested that the value should not be included until after works are actually completed, with an adjustment in the next pricing review;

- no further expenditure to upgrade the Yarwun Treatment plant was considered necessary. This has resulted in a reduction in capital expenditure of $1.1 million previously provided in the Authority's previous investigation. SMEC recommends that, as treated water demand from the northern area increases, it is more economic to moth-ball the Yarwun Treatment Plant and supply water from GWTP through the converted Hansen Road main. Accordingly, SMEC allowed $600,000 in costs to upgrade this main. GAWB's capital works programme included $400,000 for these works; and

- an additional $30,000 to be incurred in 2007-08 for a valve pit upgrade at the East End Reservoir supplying Mt Larcom. GAWB's capital works programme allowed for a cost of $45,000.

Other existing treated water supply assets which hydraulic modelling shows have at least 20 years excess capacity based on the demand projections include the rest of the treated water system namely:

- water assets managed by the CSC supplying Benaraby, Awoonga, Calliope, Yarwun and Mt. Larcom areas; and

- water assets managed by the GCC supplying the low and high levels for all of Gladstone City, South Gladstone and industry. Previous demand projections undertaken by SMEC in 2001-02 found that the low level pumped pipelines to Gladstone City reservoirs did not

have sufficient capacity over the planning period. Reduced demands have changed this position).

Further, SMEC recommended that supplies to Calliope Town and Benaraby/Wurdong/Awoonga could be optimized down by one pipe size. This optimisation is estimated to reduce current replacement and depreciated replacement costs by between 10 and 15%.

Overall, the current replacement cost of water supply infrastructure servicing Calliope Town decreased by 15% and the depreciated replacement cost decreased by 16%, from $5.159m to $4.351m. For Benaraby/Wurdong/Awoonga, current replacement cost decreased by 13% and depreciated replacement cost by 12%, from $583,300 to $514,500.

SMEC advised that the current production cost of $137/ML of treated water through the GWTP reflects a significant lower unit operating cost than the $251/ML through the Yarwun Water Treatment Plant (YWTP). Any new water treatment plant of Yarwun size, or even up to 30% of that of Gladstone Water Treatment Plant, equivalent to the maximum required to supply all of the CSC supplied areas to the south and to the west of Gladstone (excluding the Yarwun / Mt. Larcom areas), will have similarly large unit operating cost differences.

Corporate Capital Expenditure

GAWB proposed various corporate capital expenditures, none of which have been previously recognised in the Authority's Draft Report. They are noted below, along with SMEC's recommendation:

- $750,000 in telemetry systems, commencing 2005-06. SMEC agreed with the requirement, but considered that timing should be when the overall management strategy is established. SMEC provided for $510,000 commencing from 2006-07;

- a total of $730,000 in software and system upgrades, commencing with $110,000 in 2005-06, and $20,000 each year and $60,000 every third year. SMEC revised the total cost to $470,000 by not accepting the annual expenditures of $20,000; and

- a total of $2.44 million for various projects. The main cost is $1.55 million to purchase CSC owned assets at Yarwun. SMEC did not include this expenditure, and the Authority proposes not to include this expenditure in the asset base until the transaction is completed. However, SMEC accepted $200,000 for a head office fire and safety upgrade, $285,000 for flowmeters and $200,000 for a Strategic Water Plan.

Mt Larcom

In response to issues raised by Mt Larcom residents, the Authority engaged SMEC to undertake an optimisation of the East End pipeline which supplies Cement Australia and Mt Larcom.

SMEC recommended that the current replacement cost of the Mt Larcom segment should be reduced by 54% and the depreciated replacement cost by 55%. The DORC was recommended to be reduced by $4.09million from $7.45million to $3.36million. The optimised items are:

- the existing 300mm diameter DICL pipeline past the new Comalco supply point (length 21.165km), which could be optimized down to 150mm diameter;

- the East End Reservoir, which could be reduced in size from 5ML to 2.25ML; and

- the outlet main from East End Tank to the mine (1.455km in length), which could be reduced from 375mm diameter to 150mm diameter.

SMEC also considered a proposal to use the decommissioned 200mm diameter slurry pipeline, which is owned by Cement Australia, as a by-pass arrangement. However, the use of the slurry pipeline is not as cost effective as optimising the existing pipeline. Further, use of the slurry pipeline would involve significantly higher reliability risk.

SMEC made its recommendations upon the basis of hydraulic modelling that used existing customer demands, including the Mt Larcom township, East End Mine and the new Comalco Stage 1 and 2 treated water supplies.

Conclusion

In relation to GAWB's log of capital expenditure claims totalling $44.369 million over 10 years, the Authority has accepted $20.232 million on the basis of SMEC's advice. This compares with $12.08 million allowed in the Draft Report. Details are provided in Table 6.1.

SMEC has identified a number of assets which are redundant, either on a temporary or permanent basis, and which have been fully optimised out. These include:

- the future Castle Hope dam site, which may not be needed for more than 20 years and may not be required at all. As in the previous investigation, this land is excluded from the regulatory asset base;

- the raw water Aldoga/Kirkwood offtake which was installed prior to the Mt Miller pipeline. The location of the offtake was subsequently changed and the installed offtake is no longer required; and

- Boat Creek Reservoir, which was previously excluded from the asset base, is currently redundant and not included in the asset base.

Apart from asset redundancies, the extent of optimisations made since the Draft Report on existing assets is limited to the Mt Larcom pipeline (-$4.09m), the Calliope treated water pipeline (-$0.808m) and the treated water pipeline to Benaraby/Wurdong (-$68,800).

The issue arises as to whether GAWB should be compensated for these optimisations. In this regard, it is reiterated that there have been significant changes to GAWB's circumstances which have justified a further brownfields optimisation. Effectively, the current investigation reflects the most relevant circumstances on which to base GAWB's pricing practices, and should be regarded as if it were an initial valuation. Consistent with other intial optimisations, no compensation to GAWB is considered appropriate. The optimisations account for 1.6% of the total asset base, and most relates to the Mt Larcom pipeline which, in any case, is a contributed asset for current customers.

Table 6.1: Summary of Capital Expenditure

	Previously identified by SMEC (20 years)	*GAWB's Capital Works Plan (10 years)*	*Accepted by SMEC (20 years)*
Awoonga Dam	$152,000	$6,167,000	$1,179,000
Toolooa pipeline[1]	$4,588,000	$1,177,000	$3,112,000
Toolooa to Gladstone pipeline[2]	$4,810,000	$328,000	$4,928,000
Mt Miller pipeline	-	$3,215,000	$3,215,000
Fisherman's Landing pipeline	$1,100,000	-	$1,100,000
Aldoga pipeline	-	$15,040,000	-
Gladstone Area Water Treatment Plant	$1,400,000	$9,718,000	$4,348,000
South Gladstone to Toolooa pipeline	$30,000	$14,000	$30,000
Toolooa/Bernaby/Wurdong/Boyne Island	-	$4,340,000	-
Yarwun Water Treatment Plant	-	$400,000	$625,000
Mt Larcom pipeline	-	$45,000	$30,000
Corporate and General	**-**	**$3,925,000**	**$1,665,000**
Total Capital Expenditure	**$12,080,000**	**$44,369,000**	**$20,232,000**

Notes:
1. Previous SMEC estimate included a 50ML storage at Toolooa, now replaced by northern area storage.
2. Duplicate Toolooa to Gladstone pipeline identified by SMEC.

SMEC's total valuation as at 1 July 2004 was $348.66 million, but included land at GAWB's book value. The Authority substituted revised market values for land as estimated by Herron Todd White and indexed the valuation forward to 1 July 2005 values. This valuation of $19.02 million is $0.73 million higher than the rolled forward indexed historic valuation from the previous investigation.

SMEC's valuation also included $2.7 million in DORC for the Serrent road fire-fighting pipeline which services the Gladstone Port Authority. The Authority has excluded this pipeline from the asset base as it is considered that pricing in regard to specific fire-fighting infrastructure should be a commercial matter between the two parties. The valuations were then indexed forward to 1 July 2005 values.

The revised DORC valuations, including land (at market value), easements (at indexed historic cost), environmental and other assets, are shown in Table 6.2. For comparison, SMEC's valuations for total DORC, as applied in the previous investigation, and those for the Draft Report, are shown in the table.

Table 6.2: Revised Regulatory Asset Base – GAWB ($m, opening values) [1]

	2005-06	*2006-07*	*2007-08*	*2008-09[1]*	*2009-10*	*2014-15*	*2019-20*	*2024-25*
SMEC Valuations 2002 Final Report	364.06	367.52	373.70	390.22	394.11	423.80	453.71	n/a
SMEC Valuations Draft Report, July 2005 estimates	352.64	358.23	363.33	368.76	374.37	410.88	442.62	479.96
SMEC Valuations Final Report, July 2005 estimates	355.63	363.22	367.94	373.67	380.24	417.94	455.82	502.07

1. *Note that the 2002 Final Report values were inflated using actual inflation to July 2005 dollar terms. An annual inflation rate of 2.69% is applied to all values from 2005-06 onwards.*

Table 6.2 shows that SMEC's revised valuations are generally lower than the equivalent used in the Authority's previous investigation. For example, the July 2005 valuation of $355.63 million compares to a valuation of $364.06 million which would have applied had the previous valuation simply been rolled forward using CPI. The main adjustments, as at July 2005, are summarised below in Table 6.3.

Table 6.3: Regulatory Asset Base Reconciliation – GAWB, 1 July 2005

	$ million
2002 Valuation Carried Forward by CPI	**364.06**
Plus – re-inclusion of dam wall works previously optimised out	+2.80
Less – lower cost for Mt Miller pipeline than previously expected	-1.40
Less – deferral of Aldoga Pipeline and removal from asset base at July 2005	-8.30
Plus - South Gladstone to Toolooa pipeline and rising mains	+1.80
Less – removal of proposed upgrade of Yarwun Water Treatment Plant	-1.10
Less – optimisation of Mt Larcom treated water pipeline	-4.09
Less – optimisation of Calliope treated water pipeline	-0.81
Less – optimisation of Wurdong/Benaraby treated water pipeline	-0.07
Plus - other revaluation adjustments	+2.01
Valuation Adjusted for Assets	**354.90**
Plus - Change in Land Valuation to Market Value	+0.73
Revised Valuation at 1 July 2005	**355.63**

The Authority recommends that the revised DORC asset valuations estimated by SMEC be adopted for pricing purposes, that is, $355.6 million as at 1 July 2005.

6.7 Other Asset Valuation Matters

Working Capital

In the previous investigation, the Authority recommended that working capital be included in the total value of assets.

The Authority recommended that working capital should be determined on the basis of debtors (accounts receivable) less creditors (accounts payable), plus inventories, taken pre-augmentation and expressed on a megalitre basis. In the absence of any reliable data, the requirement post-augmentation is then determined by applying the per megalitre value to delivered quantities expected over the review period. This gave an amount of $15.50 per megalitre allowed in 2001-02 for its previous investigation which was included in the asset base.

Stakeholder Comment

In response to the Draft Report, DNRM suggested further explanation of the Authority's position in the final report. DNRM noted that, where accounts receivable are less than accounts payable and there are no material inventories, a working capital facility is more likely to be required.

GAWB indicated that the working capital estimate should be a positive value and that the basis of SMEC's estimate of working capital of zero was based on anomalous data.

QCA Analysis

In response to issues raised by GAWB, and noted by DNRM, the Authority requested SMEC to reassess GAWB's working capital requirement.

SMEC adopted a formula to predict working capital requirements based on the quantum of business growth and assumed collection and payment cycles. On this method, GAWB's working capital requirement increases over time based on the quantum of business growth. However, SMEC suggested an alternative approach of pegging the working capital provision to a reasonable allowance, and indexing this allowance in line with other elements of the pricing framework. SMEC's estimate of a reasonable allowance for 2005-06 was $18.07/ML, based on trade debtors less trade creditors, plus inventories. However, SMEC has indicated that there are no inventories in the working capital requirement.

The Authority recommends that a working capital allowance should be included in the asset base and that, for the purposes of the estimating maximum indicative prices, SMEC's estimate of a reasonable allowance is accepted.

The Authority recommends that a working capital allowance should be determined on the basis of debtors less creditors, plus inventories.

Contributed Assets

The justification and basis for recognising contributed assets and the manner for their recognition in prices were addressed in Chapter 4.

In the Draft Report, the Authority recommended that contributed assets previously identified by the Authority continue to be recognised on the basis of their DRC values.

Stakeholder Comment

Since the Draft Report was released for comment, GAWB provided to the Authority details regarding a 1979 agreement between GAWB and QCL, in which it is clear that QCL agreed to pay for the capital costs of the untreated water pipeline to Wilmott Lagoon, the share of operating costs of the pipeline attributable to Mt Larcom, and also the costs of the CSC pipeline from the East End Reservoir to Wilmott Lagoon. In addition, QCL was to pay for the operating costs associated with these pipelines (less a minor amount representing a rebate from sales to Mt Larcom). The Secretariat was also provided with a Supplementary Agreement of June 1998. This confirmed that there was an expectation that Mt Larcom residents would not pay for the cost of the untreated water services. A number of other stakeholders also made reference to these arrangements

The Member for Gladstone, Mrs Liz Cunningham also noted that the Mt Larcom pipeline was constructed to supply water to QCL and Mt Larcom.

QCA Analysis

The Authority's recommended maximum prices take into account a number of contributed assets that have been identified and verified in the previous and current investigations. For confidentiality reasons, these are not detailed in this Report. However, they have previously been provided to GAWB for comment and no new information has become available to the Authority.

In response to the issues raised by various stakeholders in relation to QCL's intentions to meet Mt Larcom's supply costs, the Authority accepts that a pipeline would not have been built solely for Mt Larcom residents and that they were simply collateral beneficiaries of the QCL pipeline. It is also clear that, while the initial arrangement with QCL related to untreated water, it is equally relevant to treated water supplied by the same infrastructure. Accordingly, the Authority proposes to recognise the capital contribution in determining the treated water price for CSC.

This, however, has no implications for the price of water to Mt Larcom residents as whether the Authority pools the relevant costs or sets different prices for different services delivered to CSC, as it is CSC which sets the price for Mt Larcom residents who are their customers. Under the current Ministerial reference, the Authority has no power to review or establish the prices or pricing practices of CSC or GCC, nor review the appropriateness of CSC's decision to charge Mt Larcom residents a higher fixed cost charge for water than it charges other residents.

The Authority recommends that pricing benefits attributable to previously identified contributed assets continue to be recognised on the basis of their DRC values. It is further recommended that capital and operating costs associated with the pipeline for the delivery of treated water to Calliope and intended for Mt Larcom residents not be incorporated in the price paid for treated water by CSC.

7. RATE OF RETURN

Summary

The Authority recommends that CAPM/WACC should be used to determine the appropriate rate of return for GAWB. Consistent with its past practice, a post-tax nominal approach is proposed. Bracketed amounts are those adopted for the purposes of the Authority's previous investigation.

The Authority recommends a WACC of 8.05% (8.72%), based on the following parameters:

- *risk free rate of 5.45% (6.02%);*
- *debt margin of 132 basis points (160);*
- *capital structure of 50% debt and 50% equity (50/50);*
- *market risk premium of 6% (6%); and*
- *an equity beta of 0.65 (0.63).*

7.1 Introduction

Having determined the asset base, it is necessary to determine the allowed rate of return on those assets. The rate of return is a forward-looking concept based on expected future risk.

There are a variety of approaches to calculating the regulated rate of return. It remains an evolving area and, in some recent regulatory considerations, stakeholders have raised issues with the Authority's approach. Cost of capital matters, such as the appropriate term for the risk free rate and the value of dividend imputation credits (ie 'gamma'), have stimulated significant interest and debate at the national level over the past several years among regulators, regulated businesses and customer groups.

In light of these factors, the Authority recently reviewed its methodology for determining the cost of capital. As part of the Authority's assessment of the draft access undertaking for the Dalrymple Bay Coal Terminal (DBCT), occurring concurrently to the GAWB investigation, the Authority undertook an independent and comprehensive technical review of the approach to estimating the cost of capital (QCA 2004). The Authority's review was informed by a report prepared by Dr Martin Lally of Victoria University (Wellington, New Zealand). The review involved an extensive process of public consultation.

As a result of this review, the Authority has made some changes to its previous approach. By their nature, the changes are non-specific technical matters of methodology – none require a consideration of industry or business-specific factors such as those relating to the particular circumstances of GAWB.

Given the recent nature of this review and the need for regulatory consistency in the Authority's determinations, the Authority's revised approach will apply to GAWB.

The Authority's draft DBCT decision (QCA 2004) contains a full explanation of the issues. While the changes of approach are generic, the value of certain parameters will be determined by GAWB's particular circumstances. These issues are fully discussed in the relevant sections.

7.2 Overview of the Authority's Approach

The Authority employs the Officer (1994) version 3 weighted average cost of capital (WACC) formulation. This approach defines firm cash flows in nominal, post-tax terms and modifies the cash flows, as opposed to the discount rate, for tax and the effects of dividend imputation.[3] Allowing for the cash flow adjustments described, the WACC is:

$$WACC = \hat{k}_e(1-L) + k_d L ,$$

where L is firm leverage (debt to total value), $\hat{k}_e$ is the cost of equity and k_d is the cost of debt.

Other features of the Authority's approach are that:

- the value of gamma adopted is 0.5;
- the risk free rate is based on a 20-day average of the 10-year government bond rate;
- the market risk premium adopted is 6.0%
- the debt beta is estimated as the mid-point between zero and the upper bound including the default premium on corporate debt; and
- the Conine beta levering formula, which incorporates the imputation-adjusted corporate tax rate, is adopted in place of the Brealey Myers formula which was used in the previous investigation.

Stakeholder Comment

GAWB's submission in response to the Draft Report included a review by Professor Officer of the Authority's approach. While Officer made a number of observations, in regard to the WACC formulation proposed, his comments on the approach proposed were:

- there is no theoretical justification for using a 20-day average. Using an average dilutes the information contained in the most recent rate and makes it difficult for the entity that is being regulated to effectively hedge the rate. However, Officer did conclude that the issue in terms of the overall effect on the cost of capital is not of major significance; and
- the Conine formula is derived from a WACC definition which includes a tax term. According to Officer, adopting the Conine formula for de-levering the equity beta will bias the beta estimate downwards by the impact of the tax term. Officer further noted that a reduction in the value of the equity beta estimate by the effect of the tax rate would bias the estimate downwards by approximately 30% compared to that estimated under the vanilla WACC definition.

DNRM also commented on the WACC approach, submitting that:

- the use of a 20-day average of the bond rate is appropriate. However, DNRM suggested that the Authority's December estimate for GAWB occurred at a time when the 10-year bond rate was lower than in the previous and following month (November and January). DNRM therefore suggested that, where such unusual behaviour occurs, a number of 20-

[3] Officer (1994) presents four versions of the model that vary according to the definition of company post-tax net cash flows.

day averages may be calculated and the median be used for estimating the risk free rate; and

- the Authority should not depart from the Brealey-Myers re-levering formula used in the previous investigation. DNRM submitted that this view was a result of uncertainty surrounding the appropriate gamma rate.

QCA Analysis

In relation to the matters raised in GAWB's submission by Officer, the Authority:

- agrees that there is no empirical support for a 20 day average in the setting of the risk free rate. It is a pragmatic response to balancing the need to have the most up to date information with the need to avoid unusual one-off movements in the rate and the possibility of gaming by financiers in those instances where regulated entities attempt to mirror the Authority's interest rate profile; and

- considers that the concerns raised with the Conine de-levering formula are not soundly based. The issue was previously addressed by Lally in relation to the DBCT review. According to Lally, the gearing formula must reflect the assumed tax regime. Gray (2003) supports this view.

In response to DNRM's submission, the Authority does not support taking a number of 20-day averages as it further dilutes the most up-to-date information available on the risk free rate.

On the matter of the Brealey Myers formula, it is noted that this formula implicitly assumes that the imputation adjusted tax rate is zero, that is, gamma equals 1. The Authority currently employs a gamma of 0.5. As a consequence, it is considered appropriate to change the formula to achieve internal consistency.

The Authority therefore proposes to retain the approach to the rate of return that was elucidated in the Draft Report for the GAWB investigation and in the Authority's *Draft Decision for the Dalrymple Bay Coal Terminal Draft Access Undertaking* (QCA, 2004). The specific recommendations are as listed below.

The Authority recommends, in relation to the approach for determining the cost of capital:

- **the use of the Officer CAPM for determining the cost of equity capital;**

- **a gamma of 0.50;**

- **a risk free rate based on a 20-day average of the 10-year government bond rate;**

- **the debt beta be estimated as the mid-point between zero and the upper bound including the default premium on corporate debt; and**

- **the use of the Conine beta levering formula which incorporates the imputation-adjusted corporate tax rate.**

7.3 Cost of Capital for GAWB

The above approach to the Authority's cost of capital has been applied to GAWB.

Risk Free Rate

Determining the return on equity in the CAPM requires a risk free rate. The risk free rate represents the rate of return on an asset with zero default risk. In the previous investigation of GAWB, the Authority derived the risk free rate based on a 20-day average of the 10-year Commonwealth bond yield, as at a preset date.

For the Draft Report, the Authority based its risk free rate on the average of 20 business days ending 27 October 2004. At this date, the Commonwealth government bond rate averaged 5.41%.

Stakeholder Comment

GAWB submitted that it must be given the opportunity to manage its interest rate exposure through the nomination of a prospective risk free rate reset date.

QCA Analysis

As discussed earlier, the Authority's preferred approach to determining the risk free rate is with reference to a Commonwealth government bond with a 10-year maturity, averaged over a 20-day period.

The Authority has advised GAWB in advance of the date it has assumed for the purpose of providing maximum indicative prices to customers. In this regard, the 20-day average of the risk free rate as at 4 March 2005 was 5.45%. However, it is expected that GAWB will adjust the risk free rate to the 20-day average on a 10-year Commonwealth Government bond as at 1 July 2005 when it is setting actual prices. The 20-day average is based on the 20 business days ending at the nominated date.

For the purpose of advising customers of maximum indicative prices, the Authority has used a risk free rate for GAWB of 5.45%. However, the Authority accepts that GAWB will reset this rate using the 20-day average of the yield on a 10-year Commonwealth Government bond as at 1 July 2005.

Market Risk Premium

The market risk premium represents the reward that investors require to accept the uncertain outcomes associated with equity investment, relative to the return provided by the risk free rate. This premium is determined with reference to the market portfolio, which is defined as the value-weighted portfolio of all risky capital assets. Since the true market portfolio is not observable, the most commonly used proxy is listed equity in a share market index, such as the All Ordinaries Index in Australia. The corresponding risk premium provided by these equities, comprised of dividend yield and capital gain, is provided by the All Ordinaries Accumulation Index.

Based on the historical average of the risk premia provided by the Australian equity market, using the All Ordinaries Accumulation Index, the Authority has adopted a market risk premium

of 6% in its previous regulatory determinations. A full analysis of relevant information was provided in the Authority's previous GAWB investigation (2002).

Stakeholder Comment

In response to the Draft Report, Comalco's view was that the premium over the risk free rate is too large given the certainty over GAWB's future revenue stream and its risk profile as a supplier of an essential service.

QAL submitted that the market risk premium in the rate of return calculation should use the geometric mean of equity returns rather than the arithmetic mean. The geometric mean takes into account continuous compounding and is lower than arithmetic averages.

CS Energy submitted that the market risk premium of 6% is too high for an organisation with GAWB's risk profile.

Other Jurisdictions

Recent water industry regulatory decisions from IPART (2003), ICRC (2004) and GPOC (2004) all adopted a market risk premium of 6%.

QCA Analysis

Comalco's submission does not identify specific issues in relation to estimating the market risk premium. The Authority's approach to estimating WACC incorporates a market risk premium based on observed historical equity market premiums and a beta reflective of GAWB's level of systematic risk. The approach adopted is consistent with current academic advice and regulatory practice.

In relation to QAL's comment, the Authority notes that the geometric mean is always lower than the arithmetic mean, and that there are theoretical issues in favour of each. However, the Authority also notes that proponents of the geometric mean are in the minority (Lally, 2004). Dimson et al (2002) showed that the effect of using a geometric mean for the estimate of the Australian market risk premium would be to reduce the estimate by 0.016. Nevertheless, on the weight of academic and regulatory opinion, the Authority proposes to retain the arithmetic means of averaging historical market risk premiums.

Based on surveying a range of different estimation methodologies, including historical averaging, historical estimation, and forward-looking estimation, Lally concluded that the Authority's current estimate of 6% is reasonable in the context of the Officer CAPM (QCA 2004).

The Authority considers that an appropriate value for the market risk premium is 6.00%.

Asset and Equity Betas

An asset beta represents the business risk arising from the sensitivity, or covariance, of a firm's operating cash flows relative to the market. Asset betas are not directly observable and therefore must be derived from (observable) equity betas. The difference between an asset beta and an equity beta reflects the extent to which debt is used to finance the firm's assets. As a consequence, a firm's equity beta reflects both the underlying business risk associated with its assets and the financial risk borne by shareholders due to the firm's use of debt financing. Equity betas can be estimated from the historic returns of publicly listed companies.

Given this standard relationship between asset and equity betas, there are four basic steps for determining the underlying (asset) beta for the regulated firm:

(i) apply statistical techniques to estimate the equity beta from the firm's observable historic returns;

(ii) if returns are unavailable (i.e. the firm is not publicly listed) then identify comparator firms that match the firm of interest on the basis of explanatory factors for its beta (i.e. systematic risk), such as the nature of the product and customer, the pricing structure and extent of monopoly power, the duration of supplier contracts, the presence and type of regulation, etc.;

(iii) after estimating equity betas for one or more comparator firms, use a levering formula and a value for the comparator firm's leverage to convert the estimated equity betas to the underlying asset betas; and

(iv) pool the derived asset betas in some manner to arrive at a single estimate for the regulated firm of interest, e.g. a simple pooling method is to select the median asset beta to eliminate the effect of outliers.

In its prior regulatory decision for GAWB (2002), reflecting the absence of listed comparators, the Authority considered the appropriate asset beta for GAWB, taking into account regulatory comparators and relevant risk factors. Then, the Authority re-levered the selected asset beta to account for GAWB's capital structure.

In deriving the asset beta for GAWB, the Authority concluded on the basis of other regulatory decisions and stakeholder comments that asset betas for the water industry typically fall within a range from 0.30 to 0.45, with most falling around 0.30 to 0.40.

The main factor which supported a beta towards the upper bound of the range for GAWB was uncertainty associated with future sales and thus future revenue stability. By comparison with other water businesses, GAWB was considered to be smaller, less diversified and more exposed to a proportionately higher level of excess capacity and medium term demand risk. The implications of the then drought and potential for GAWB's historic no failure yield to be reviewed also suggested significant revenue uncertainty. On these grounds, the Authority opted for an asset beta of 0.45 in its previous investigation, which, combined with a debt beta of 0.27 and a capital structure of 50%, was equivalent to an equity beta of 0.63.

Consultant's Report

For its Draft Report, the Authority engaged the Allen Consulting Group (ACG) to undertake an independent study to determine an appropriate asset beta for GAWB. The ACG was also engaged to respond to issues raised by various submissions.

For the Draft Report, the ACG noted that GAWB had not demonstrated any relationship between the domestic economic cycle and its own revenues to justify its claim for an asset beta of 0.60. Indeed, ACG's examination of historical revenues from GAWB's major customers demonstrated a negligible sensitivity to the domestic economic cycle.

The ACG undertook a 'first principles analysis' of GAWB's business characteristics to identify the underlying explanatory factors for beta. This analysis suggested some key countervailing influences on beta:

- as a regulated monopoly service provider, GAWB would have a lower beta than the average company in the market;

- the demand for water is stable relative to the economic cycle, and would suggest a lower beta than, say, electricity distributors;

- GAWB's pricing structure has a significant fixed component which will cushion the impact of a reduction in volumes due to a downturn in the economy, suggesting a lower beta;

- relative to water companies serving large metropolitan areas, GAWB's demand is more heavily weighted towards industrial demand, which should have a higher systematic risk than domestic demand. However, for untreated water, a large proportion of existing demand is due to QAL. QAL is dependent on the world market for alumina, which is not correlated with the domestic economic cycle, suggesting that a large part of GAWB's existing industrial load is uncorrelated with the domestic cycle;

- the utilisation of GAWB's spare capacity by new demand is likely to be dependent on the domestic economic cycle which would suggest a higher level of systematic risk and a higher beta. However, given that the demand forecasts in utilising spare capacity are not aggressive, this mitigates any systematic risk arising from the existence of excess capacity;

- while a price cap will negatively impact a utility in a downturn due to exposure to volume risk, it is unlikely to have an appreciable effect on low or very low levels of systematic risk as is the case for GAWB; and

- GAWB's average operating cost ratio was found to be low relative to that of Victorian metropolitan and rural water utilities. However, this ratio was found to be significantly more variable over time than US water companies, indicating that GAWB's relative risk may be higher.

Taken as a whole, and after weighing the countervailing influences on beta, the ACG's Draft Report advice was that GAWB faces a similar level of systematic risk as a metropolitan water utility. However, there are no listed Australian water companies from which to derive an equity beta from market data.

On the basis of these characteristics, ACG therefore reviewed betas of listed Australian energy distribution and transmission businesses, nine US and six UK water businesses. ACG compared rolling averages taken over 60 weekly observations and 60 monthly observations (Table 7.1).

Table 7.1: Observed Equity Betas – Comparator Markets

	60-month average pre-dot-com bubble	***60-month average, current***	***60 week average, current***
Australian Energy (re-levered to 60%)	At June 1999	At Oct 2004, monthly	At Nov 2004, weekly
	0.70	0.21	0.73
US water businesses (re-levered to 50%)	At June 1997, monthly	At Oct 2004, monthly	At Nov 2004, weekly
	0.34	-0.02	0.86
UK water businesses (re-levered to 50%)	At June 1998, monthly	At Sept 2004, monthly	At Oct 2004, weekly
	0.96	0.23	0.17

Source: ACG, 2004

ACG proposed that the current 60 month averages are likely to be significantly understated, as they use data from the unusual 'dot-com' stock market bubble period. During this period in the early 2000's, the increased demand for utility stocks relative to the market depressed observed betas to low or negative values.

ACG submitted that utility stocks were undervalued during this period and did not reflect a typical, long-term relationship with the market. ACG therefore proposed that beta estimates prior to and after this period should be used, as they are more indicative of future values. Adopting a 60 week average, ACG estimated equity betas for Australian energy companies of 0.73, US water companies of 0.86, and UK water companies of 0.17.

Other Jurisdictions

Betas adopted in other recent regulatory pricing decisions in the water industry are noted in Table 7.2 below.

Table 7.2: Regulatory Determinations on Beta – Water Industry

Regulator	*Year*	*Gearing*	*Debt beta*	*Asset beta*	*Equity beta*
GPOC	2004	50	0.12	0.3-0.55	0.50 – 0.96
ICRC	2004	60	0.06	0.4	0.90
IPART	2003	60	0.06-0.14	0.3-0.45	0.65-0.9
QCA	2003	50	0.3	0.35	0.4
QCA	2002	50	0.27	0.45	0.63

Source: Regulatory decisions as reported in ACG 2004.

The Authority also notes that the ESC's Draft Decision (2005) for metropolitan and regional water businesses adopted an equity beta of 0.75. Based on the parameters used by ESC for debt margin (110 basis points) and gearing (60%), and the Authority's debt beta, this was equivalent to an asset beta of 0.38.

Stakeholder Comments

In initial submissions, Comalco considered that the previously recommended WACC was very high and not reflective of the business environment in which GAWB operates. It stated that GAWB's risk was very low, and recommended that it be reassessed based on a number of factors including:

- security and certainty of cash flow;
- credit rating of individual customers;
- price risk environment;
- technological environment;
- threat of competition;
- debt levels; and
- service levels.

Comalco proposed that a nominal WACC based on the risk free rate plus 1.2% (reflecting an appropriate equity beta) be used as it was commensurate with competitor infrastructure service providers in the global environment. Comalco also stated that for those customers that require greater supply security, a compensating increase in the WACC rate could be determined.

Both CSC and GCC argued that industrial customers are a higher risk customer group relative to Councils and should be priced accordingly. They suggested that the higher financial/investment risk to GAWB from industrial customers be considered when prices are formulated, possibly through a higher rate of return on capital (via specific customer group betas in the WACC calculation). CSC stated that, to be equitable, those customers who demand higher reliability should pay a premium which reflects the additional infrastructure costs to deliver that surety.

In its initial submission, GAWB proposed that the asset beta should be in excess of 0.45, and suggested that it be set at 0.60, similar to the value applied to the Central West Pipeline (CWP) by the ACCC. This would equate to an equity beta of 0.97. GAWB submitted that it shares many similarities with CWP including uncertain future revenue and a regional industrial customer base.

GAWB noted that water businesses are generally considered to be inherently less risky than other industries, because of low technology risk, the absence of substitutes and the essential nature of water as a commodity. However, it proposed that GAWB is different, as:

- only a small proportion of sales is used for sustaining life – everything else is essentially discretionary and dependent on economic factors;
- more than 50% of water supplied is used in cooling processes, for which substitutes exist and technology risk of stranding is much higher than applies to potable water reticulation;
- the regulatory regime provides a higher risk (threat of asset optimisation, uncertain regulatory period, uncertain scope of future regulatory intervention);
- there is higher demand and cash flow uncertainty; and
- there is a higher correlation of its returns with market returns.

GAWB submitted that other urban distribution businesses have lower systematic risk because their returns are dependent on 'migration, birth rates and local economic performance (and other specific factors such as take-up rates of air-conditioning etc.)' and therefore their returns are likely to be uncorrelated with market returns. By comparison, GAWB submitted that its industrial demand varies with changes in international markets. GAWB proposed that its business risk is more similar to the 'electricity generator providing energy to Gladstone's industrial customer base than with urban water distribution utilities'.

Alternatively, GAWB submitted that, should the Authority retain an asset beta in the range of 0.45, the Authority should 'de-risk' the regulatory framework to better align GAWB's regulated business risk with its allowed return.

In response to the Draft Report, GAWB submitted that statistical evidence supports an equity beta for GAWB of 1.0, approximating that of gas and electricity distributors. GAWB noted that its output is influenced by significant industrial users to a much greater extent than most water companies. On GAWB's analysis, this corresponded to an asset beta of 0.56, assuming the Authority's debt beta of 0.11 is adopted.

In a supporting paper, Officer noted that the nature of overseas listed water companies is typically different and their market betas are not directly comparable. He noted that ACG

referred to UK estimates of equity betas of 0.17 for water companies and contrasted this with estimates provided by Cooper and Currie (1999). Officer noted the variability of these estimates and that they average 0.93. He stated that, on the basis of these numbers, one could accept with little reservation a null hypothesis that the equity beta of the UK water companies is 1.0.

Officer also expressed concern that ACG related the asset beta to GDP instead of a market factor. He submitted that, while there is a relationship between GDP and the market factor, it is typically a poor one with the market tending to lead GDP by some quarters. Accordingly, any comparison would cause a downward estimate in the beta because of the poor correlation between GDP and the market return.

Further, Officer expressed concern that ACG relates aluminium production to Australian GDP and then relates that to an estimate of GAWB's equity beta. He stated that this is no better than using the equity beta of alumina companies as a surrogate for the supplier. Officer submitted that electric and gas utilities are a better surrogate of water companies whose major companies are commercial and industrial users. However, he acknowledged that, even in the context of gas and electricity distributors, estimates of equity betas present significant measurement problems.

Officer found the Authority's debt beta estimate of 0.11 to be defensible.

Conversely, CPM supported the finding that GAWB systematic risk exposure is less than most other utilities. However, it submitted that GAWB's risk exposure to dam-only supply is lower again. It noted that about half of GAWB's total demand is from dam-only customers with stable long-term water requirements.

CPM suggested that GAWB is insulated from volume risk by the effect of the 'take-or-pay' arrangements. CPM considered that water quality risk is effectively transferred to customers and that GAWB provides no warranties or indemnities for water quality. CPM sought consideration of whether this would have a bearing on GAWB's cost of capital.

Mr Garry Ross, a resident of Gladstone, submitted that the WACC recommended in the previous pricing investigation did not take account of the 'virtually risk free' nature of the water industry or of GAWB's reliance upon large industrial customers. Mr Ross indicated that, in return for security of supply and stable, internationally competitive prices, large industrial customers are prepared to offer 'take or pay' provisions for 90% or more of the contracted supply; long term contracts; precise information on the demand requirements of existing facilities; and advanced notice of expansion plans. Mr Ross submitted that these arrangements virtually eliminate demand risk. Mr Ross also submitted that demand risk for residential customers is minimal, as demand can be forecast with a high degree of certainty.

QCA Analysis

ACG Analysis

The Authority engaged ACG to respond to the issues raised in submissions received in response to the Draft Report.

In relation to GAWB's proposition that it should have a beta approximating that of other infrastructure assets such as gas and electricity, the ACG observed that regulators have generally assessed the equity beta of water businesses at less than 1.0 and consistently below that of gas and electricity companies. Empirical evidence from the United States showed a consistent relativity between water and electricity business equity betas. As a generalisation, the ACG noted that the US water industry betas maintained a level of just over one half of the US electricity industry betas. While results from the US should be treated with caution due to

market differences, the ACG noted that the regulatory framework was constant between US water and electricity regulated businesses so that, as a general rule, the water industry has less systematic risk than the electricity industry.

In relation to GAWB's claims for an equity beta of 1.0 and Officer's view of a null hypothesis for beta of 1.0, the ACG's commented that:

- the reasoning for a null hypothesis of 1.0 is flawed in that, while it may be appropriate when assessing the systematic risk of an average company, it is not appropriate for regulated businesses. Regulated businesses are generally assumed to have higher gearing than the average for listed firms, which is around 30%. Further, given that equity beta estimates have high standard errors, it would be difficult to reject the null hypothesis in such circumstances and all regulated businesses would have an equity beta of 1.0;

- a null hypothesis of unity could have negative consequences for investments in higher risk regulated industries where an equity beta of more than 1.0 would be required to attract investment;

- if an alternative null hypothesis of 0.8 or 1.2 were proposed, it too may be difficult to reject, highlighting the arbitrary nature of the proposal; and

- regulators do discriminate between industry sectors, so that a beta of unity is not applied universally.

Professor Officer also commented on the use of overseas comparators. Despite this, Officer used equity beta data from the UK to support his position for a null hypothesis of unity. The ACG noted that, for the data quoted by Officer, the average gearing of UK water companies during the mid to late 1990s was around 35%. The ACG noted that the fact that international beta estimates must be treated with caution is understood by all practitioners, but that this does not mean that the evidence should not be referred to.

On the matter of the correlation between GDP and market return, the ACG noted that there is a significant amount of empirical evidence tying sensitivity to macroeconomic variables to the cost of capital. This means that cyclical firms, with earnings dependent on the economic cycle, tend to be high beta firms. The ACG found alumina production to be relatively invariant to GDP. ACG's purpose was to show that, although a large proportion of GAWB's revenue is derived from industrial customers, a large component of this demand is not cyclically related to the Australian economy.

In regard to CPM's proposition for a dam-only WACC, ACG considered that individual customers within a regulated entity such as GAWB should not be distinguished as to relative risk levels, on the basis that it would not be possible to identify relevant betas. On the matter of water quality risk, ACG's view was that this risk was a non-systematic risk as it would be highly unlikely to be influenced by market cycles.

The matters raised by Mr Ross, in terms of the take-or-pay arrangements, long term contracts and relatively stable demand, have been taken into account in arriving at the estimated betas.

Based on its analysis of underlying factors and beta estimates of selected comparators, the ACG recommended an asset beta for GAWB of 0.40.

Conclusions

The Authority notes that the factors proposed by Comalco in response to the Issues Paper as relevant to determining the relevant WACC generally relate to the variability of cashflows. These factors have been taken into account in ACG's analysis of the appropriate level of beta.

ACG also took account of other infrastructure providers domestically and internally, as proposed by Comalco. However, the Authority notes that Comalco's suggestion of a 1.2% premium on WACC above the risk free rate would equate to an asset beta of around 0.15 and an equity beta of around 0.17, which would be inconsistent with these comparators.

In relation to the issues raised by the Councils, the Authority notes that its assessment of GAWB's WACC is an entity-wide assessment. The Authority does not consider the variability in the service provided and related risk between industrial customers and Councils to be sufficient to justify determining separate rates of return. However, the Authority considers that prices to these customers should be determined separately and should reflect the costs of relevant infrastructure, including any additional security requirements (Chapter 4).

In relation to the issues raised by GAWB, the Authority considers:

- GAWB's initially proposed asset beta of 0.60, based on the ACCC's CWP decision, is not appropriate. This beta was predicated on CWP's newly constructed infrastructure and absence of established market for services and contractual arrangements (ACCC 2000). In contrast, the Authority notes that GAWB has a number of existing customers predominantly under contract with an established market for its services;

- the proposal for a null hypothesis on the equity beta of 1.0 is flawed, in that it would be difficult to reject in a statistical analysis of confidence intervals, and all regulated businesses would have an equity beta of 1.0. There is clear evidence that betas vary for different industries in markets around the world;

- GAWB faces a relatively low risk environment due to the low level of technology risk, absence of reasonably priced substitutes, and the essential nature of water as a commodity, including its uses for sustaining life and as a reasonably priced cooling agent. It is the affordability of GAWB's water that ensures substitutes are unlikely to pose an immediate or medium term threat to its provision of water services;

- by determining key pricing principles in advance, the regulatory regime provides a stable and known environment for commercial decision making. In particular, the risk of asset optimisation, regulatory periods and future regulatory intervention are known in advance;

- demand estimates for the current investigation are based on contracted volumes which are relatively certain, with only a small component to account for future undetermined demand growth; and

- GAWB's cashflows are not highly correlated with domestic market returns, as demonstrated by ACG. In particular, the demand derived from GAWB's key industrial customer, QAL, is correlated to the international market for alumina, which has not been highly correlated to the domestic market.

The Authority also considered whether, in the public interest, it should increase the recommended beta estimates for GAWB. In this regard, the Authority is aware of recent comments by the Productivity Commission and others that regulatory bodies should err on the high side, on the basis that the impact on the economy of under-investment exceeds the impact on the economy of higher than warranted prices being paid by customers.

In principle, the Authority agrees with that proposition. However, the Authority is not aware of any evidence that the rates of return applied by regulators have impacted adversely on the level of infrastructure investment by regulated industries. Indeed, the Authority notes that, where regulated industries have changed hands, it is usually at a multiple to the regulated asset base (RAB). Such transactions are not consistent with regulated industries receiving an inappropriate return when all aspects of the regulatory arrangements are taken to account.

The Authority notes that, at a recent conference attended by key infrastructure companies, a poll indicated that almost 60% of respondents believed an appropriate RAB multiple was 1.1x to 1.2x and that, for over 40% of respondents, the key factor in deciding an appropriate multiple was the 'spread between the allowed return and actual WACC'.

In the case of GAWB, the Authority also notes that there is currently significant excess capacity in Awoonga Dam and augmentation is not anticipated within the current 20 year planning horizon. A key focus for GAWB is therefore to ensure that long term contracts are obtained so that existing capacity can be effectively utilised. Furthermore, GAWB needs to seek out opportunities for the sale of water in excess of longer term requirements. In other words, effective utilisation of the current capacity is extremely important to GAWB's financial future.

Taking all factors to account, the Authority proposes to accept the equity and asset betas recommended by ACG. In other words, the Authority recommends an asset beta of 0.40 which translates to an equity beta of 0.65 with a 50% gearing level.

The Authority considers that an appropriate asset beta for GAWB is 0.40, with a corresponding equity beta of 0.65.

Capital Structure

A firm's weighted average cost of capital is the weighted average cost of servicing the various classes of financial claims on the firm. Capital structure refers to the relative weights of debt and equity that together finance the company's asset base. Each source of capital or financial claim involves different risks and, therefore, different costs. Business or operating risk reflects the risk of the firm when it is solely financed by equity funds. The addition of debt financing increases the risk to equity holders. The risk from financial leverage is known as financial risk and is the result of the capital structure decision. The higher the level of debt, the higher the equity beta will be and the higher the cost of equity.

The Authority's typical approach to determining the capital structure for a regulated business involves benchmarking an 'optimal' capital structure by examining the average level of leverage in an industry (or set of related industries), regulatory precedents and by using simulation techniques.

In the previous GAWB investigation (QCA 2002), the Authority noted that, while the average gearing for water service providers was less than 50%, this was expected to rise with a greater emphasis on commercial practices. At the time, GAWB and its customers generally supported a gearing of 45 to 50%. The Authority considered that the lumpiness of water industry capex was a major constraint on the capital structure, and that because of the resulting need for adequate coverage of debt payments associated with augmentation, a benchmark level of gearing for GAWB of 50% was recommended.

Consultant's Report

For the Draft Report, the Authority engaged ACG to assess the optimal capital structure and associated credit rating of GAWB on a stand-alone basis. The ACG assessed GAWB against

actual and regulatory capital structures for water and other regulated entities in Australia and overseas.

In relation to actual capital structures, ACG noted that:

- actual capital structures of Australian water entities are typically low. Gearing levels generally lie below 20%, partly due to the public ownership of assets and non-commercial asset valuation techniques. Gearing tends to rise in response to commercialisation. Given these considerations, the commercialised Melbourne Water's 45% gearing probably provides the best available individual benchmark; and

- water companies in the US and UK have gearing levels within the 50% to 60% range, supporting the view that Australian water companies can support higher levels of debt than those currently observed. However, these results relate to larger water companies with stable domestic and industrial demand that do not have the reserve capacity that affects GAWB's operations.

ACG noted that recent regulatory decisions have favoured capital structures in the range of 40% to 60% (Table 7.3):

- in the energy sector, regulatory practice has uniformly been a 60% gearing assumption;

- for water companies, gearing levels have varied from 50% to 60%, reflecting the water industry's lesser capacity than the energy sector to generate consistent and stable cash flows required to support debt. These gearing levels relate to relatively large water companies with stable domestic and industry demand; and

- for ports and rail, 40% to 60% gearing has been assumed.

After comparing GAWB with these entities, ACG advised that GAWB is less able to support debt than energy companies, due to the lumpy nature of GAWB's demand and capital investments with large amounts of reserve capacity. GAWB faces greater volatility in earnings than these companies. Moreover, ACG considered GAWB was less able to support debt than larger, more diversified water companies, given its level of reserve capacity, weather risks and demand factors.

Stakeholder Submissions

In response to the Draft Report, GAWB submitted that the reduction in gearing from 60% to 50% was inconsistent with the reduction in the asset beta. Officer referred to a 'logical inconsistency' in that, the asset beta of water companies is greater than the asset beta of energy companies and other infrastructure assets insofar as the GAWB cannot sustain the same level of debt as these other companies, and yet, the QCA has adopted an asset beta for GAWB that is below the asset beta of the other companies. Gray's advice to GAWB suggested that the assumed gearing levels have cancelling effects on the equity beta, and that the 'lower level of gearing would suggest a higher asset beta than a lower beta'.

Other Jurisdictions

Gearing levels adopted in other recent regulatory pricing decisions are noted in Table 7.3 below.

Table 7.3: Regulatory Determinations on Capital Structure

Regulator	*Year*	*Industry*	*Gearing (%)*
Ofwat[1]	2004	Water (UK)	55
GPOC	2004	Water (Tas)	50
ICRC	2004	Water	60
IPART	2003	Water	60
QCA (Burdekin)	2003	Water	50
QCA (GAWB)	2002	Water	50
ICRC	2004	Electricity distribution	60
IPART	2004	Electricity distribution	60
ACCC	2003	Electricity transmission	60
ACCC	2002	Electricity transmission	60
QCA	2001	Electricity distribution	60
OffGAR	2003	Gas transmission	60
ACCC	2003	Gas transmission	60
NTUC	2002	Gas supply	60
ORG	2002	Gas distribution	60
QCA	2001	Gas distribution	60
QCA[2]	2004	Ports	60
QCA	2001	Rail	55
ORG	2000	Ports	40

1. Preliminary position
2. Draft Decision
Source: Regulatory decisions as reported in ACG 2004.

QCA Analysis

ACG

ACG were requested by the Authority to respond to the issues raised by Officer and Gray in GAWB's submission. ACG noted that the flaw in Officer's submission was that, while beta risk depends on the covariance of returns with the market portfolio, the level of covariance will not be related to the variance (total risk) of a company's cash flows. In relation to optimal gearing, it is variance of returns that is important, and that in GAWB's case, there is material non-systematic risk to the stability of cash flows due to the dependence on Awoonga Dam, dependence on a small group of major industrial customers and sensitivity to drought conditions.

In relation to the cancelling effects of gearing and the asset beta, raised by Gray, the ACG indicated that there was no evidence that companies try to achieve an average level of systematic risk, and would not do so if it were financially imprudent.

In summary, ACG concluded that a gearing level below that of energy companies and at the lower end of the range applied to water companies should apply. Consequently, ACG recommended that gearing of 50% for GAWB would be appropriate for regulatory purposes. Given a gearing of 50%, ACG recommended a credit rating of BBB on the basis of cash flow and ratio sensitivity analysis and comparisons with rated comparables.

Conclusions

ACG has determined an optimal capital structure and associated credit rating for GAWB on the basis of an analysis of actual structures, regulatory comparators and financial ratios. Energy companies are typically geared at 60% for regulatory purposes and large water companies are geared at between 50 to 60%. However, GAWB's operations are characterised by greater periods of excess capacity for long periods and weather risks relative to these businesses.

The Authority therefore accepts ACG's recommended capital structure of 50% debt, and associated credit rating of BBB, on the basis that GAWB's circumstances impose additional constraints on capital structure compared to energy companies and other water business comparators.

The Authority considers that an appropriate capital structure for GAWB is 50% debt and 50% equity, with an associated credit rating of BBB.

The Cost of Debt

The cost of debt is the marginal rate at which a firm can raise debt financing, or alternatively, the cost that the firm's debt holders demand on new borrowings. It is usually expressed as the sum of the risk free rate and a debt premium or debt margin.

The cost of debt depends on a variety of risk factors, including liquidity and default, the latter of which is, in turn, affected by the firm's leverage, the short term volatility of cash flows and the long term security of revenue.

For regulatory purposes, the cost of debt should reflect the current market rate for debt for a firm that is efficiently financed, having regard to any obligations that the firm is required to meet. For example, GAWB is required to maintain at least a BBB credit rating. A further issue relates to debt issuing costs, which can be included within the cost of debt or treated separately in cash flows.

In the previous GAWB investigation, the Authority used a debt margin based on the differential between the risk free rate and BBB rated 10-year debt, estimated at June 2002 to be 160 basis points. No submissions were received on this issue.

Consultant's Analysis

For the Draft Report, the Authority engaged the ACG to undertake an analysis of GAWB's cost of debt, based on the previously determined optimal capital structure and credit rating.

The ACG examined evidence for determining current yields on BBB rated entities from these sources:

- recent BBB+ and BBB rated bond issues;
- CBASpectrum and Bloomberg estimates; and
- other bond-issuing options.

For the Draft Report, ACG observed that there was presently only one 10 year fixed-rate BBB rated bond in the Australian market, and its current yield was about 127 basis points above the 10-year government bond rate. As a consequence, direct market evidence for 10-year, BBB rated debt in Australian markets was very thin and, therefore, somewhat uncertain.

Estimates from CBASpectrum and Bloomberg services were derived from optimisation models that estimate a 'fair market' yield for various maturities and rating for Australian corporate bonds. ACG observed that these models also rely on available market data as an input. As a result, the uncertainty surrounding the market data also affected their estimates. CBASpectrum data suggested a yield of 110 basis points and Bloomberg suggested a yield of around 135 basis points above the 10-year government bond rate.

ACG observed that higher leveraged infrastructure utilities typically take advantage of major debt-raising options, such as 'credit wrapping', where a financial organisation provides a non-revocable financial guarantee to the bondholder to make good the principal and interest that was not paid by the issuer. These organisations, known as 'monolines', are rated AAA and provides their own credit rating to the issue for an annual fee.

Indirect evidence of 10-year credit wrapped bonds issued in the Australian market by energy and transport infrastructure companies over the past two years suggests that credit wrapping may enable Australian infrastructure companies to issue at debt margins that are lower than the CBASpectrum and Bloomberg 10-year bond rate estimates. Further, many such Australian firms currently seek funding for long-term debt in extremely competitive US private placement markets, and evidence from these markets also suggests that firms can obtain 10-year debt at a margin that is substantially below the CBA Spectrum and Bloomberg estimates.

However, given the lack of direct evidence on the above matters, the ACG recommended continued use of the CBASpectrum and Bloomberg benchmarks. Using an average over the 20 days preceding 27 October 2004, the range was 110-135 basis points for the debt margin, exclusive of debt-issuing costs.

Other Jurisdictions

Debt margins adopted in other recent regulatory pricing decisions are noted in Table 7.4.

Table 7.4: Regulatory Determinations on Debt Margins

Regulator	*Year*	*Industry*	*Margin[1] (basis points)*	*Benchmark credit rating*
GPOC	2004	Water (Tas)	70	n.a.
ICRC	2004	Water and elec distribution	112	BBB+
IPART	2003	Water	70-100	n.a.
QCA	2003	Water (Burdekin)	180	BBB
QCA	2002	Water (GAWB)	160	BBB
IPART	2004	Electricity distribution	90-110	BBB to BBB+
ESCOSA[2]	2004	Electricity transmission	150	BBB+
ACCC	2003	Electricity transmission	91	A
ACCC	2002	Electricity transmission	110	A
OffGAR	2003	Gas transmission	120	n.a.
ACCC	2002	Gas transmission	159	BBB+
ESC	2002	Gas distribution	165	BBB+
QCA[3]	2004	Ports	117.5	BBB+

1. Margin excludes allowances for debt-raising costs
2. Preliminary/draft position
3. Draft Decision
Source: Regulatory decisions as reported in ACG 2004.

QCA Analysis

ACG

For the Final Report, the ACG applied the same methodology, and determined from the CBASpectrum data base a differential of 108 basis points. Since October 2004, Bloomberg has discontinued its estimation of 'fair value' yield for BBB rated Australian bonds owing to the thinness of the market. ACG calculated that, during the period from August 2003 to October 2004, the average differential between the Bloomberg and CBASpectrum yields was 23.3 basis points. Applying this differential gives an imputed margin of 131 basis points for Bloomberg.

The typical range that regulators provide for debt-issuing costs is 10-15 basis points. The ACCC established an allowance of 12.5 basis points applied to companies with a BBB+ credit rating, on the basis of advice from Westpac and detailed analysis of its own. The 12.5 basis points allowance has since been revised upwards to 25 basis points by the Australian Competition Tribunal (ACT) in the GasNet and EAPL appeals, but based on little empirical support.

ACG considered that whether the allowance of 12.5 basis points (based on BBB+ rated debt) should be revised upwards if GAWB has a benchmark rating of BBB was ultimately an empirical question. It noted the evidence in the Australian market is very thin, and US studies suggest that for bond issues rated above investment grade (BBB or better), gross underwriter spreads have little correlation with the bond rating. As underwriter fees form the majority of issuing costs, ACG considered that these costs will be similar for BBB and BBB+ rated bonds.

In summary, the ACG recommended a range of 108 to 131 basis points for the debt margin. Including the proposed allowance of 12.5 basis points for debt-issuing costs results in a range of 120.5 to 143.5 basis points for the total margin above the risk free rate.

Conclusions

Estimates from CBA Spectrum and Bloomberg services suggest a margin spread within which lies the single market observation for fixed rate 10-year BBB rated debt. However, as there is only one market observation, it is uncertain how much reliance can be placed on it. Other market evidence, based on bond-issuing options, indicates it is likely that infrastructure firms are able to secure debt financing at a margin that is lower than both the Bloomberg and CBA Spectrum estimates. The Authority also notes that regulators' use of these estimates provides firms an incentive to seek innovative financing.

Taking all of these factors into account, the Authority accepts ACG's recommended range, and that an average of the estimated lower and upper bounds should be adopted. Therefore, an allowance of 132 basis points for the cost of debt was adopted, giving GAWB a cost of debt of 6.77%.

The Authority recommends that the cost of debt be based on the BBB margin above the risk free rate. For the purpose of advising maximum indicative prices to customers, the Authority has adopted a cost of debt for GAWB of 6.77%, based on a risk free rate of 5.45% and a total margin of 132 basis points above the risk free rate.

Expected Inflation

In applying its preferred nominal post-tax approach, the Authority requires a projection for inflation over the regulated period. CS Energy submitted that the inflation rate should be set at 3% rather than the 2.6% used in the Draft Report.

QCA Analysis

The Authority's preferred approach is to estimate inflation as the difference between the nominal bond rate and capital indexed bonds over the same period (that is, utilising the Fisher equation). The approach of using 3% as an indicative estimate suggested by CS Energy is considered arbitrary.

The benefit of such an approach is that it delivers a forward looking estimate of inflation rather than an historic measure. This method is also consistent with the approach adopted by other regulators. Being forward looking, it is more indicative of the underlying inflation rate exclusive of one-off impacts such as the introduction of the GST.

Consistent with the view that information should be as up to date as possible, the Authority has calculated an expected inflation rate based on the difference between the ten year bond rate and a similar maturity indexed bond rate, averaged over the 20 trading days to 4 March 2005. The implied inflation rate is 2.69%.

The Authority recommends that inflation be estimated using the difference between the nominal bond rate and capital indexed bonds over the same period (that is, utilising the Fisher equation). For the purpose of advising maximum indicative prices to customers, the Authority has adopted an inflation rate of 2.69%.

7.4 Summary of WACC Parameter Values

The Authority's analysis gives a cost of equity capital for GAWB of 9.33%, based on a risk free rate of 5.45%, a market risk premium of 6.00% and an equity beta of 0.65. The cost of debt capital is estimated at 6.77%, based on the risk free rate of 5.45% and a total margin of 1.32%. Applying a capital structure of 50% equity and 50% debt yields a nominal, post-tax WACC for GAWB of **8.05%**. Table 7.5 summarises Comalco and GAWB's positions where available, along with the Authority's recommended final position, on the cost of capital for GAWB.

Table 7.5: GAWB Cost of Capital Parameter Values

Parameter	***Comalco***[1]	***GAWB***	***Authority Final Position***
Risk free rate (%)	-	5.35	5.45
Market risk premium	-	-	6.00
Debt margin	-	-	1.32
Debt beta	-	0.11	0.11
Capital structure (% debt)	-	50	50
Equity beta	0.17	1.00	0.65
Gamma	-	-	0.50
Officer WACC3	**6.61**	**8.68**[2]	**8.05**

1. Comalco submitted that GAWB's nominal WACC be based on the risk free rate plus 1.2% (reflecting an appropriate equity beta). The equivalent equity beta using the Conine levering formula is 0.17.
2. GAWB submitted, in response to the Draft Report, a WACC estimate of 9.03% based on a long term bond rate of 5.35% as at 11 February 2005. However, GAWB also estimated a WACC of 8.68% based on the Authority's estimate of the debt beta.

8. RETURN OF CAPITAL

Summary

Return of capital (or depreciation) is a measure of the rate of consumption of an asset's service potential.

While there a number of approaches for calculating depreciation, the Authority has concluded that depreciation for the regulatory pricing period commencing on 1 July 2005 should be based on straight-line depreciation calculated using DORC asset values and condition-based estimated remaining asset lives. Straight-line depreciation is appropriate as it best reflects the average pattern of deterioration for GAWB's asset types.

The Authority considers a renewals annuity to be a suitable alternative to depreciation for longer life assets that are renewable rather than replaceable. The Authority considers that the use of renewals annuities should be reviewed when GAWB develops the relevant data.

8.1 Background

Return of capital (depreciation) is a measure of the rate of consumption of the service potential of assets. It is measured with reference to either depreciation charges or (where appropriate) renewals expenditures. As such, it is included as a cost of service provision.

Methods of dealing with asset consumption include:

- a periodic depreciation charge can be allocated to assets. This periodic depreciation charge can be set using either accounting or economic depreciation methods; or
- a renewals annuity approach which assumes that, through regularly planned maintenance and renewals programmes, the system as a whole does not lose service potential and therefore does not need to be depreciated.

8.2 Approaches to Return of Capital

Accounting Depreciation Approach

An accounting depreciation approach depreciates assets over the term of their useful lives. A number of central issues need to be addressed in determining accounting depreciation, including:

- the opening and closing values of the asset;
- an assessment of the useful life of the asset, to determine the period of time over which the reduction in service potential for an asset should be charged; and
- the pattern or method of depreciation. Central to this choice is a consideration of the elements of consumption that drive changes or reductions in the service potential of assets. Different approaches may therefore be appropriate for different assets.

Where a smoothed pattern of the erosion of asset value over time is adopted, the best-known options are:

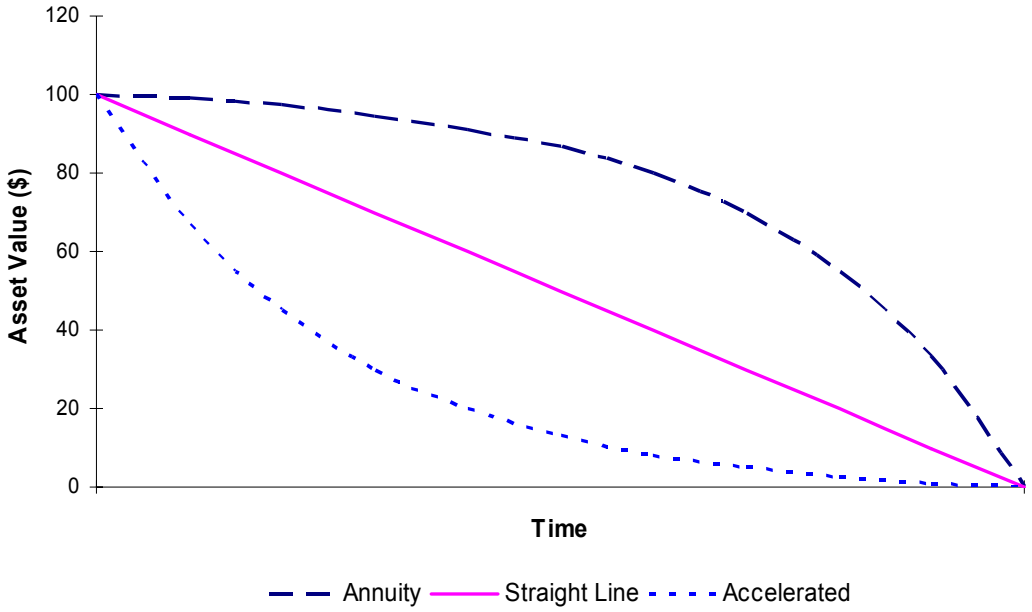
- straight line (or linear consumption) depreciation – this method provides for an equal amount of depreciation each year, found by dividing the difference between opening value and salvage value by the expected life of the asset. This is a simple approach that is well understood and widely accepted, and is suited to assets where the rate of consumption is stable from year to year;

- annuity based depreciation or constant efficiency – this method is most suited when assets maintain full productive capacity until they reach the end of their useful life, like a light bulb for instance; and

- accelerated depreciation – this method is most suited when productive capacity declines at a constant rate, for example, 25% per year, like radioactive decay or a melting block of ice. Maintenance must grow at an increasing rate to sustain output. Accelerated depreciation, or the diminishing value method, results in higher depreciation early in the asset's life. Under this method, a fixed percentage is written off each year, calculated on the declining balance at the beginning of each period.

Asset valuation patterns for an equivalent asset under each of these alternatives are illustrated in Figure 8.1. Equivalent assets are valued more highly under the annuity depreciation approach compared to either the straight line depreciation or accelerated depreciation approaches.

Figure 8.1: Depreciation Schedules



Where the erosion of asset value over time is not smooth, the units of production method assigns a depreciation charge according to the asset's use or productive output. This approach is appropriate where water asset usage varies substantially from year to year. The main drawback is the difficulty of establishing an effective measure of use that reflects the decline in the value of the asset.

For the water industry, cost based depreciation may result in a depreciation charge which exceeds the actual revenue requirement for the maintenance of the service potential of the asset, particularly because of the inability to accurately determine the lives of some water assets (for which the useful life may extend beyond 100 years). Under this approach, there is a tendency to under-estimate the useful lives of long-lived water supply assets such as dams and pipelines.

Where depreciation is applied, it is important to ensure that it extinguishes the asset value over the remaining productive life of the asset. That is, the methodology adopted should be tested to ensure it results in an asset value of zero at the end of the economic life of the asset.

Economic Depreciation Approach

One approach to economic depreciation measures the change in the economic value of the entity, measured as the difference between the value at the beginning of the period and at the end of the period. For regulated monopolies, this introduces a circularity problem as their economic value is dependent on the prices allowed by the regulator which are in turn dependent upon the level of depreciation allowed.

Another approach to economic depreciation, as accepted by the ACCC in its Central West Pipeline decision (2000), allows for under-recovery in the early years of a start-up project's development, and over-recovery in later years. In this formulation, economic depreciation is deducted from the capital base each year to reflect the extent to which total revenue has covered costs. Costs incorporate accounting depreciation. If costs are not covered in the initial regulatory period, economic depreciation will be negative. This results in an increase in the capital base over the period.

8.3 Renewals Annuity

Under the renewals annuity approach, the asset network is considered to be an integrated, renewable system to be maintained in perpetuity, rather than a collection of individual assets each with their own asset lives and maintenance requirements.

The renewals annuity approach is generally considered to be valid only for infrastructure assets satisfying the following characteristics:

- the asset system is renewable rather than replaceable. In other words, the components of the system will be replaced according to their own useful lives, but the operating capacity of the system as a whole will be maintained; and

- for the foreseeable future, demand is such as to warrant continual renewal of the asset system so that the assumption of an infinite asset life is warranted.

The essential input to a renewals annuity approach is an asset management plan. GAWB is required to develop a strategic asset management plan (SAMP) under the *Water Act 2000*. Taking account of the age, condition and service capacity of the system, a total maintenance plan is developed which identifies the most effective operating lives and times for replacement of all assets which together comprise the system or network. An expenditure programme, in some cases for a period as long as 35 years, is then developed to both replace component parts of the system when required and to carry out all other operations and maintenance.

Major expansions to the network, such as the addition of a new storage or transmission link, would form part of the capital expenditure. These would need to be dealt with separately, as would other 'assets' that do not comprise part of the overall network (such as office equipment, motor vehicles and other ancillary assets used by a water services business).

The potential advantages of the renewals annuity approach include:

- the existence of higher quality information about the total system or network that the overall plan provides;
- the reduced requirement for determining the lives of long life assets (as compared to conventional depreciation approaches); and
- the smoothing of lumpy annual operating and maintenance costs.

The renewals annuity approach is well suited to the water industry, which comprises network assets that are renewable rather than replaceable.

The major disadvantage of a renewals annuity relates to the difficulty of developing long term asset management plans, particularly plans encompassing realistic engineering and financial estimates. The approach is rendered more complex where expansion of the network is occurring, and where there is potential for asset components to become redundant in the future.

A renewals annuity approach also requires a decision on the time scale over which the renewals charge would be determined, and its frequency of adjustment. Where it has been applied in rural water businesses, the renewals annuity is typically determined over a rolling 30-year period, with yearly or five-yearly adjustments. However, if a significant peak or trough can be foreseen beyond the chosen time horizon, it is prudent to extend it to smooth the annuity charges. The choice of an earnings rate is also an issue, and the tax implications of these earnings may also need to be recognised in determining revenue requirements.

In its previous investigation of GAWB's pricing practices (2002), the Authority stated that in principle it would prefer to apply a renewals annuity approach to long-lived infrastructure. However, as GAWB had yet to finalise its strategic asset management plan, which is essential for the effective application of a renewals annuity, this was not possible. Consequently, the Authority recommended that straight-line depreciation be used for all of GAWB's assets.

Approaches Adopted in other Jurisdictions

The potential for renewals annuities in the water industry has been recognised by ARMCANZ in its water pricing guidelines. These guidelines state that 'an annuity approach should be used to determine the medium to long term cash requirements for asset replacement/refurbishment where it is desired that the service delivery capacity be maintained'. ARMCANZ further noted that in defining the minimum level of cost recovery for a water business to ensure viability, the return of capital should be a 'provision for future asset refurbishment/replacement', using the annuity approach. In defining the maximum level of cost recovery, to avoid monopoly rents, ARMCANZ considered a 'provision for the cost of asset consumption' appropriate.

As a consequence, renewals annuities have been widely adopted in the irrigation sector. Irrigation service providers such as Murray Irrigation Limited (NSW) and SunWater base their pricing policies on renewals annuities.

Variations on the renewals annuity approach have been adopted by a number of other jurisdictions, including Ofwat in the United Kingdom.[4] Ofwat has established an annual infrastructure renewals charge calculated as the average over several years of the forecast infrastructure renewals expenditure required to maintain the serviceability of the infrastructure network. The infrastructure renewals charge effectively takes the place of both depreciation and major maintenance expenditure. Differences between actual infrastructure renewals expenditure

[4] To be more precise, Ofwat uses a form of renewals accounting, of which the annuity approach is a subset.

and the estimated infrastructure renewals charge are carried forward in the business's balance sheet as an accrual or a pre-payment, with major differences redressed at price reviews.

In Queensland, amendments to the *Local Government Act 1993* have been effected to allow local governments (when applying competitive neutrality reforms to a water business activity) to apply a renewals approach to asset consumption charges for pricing purposes. A number of councils have adopted this method for their water and sewerage business activities.

The Government Prices Oversight Commission of Tasmania (GPOC) recommended in its 1998 investigation of bulk water services that authorities prepare information to allow return of capital to be based on a renewals annuity approach. In its 2004 investigation, GPOC adopted straight line depreciation for pricing purposes, but compared these estimates with estimated renewals annuities for the major water authorities to ensure that they were financially sustainable (ie that the depreciation amount more than covered the provision for asset refurbishment and replacement).

Recent regulatory decisions have been virtually unanimous in their choice of straight line depreciation for valuing return of capital (see Table 8.1). The only exception was IPART's decision on bulk water prices for the Department of Land and Water Conservation (DLWC) which was based on a renewals annuity. This renewals annuity included major periodic maintenance and replacement expenditure expected over a rolling 30-year period.

Table 8.1: Summary of other regulators' approaches to return of capital

Regulator	*Industry/Businesses*	*Depreciation method*
IPART (2003)	Hunter and Sydney Water Corporations, Gosford and Wyong Councils.	Straight Line
IPART (2001b)	Bulk water prices – Department of Land and Water Conservation	Renewals Annuity
ICRC (2004)	ACTEW (Water and Wastewater)	Straight Line
GPOC (2004)	Bulk water pricing	Straight Line
IPART (2004)	Electricity distributors	Straight Line
ESC (2004)	Electricity distributors	Straight Line
QCA (2001)	Electricity Distribution	Straight Line
QCA (2001)	Below rail coal network	Straight Line

Recent history suggests that renewals annuities have been adopted where there is a dominance of renewable long-life assets such as dams and earthen channels, as is the case for irrigation water suppliers.

Stakeholder Comment

In initial submissions, GAWB indicated that a renewals annuity may have advantages over other forms of depreciation allowance for some utility assets (particularly if the expected asset life is greater than that of its components). However, GAWB submitted that the approach may not be valid for much of GAWB's asset base because sea water technologies and alternatives to fresh water cooling processes have the potential to significantly reduce the remaining economic

life of GAWB assets below their technical life. GAWB also advised that it has yet to finalise its strategic asset management plan.

GAWB proposed to maintain straight line depreciation for existing assets and minor new assets, as this approach is 'simple and well understood', and to make a case for accelerated depreciation where particular assets are identified that are likely to face shorter economic lives.

GAWB also proposed that, if a revenue cap form of regulation is not adopted, then economic depreciation (similar to that approved by the ACCC for the CWP access arrangement) be applied for significant new investments to de-risk new investment and ensure a consistent treatment of investments over several regulatory periods.

On the other hand, both CSC and GCC supported a renewals annuity approach. CSC stated that, if the Authority feels that the renewals annuity method is the more suitable basis for the calculation of depreciation, then a direction should be given that GAWB implement this and a suitable transition path be put in place. GCC stated that renewals annuity is preferable to straight-line depreciation given that long lived assets generally feature lives well in excess of traditional lives.

CBP&RA stated that the renewals annuity approach has the disadvantage of encouraging continued use of present day technological approaches to service delivery and exacerbates the barrier to entry for smaller scale innovative decentralized technologies.

In response to the Draft Report, QAL submitted that financial annuity depreciation is a more economically efficient return of capital than straight line depreciation. QAL noted that 'While it can be shown that the combined return of capital and return on capital can equalise over the cash flow period for straight line and financial annuity depreciation, straight line depreciation results in much larger annual revenues for GAWB in the earlier years'. QAL believed this to be inconsistent with a 5-year regulatory period.

CSC submitted that:

- the Awoonga Dam would have a useful life of more than 150 years and should be depreciated over a longer period; and
- GAWB's failure to have a Strategic Asset Management Plan (SAMP) in place is not an acceptable reason for excluding renewals annuity as the most appropriate method of depreciating long-life assets.

CSC also doubts whether substitutes such as sea water cooling would impact on the future economic viability of Awoonga Dam.

The Mt Larcom and District Chamber of Commerce also questioned the dam life of 150 years. Further, the Chamber expressed concerns regarding the calculation of depreciation on fixed structures that had high levels of input from industry.

GAWB indicated that it has a Strategic Asset Management Plan in place approved by DNRM. However, the development of a renewals annuity has not been a priority since GAWB's assets are relatively new and in good condition.

QCA Analysis

The Authority notes that most water industry decisions have proposed a straight line method for calculating depreciation, on the basis that, if a single approach is to be applied, straight line approach best reflects the average pattern of deterioration of all types of assets.

However, the Authority acknowledges that no single depreciation profile is consistent with the loss of service potential pattern applicable to all asset classes, as the applicable pattern depends upon the combination of the particular degenerative characteristics of each asset.

The particular degenerative characteristics of water supply and distribution assets fall broadly into three categories:

- assets that never need to be replaced (such as land and easements);
- assets that have a very long useful life and require very low annual maintenance, such as dams, reservoirs and some major pipelines; and
- assets that need a relatively constant or increasing maintenance schedule as the life of the asset increases, such as smaller pipelines, pumps, valves etc.

Dams generally have very long lives requiring minor maintenance, and thus maintain much of their productive capacity. Such assets can be maintained indefinitely, providing an appropriate periodic maintenance and renewal programme is put in place, and the major threat is likely to be technical obsolescence rather than deterioration.

Other long-life assets such as pipelines may lose value more evenly over their useful lives, best fitting the straight line depreciation profile. Assets such as pumps and motors exhibit linear consumption or geometric asset consumption patterns.

As noted in its previous investigation, the Authority would prefer to apply a renewals annuity approach to long-lived infrastructure that is renewable and for which ongoing demand is envisaged. The Authority accepts that this approach may not be appropriate for assets subject to technological or economic redundancy, which may require a greater emphasis on the earlier return of capital to ensure incentives to invest.

In response to the submissions on the Draft Report, the Authority notes that:

- the Authority accepts the comment from QAL that the depreciation approach results in higher revenues for GAWB in the earlier years of long-lived assets. It is not inconsistent with the Authority's approach. However, the financial annuity approach, by weighting the return of capital towards the end of the asset life, exposes the entity to risks from changes in demand, hydrology and long term alternative technologies;
- the life of Awoonga Dam is based on the engineering design life as advised by SMEC. However, the Authority engaged SMEC to comment on issues raised by CSC and the Mt Larcom Chamber of Commerce that the estimated dam life of 150 years may be conservative. SMEC indicated that the design life is based on the maximum design life practiced by many of the larger water authorities in Australia. For large dams such as Awoonga Dam, a longer physical life of 200 to 400 years should be traded off against shorter term impacts such as changing development needs and safety standards.

  It should also be noted that any reduction in depreciation charges as a result of extending the dam life would be partially offset by increased return on capital on the value of the dam over the 20-year planning period. Given that the asset life of 150 years is already very long, the financial impact of a longer life is not significant; and
- GAWB has indicated that it has completed its SAMP, but that it does not provide sufficient information to establish a renewals annuity. GAWB has not accorded the estimation of renewals annuity a priority since GAWB's assets are relatively new and in good condition.

In relation to whether economic depreciation is required to 'de-risk' new investment if a revenue cap is not adopted, as argued by GAWB, the Authority considers that the regulatory framework appropriately allocates risks to the party best able to handle them, as noted in Chapter 4. Moreover, the Authority has accepted that any further optimisation of assets requires compensation to ensure appropriate incentives to invest, subject to the provisos set out in Chapter 6. There is therefore no reason to further 'de-risk' new investments for regulatory pricing purposes. Furthermore, GAWB should be able recover its costs in the years in which they are incurred, and therefore economic depreciation is not required.

As a result, the Authority recommends straight line depreciation for all assets over the condition-based remaining asset lives identified by SMEC, as summarised in Table 8.2.

Table 8.2: Asset lives for GAWB assets

Asset Type	*Remaining Asset Life (Years)*
Dam earthworks and spillways	150
Dam outlets	100
Bridges	100
Roads and pavements	30
Electrical/power	35
Switchboards	20
Flow meters	15
Pumps, electric motors, cranes and mechanical	25
Pipelines (asbestos cement, reinforced concrete, fibre resin cement)	50
Pipelines (ductile iron, mild steel, poly vinyl chloride)	70
Valves	30
Concrete reservoirs, buildings and other concrete structures	50
Steelwork	35

The Authority's approach uses SMEC's depreciated asset values as the starting values for DORC for each asset, with straight line depreciation applied over the remaining lives.

The Authority considers that the use of renewals annuities should be reviewed when GAWB develops the relevant data.

The Authority recommends that return of capital be based on straight line depreciation for all GAWB's assets.

9. OPERATING COSTS

Summary

The Authority recommends that independently assessed efficient operating costs be incorporated in the cash flows for pricing purposes.

The Authority engaged SMEC to establish the efficient operating costs for GAWB. Relative to the previous investigation, GAWB's operation and maintenance costs are lower, due to lower demand, although some of these savings are taken up in earlier years largely due to the backlog of maintenance. However, general administration costs are higher, reflecting more commercially-based salaries and increased costs for managing workplace health and safety issues.

Because of the complexity and administrative costs associated with an efficiency carryover mechanism (ECM), the Authority has concluded that an ECM is not appropriate for GAWB at this point in time.

9.1 Background

GAWB's operating costs include electricity, chemicals, asset maintenance, employment, rent, insurance, administration, and corporate overheads.

9.2 Cost Allocation

In general, the greater the degree to which costs can be related to the provision of services, the greater the cost reflectivity of the pricing structure, and the more effective the pricing signals. To achieve this, costs should be directly allocated where a verifiable relationship is ascertainable between the expenditure and an individual product or service.

In its previous investigation, the Authority allocated costs as follows:

- certain costs (referred to as direct costs) were directly attributable to segments of the network. These included operating, maintenance, chemicals and electricity costs. These were then allocated according to the users' share of the segments throughput;

- other cost items which could not be directly attributed to the raw water system and treated water system were allocated to each segment on the basis of the segment's share of total direct costs and then to users according to their share of throughput; and

- general administration costs were distributed according to whether they related to management/administration efforts or customer related activity.

General administration costs were found to comprise about 30% of total operating costs in the previous investigation. On the basis of an analysis of GAWB's general ledger entries and an assessment of its operations, SMEC concluded that approximately 10% of general administration costs were customer based, including such costs as billing, customer contract administration, customer enquiries and pricing matters.

The remaining 90% of operating costs was allocated according to administrative effort in each major segment (dam, raw water delivery and treated water delivery). This relative administrative effort was approximated by the relative operating and maintenance costs per megalitre. This resulted in the following weights:

- 0.5 x ML delivered for supplies out of Awoonga Dam;
- 1.0 x ML delivered for supplies to raw water customers; and
- 2.0 x ML delivered for supplies to treated water customers.

The Final Report noted that further analysis of general administration costs, on an activity basis, was warranted. Any further development by GAWB of its accounting information may provide the basis for an improved activity based cost allocation system. Relevant issues include the appropriateness and justification of any cost drivers, their administrative complexity and cost.

Stakeholder Comment

In initial submissions, GAWB proposed to retain the cost allocation methodology recommended by SMEC in 2001. GAWB submitted that they have yet to consider the benefits of the activity based costing model discussed in the Authority's previous investigation and that the allocation is not critical as the costs correspond to less than 8% of GAWB's maximum revenue requirement.

CSC suggested that, while the existing cost allocation method seems reasonable, industrial customers may place a greater burden on planning than Council customers and hence the overhead cost allocation may need to be revised to reflect this. Financial evaluations, planning and the collection of bulk water charges need to be considered.

CBP&RA stated that, for a capital intensive enterprise, allocation of general administration costs should follow the patterns of efficient capital investment.

In response to the Draft Report, CSC again proposed that industrial customers place a greater cost burden on the Board for network planning than Council customers.

QCA Analysis

GAWB has two water products, raw and treated water, and geographically defined classes of customer. The Authority considers that efficient operating costs should be identified for each segment of GAWB's water supply system, wherever possible. In addition to identifying efficient direct costs, efficient indirect and general administration costs should be identified and allocated using appropriate cost drivers. Some costs, such as those related to the maintenance of customer spur-lines, would be directly attributable to those customers.

The Authority engaged SMEC to undertake further analysis of the allocation of costs between customers and system segments.

As was the case for the Authority's previous investigation, SMEC identified three main cost pools:

- system direct costs, those costs specifically attributable to system segments, which include operations, maintenance, electricity and chemicals costs;
- system overhead costs, or costs which are attributable to raw water or treated water service provision, but not to a specific segment. SMEC considered that the amount of system overhead costs allocated to an individual segment would vary in proportion to its operations and maintenance costs incurred on a year by year basis; and

- general administration costs, or those costs which could not be attributed to a particular service or segment.

SMEC proposed to allocate general administration costs to two cost pools - customer service functions and demand based functions. SMEC's analysis of GAWB's general ledger accounts was consistent with the previous recommendations, with 10% of common costs being attributed to customer service functions (including billing, customer contract administration, queries and customer pricing matters) to be evenly distributed between GAWB's customers. For demand based functions which make up the remaining 90% of common costs, SMEC's conclusion was again consistent with the previous recommendations. SMEC considered that the relative management effort between the three major segments is inversely proportional to the volume of water delivered to each segment. On 2003-04 deliveries, volumes were 45,240ML delivered from the dam, 29,140ML through the raw water distribution system to Toolooa, and 13,400ML through the treated water system. This gives approximate relative effort weightings of:

- 0.5 x ML delivered for supplies out of Awoonga Dam;
- 1.0 x ML delivered for supplies to raw water customers; and
- 2.0 x ML for supplies to treated water customers.

In its submission to the Authority, GAWB supported the continued use of these weightings. In regard to the issue raised by CSC in its submissions to both the Issues Paper and Draft Report, the costs associated with planning are likely to be similar for services provided to industrial and Council customers. For example, the addition of a major new industrial customer may also require planning for treated water system upgrades to meet the needs of any increased demand from associated population growth. The Authority could not identify any basis to differentiate customers on the basis of planning costs.

It is recommended to allocate general administration costs on the basis of 10% to customer service, allocated equally to each customer; and 90% to demand based functions, allocated to storage, raw water delivery and treated water delivery according to relative administrative effort.

9.3 Efficiency of Operating Costs

Efficient costs should reflect costs that would normally be expected to occur in a competitive environment. That is, there is a need to reflect the impact of changes in technology, developments in economies of scale, and productivity improvements in response to increased competition and inflation.

The attainment of efficient operating costs in a regulatory sense may be through:

- a benchmarking or company-specific activity based costing exercise to establish efficient costs; and/or
- using incentive mechanisms such as CPI-X to encourage the service provider to seek out efficiency savings.

A combination of the approaches may be adopted, for example, where benchmarking is used to establish an appropriate X factor to apply in incentive mechanisms.

The most common approach to setting efficient cost targets is a CPI-X mechanism, where the CPI is a price escalation inflator and X is a pre-determined index reflecting the perceived

capacity of the regulated business to realise cost savings. The X factor may be determined by an assessment of overall efficiency linked to costs, or assessments not specifically linked to costs.

Cost-linked benchmarking measures involve comparisons to similar businesses (benchmarking across the industry), with the previous performance of the organisation (benchmarking over time), or with the best performer in an industry (performance targeting). The unlinked approaches, or global efficiency measures, include total factor productivity (TFP) and data envelopment analysis (DEA).

However, limited sample size and wide variations in the nature of water businesses mean that global efficiency measures have not been widely adopted by Australian water industry regulators.

In its previous GAWB investigation, the Authority recommended that the CPI-X approach was not appropriate for GAWB at the time. Rather, estimated cost savings were explicitly included in operating costs in the cash flows, based on estimates provided by SMEC. SMEC's analysis reflected the findings of a benchmarking analysis using a range of broad productivity measures.

The rationale for this approach was that GAWB's operating cost base is relatively small and the scope for savings over the regulatory period was also likely to be small. However, the Authority recommended that a further review of incentive mechanisms be undertaken as part of the next review of prices, and that in the interim, GAWB should undertake to develop an activity based costing approach for its operating costs.

Other Jurisdictions

Other Australian water regulators, including IPART (2003), ICRC (2004) and GPOC (2004) have generally employed partial factor productivity benchmarking key performance indicators (KPIs) in combination with activity based costing reviews.

Ofwat (1999) reviewed the actual cost structure of each company as the basis for determining current efficiency and areas where future efficiency gains could be achieved over the regulatory period. Ofwat has also adopted econometric modelling using Ordinary Least Squares (OLS) approaches and has cross-checked these methodologies with DEA and stochastic frontier analytical techniques.

Stakeholder Comment

In initial submissions, GAWB proposed that efficiency savings continue to be directly incorporated in operating costs, based on 'expert opinion' of the efficient level of expenditure. GAWB argued that no additional x-factor adjustment should be applied for 'speculative unanticipated efficiency improvements', submitting that the CPI-X type of mechanism does not itself promote further efficiency gains, as the financial incentives for cost savings are independent of allowed costs.

CS Energy submitted that CPI–X price escalation should be used between price reviews and re-iterated this view in response to the Draft Report.

In response to the Draft Report, GAWB indicated that it had insufficient time to review SMEC's estimates of operating costs. However, GAWB requested that the Authority incorporate an appropriate level of insurance costs (including self-insurance) consistent with the price cap regime proposed. GAWB identified uninsured risks of business interruption and catastrophes, the effect of drought and the loss of large customers.

GAWB also proposed that the Authority should include costs associated with progressing the Fitzroy option for drought mitigation to a point where it can be developed at short notice. These costs are material and mainly include land acquisition, survey and design work and project planning.

GAWB advised separately that the Authority's operating costs should include an allowance for the cost of system losses, in the form of seepage, main breakage, losses due to flushing and backwash water losses from treatment plants. GAWB initially proposed a figure of 10% but subsequently revised estimates to 1 to 2%.

QAL noted that the cost benchmarking analysis conducted by the QCA was at best inconclusive due to a lack of comparative data.

QCA Analysis

Base Year Operating Costs

SMEC's analysis of GAWB's base operating costs used full year 2003-04 actual costs and 2004-05 budget costs. Overhead costs were dissected to reflect general management/asset management costs, project (capital) management costs, general administration costs and recoverables.

Project (capital) management costs were removed from system overhead costs as these were attributable to work in progress and will be capitalised into the asset base once assets are completed.

SMEC identified a number of specific costs in the 2004-05 year which were not previously included. These were:

- $61,000 per year for Resource Operations Plan monitoring;
- $16,000 per year for blue green algae monitoring;
- a $90,000 one-off expense for vegetation rehabilitation;
- $27,000 per year for fish hatchery costs; and
- an increase of $200,000 per year for salaries.

SMEC assumed that the 2003-04 operating and maintenance costs provided a sound base upon which future operating and maintenance costs could be forecast, subject to adjustments where further segments are split and known major periodic maintenance plans were not available. SMEC noted that total operating and maintenance costs have not changed since 2001-02, despite further augmentation works coming into operation. However, general administration costs have increased 63% effectively due to increased salaries and insurance costs. SMEC considered that the insurance increase was consistent with increases occurring in the water industry.

SMEC's operating costs are based on advice from GAWB.

GAWB has been unable to provide estimates of costs for self-insurance, the Fitzroy pipeline proposal or systems losses. Primary responsibility in this regard rests with GAWB. The Authority is not privy to the level of detail necessary for this purpose. Indeed, it is for GAWB to substantiate its claims. On the basis of information available to the Authority, it is noted that:

- various capital expenditures to reduce reliability risk, such as pump cross-connections and lightning protection, have been incorporated in the asset base; and

- SMEC has noted that GAWB's rate of pipeline breakages is very low. In 2002-03, GAWB recorded only 2 breaks per 100km of pipeline compared to an average of 25.7 for other bulk water suppliers.

Efficient Costs

The Authority considers that the approach used in the previous investigation remains valid for the current review. That is, efficiency gains in operating costs should be identified by means of an appropriate independent assessment and directly incorporated in the MRR.

This approach is appropriate for an entity such as GAWB which is a relatively small regulated entity and which has a relatively low level of operating costs as a proportion of total costs.

The Authority is of the opinion that GAWB's maximum revenue requirement should be based on the recovery of an efficient level of operating costs, with specific adjustments over time to reflect expected on-going efficiency gains.

In determining efficient cost targets, it is important to understand that quantitative benchmarking approaches provide point in time estimates only and are not forward looking. As such, activity based costing reviews remain necessary, as a minimum, for assessments of likely changes in future cost structures. This is because costs in a competitive environment are subject to changes in productivity, economies of scale and increased competition over time.

For this investigation, the Authority engaged SMEC to estimate efficient costs for GAWB.

SMEC undertook a benchmarking study, but noted that benchmarking is severely restricted due to a lack of comparative data from GAWB and other bulk water supply entities. However, SMEC compared GAWB to various water businesses including ACTEW, Sydney Water, Metro Water, Hunter Water Corporation, Power and Water Corporation, Brisbane Water, SA Water Corporation, Melbourne Water and the Water Corporation of WA.

The broad findings from SMEC's analysis are shown in Table 9.1.

Table 9.1: Benchmarking Analysis[1]

Key Performance Indicator (KPI)	*GAWB*	*Average*	*Rank[2]*
Costs as a proportion of total asset value	1.63%	7.1%	2
Costs per ML delivered	$111/ML	$401/ML	2
Costs per kM of pipeline	$25,018/km	$16,015/km	9

2. Data for 10 utilities only.
3. The lower the rank, the better the performance against others.

SMEC noted that, although GAWB has lower unit operating costs than those used in the benchmarking study, this was expected as the major urban entities have more extensive networks. SMEC concluded that, due to the lack of sufficient data, there is no direct assignment of efficiency savings to future operating costs as a result of the benchmarking analysis. In this regard, QAL's comments about the lack of conclusiveness from the benchmarking analysis are noted. It is for this reason that the Authority prefers to rely upon the more detailed independent assessment of particular cost items.

SMEC then undertook an activity based analysis of GAWB's operating costs. This assessment focused on asset and financial management, mechanical and electrical operations and maintenance, backlog of planned works and maintenance and levels of customer service. SMEC assessed activity, system and overhead costs against such parameters as asset condition and maintenance regimes, levels of service, and effectiveness of operational control of such variable costs as electricity and chemicals. The analysis sought to identify key areas of improvement in asset management and financial and administration management. SMEC's analysis for the Draft Report was revised to take into account changes in operating costs as a result of:

- changes in demand projections, particularly for treated water;
- potential revisions to assets as a result of GAWB's proposed capital works programme submitted to the Authority subsequent to the Draft Report; and
- further optimisation, such as for the pipeline servicing the Mt Larcom area.

SMEC's general conclusions were that:

- workplace health and safety requirements are becoming more stringent and are adding to GAWB's operating costs;
- a number of facilities, including Calliope Booster Station and Toolooa and South Gladstone Reservoirs require backlog maintenance and periodic maintenance costs are not reflecting an adequate level of expenditure. SMEC considers that GAWB will require one position dedicated to condition assessment. SMEC assessed backlog maintenance to include $19,000 in 2005-06 for the Glen Eden, Calliope and Benaraby booster pump stations, and $2000 each year thereafter;
- there are some safety deficiencies which need to be addressed such as ventilation, gas detection and warning systems. Ongoing costs for these are reflected in operating costs;
- existing and proposed automation and telemetry appear appropriate for efficient operations and appropriate capital expenditure is incorporated in the asset base; and
- the scope for further savings in operating costs was identified by SMEC as being:
  - for asset maintenance, 3% additional savings per year for 3 years commencing 2006-07 for the Awoonga and Toolooa segments, the water treatment plant, and treated water delivery services;
  - a 5% saving in electricity costs from 2006-07 for the Toolooa segment and the water treatment plant;
  - a 5% saving in 2006-07 and a further 8% saving in 2012-13 for competitive tendering due to increased investment in software systems and telemetry upgrades; and
  - a saving of $150,000 in 2007-08, and an additional $150,000 in 2008-09, in corporate management systems.

SMEC also amended the electricity and chemical costs to reflect the change in treated water demands. The major change occurs in 2006-07 when the Yarwun treatment plant is moth-balled and the Hanson Road pipeline is returned to operational status.

SMEC considered that savings in salaries could be possible when managing the system becomes more of an ongoing exercise rather than a 'building up' exercise. Savings that were identified by SMEC since the previous investigation included:

- two positions for capital works management and contracts and asset supervision which were removed due to the reduced outlook for capital works over the next 20 years;
- three positions for customer service which were removed and incorporated in the existing CEO and senior management roles; and
- a position for a Regulatory Compliance Officer which is now encompassed by the existing senior management structure.

Relative to the previous investigation, GAWB's operation and maintenance costs are lower, due to lower demand, although some of these savings are taken up in earlier years largely due to the backlog of maintenance. However, general administration costs are higher, reflecting more commercially-based salaries, higher insurance costs and increased costs for managing workplace health and safety issues. SMEC's estimated efficient operating costs are summarised in Table 9.2.

Table 9.2: Summary of Operating Costs ($'000), opening values

Cost Element	*2005-06*	*2006-07*	*2007-08*	*2008-09*	*2009-10*	*2014-15*	*2019-20*	*2024-25*
Previous Investigation								
Operation and Maintenance	5,449	5,625	7,103	7,513	7,893	9,440	11,144	n/a
General Administration	1,942	1,993	2,044	2,098	2,361	2,685	3,052	n/a
Total	**7,391**	**7,618**	**9,147**	**9,611**	**10,254**	**12,125**	**14,196**	**n/a**
Final Report								
Operation and Maintenance	5,164	4,982	5,170	5,419	5,729	6,881	8,302	9,892
General Administration	3,019	3,100	3,183	3,269	3,357	3,834	4,378	4,999
Total	**8,183**	**8,082**	**8,353**	**8,689**	**9,086**	**10,715**	**12,680**	**14,891**

Source: SMEC

The Authority recommends that independently assessed efficient operating costs be incorporated in the cash flows for pricing purposes.

9.4 Efficiency Carryover Mechanisms

Under the proposed price cap regulatory approach, GAWB has an incentive to achieve cost savings.

A key element of the review of incentive mechanisms is to assess the potential for applying efficiency carryover mechanisms (ECMs) to GAWB, to supplement the proposed arrangements. ECMs are intended to provide a regulated business with an ongoing incentive to operate efficiently throughout the regulatory period.

ECMs are designed to reward the service providers own efforts in delivering efficiency gains and should not apply to windfall gains or other fortuitous cost savings. In a properly functioning competitive market, windfall gains are likely to be passed through to customers relatively quickly as they are likely to benefit all competitors.

Various types of efficiency gain carry-over mechanism may be used to define the magnitude and timing for retention of out-performance efficiency gains by a regulated business. The main two types, differentiated mainly in relation to timing, are:

- glide path, which allows for savings to be passed to customers in a staged manner over time. For example, the benefits may be allocated to customers at 20% per year for 5 years; or

- rolling carryovers, which allow efficiency gains to be retained by the entity for a set period of time, regardless of when they are achieved, and then passed to the customers as a one-off price reduction.

The glide path approach will not necessarily eliminate all timing issues as the business can still achieve a greater benefit by strategically biasing its savings initiatives towards the beginning of the regulatory period. This timing issue is eliminated with the rolling carryover mechanism. However, a disadvantage of the rolling carryover mechanism is the level of detail that may be required to track efficiency gains across the years.

Effective implementation of an ECM requires a suitable approach for identifying efficiency gains, as distinct from windfall gains, and for the treatment of both operational and capital cost gains. Approaches for identifying efficiency gains include self-assessment by the service provider, ex-ante business case proposals, third party certification, desktop review or detailed assessment by the regulator.

The expected scope and controllability of a service provider's cost items is also critical. Application of an ECM is likely to be warranted only for those cost items which have a prima facie potential to be reduced through innovation in work practices and technology and/or contract renegotiation.

An important consideration is that reductions in costs can be pursued at the expense of the quality of service standards. Therefore, an ECM should incorporate adequate monitoring to avoid rewarding inappropriate outcomes.

The design, implementation and monitoring of an ECM can be an expensive exercise, both for the regulator and the regulated entity. As a minimum, unless an ECM is cost-effective to the service provider, there are unlikely to be any gains to distribute.

Other Jurisdictions

ECMs have not been explicitly addressed by all Australian regulatory jurisdictions. Where they have been considered, increasing support has emerged for rolling carryover mechanisms, principally to address concerns with gaming related to pricing periods.

The ACCC has adopted a rolling ECM to apply to operating costs only for electricity (1999) and gas transmission (GasNet, 2002a). ESC has adopted a rolling ECM for electricity and gas distributors. IPART (2004b) also noted the strong theoretical arguments for a fixed-term efficiency carryover mechanism.

IPART (2004b) has opted against the use of a 'fixed-term' ECM for electricity distribution this regulatory period (due to the costs associated with its establishment). However IPART has flagged its intention to re-assess the issue for the next pricing period from 2009 and expects to do the same for Sydney Water from 2005 (IPART 2003).

Stakeholder Comment

In its initial submission, GAWB argued that incentives to make efficiency gains are most noticeably dependent on the duration of the regulatory period and the benefit sharing mechanism. GAWB did not propose a specific benefit sharing mechanism, but submitted that during the upcoming regulatory period:

- no efficiency gains be claimed for the current period;
- efficiency gains should not be differentiated from windfall gains, as this adds too much complexity;
- both operating and capital savings be treated equally, to ensure that incentives are not biased; and
- that 'thresholds or a scale factor' be considered, to ensure that GAWB is not rewarded for cost savings that are achieved at the expense of reduced reliability.

In a submission in response to the Authority's Issues Paper *Efficiency Carryover Mechanism*, (QCA, 2004c) GAWB supported deferral of the introduction of an efficiency carryover mechanism for water businesses until the regulatory regime is stable and inherent incentives better understood. GAWB submitted that if an ECM is introduced, attention should be paid to the cost of administering the mechanism and the effect on incentives for maintaining service levels. GAWB preferred a simple mechanism with no attempt to distinguish between management induced savings and windfall events, and including both operational and capital efficiencies. GAWB proposed a rolling annual assessment of efficiencies with a 5-year retention period for operating efficiencies and 10 years for capital efficiencies.

In response to the Draft Report, DNRM suggested that an incremental rolling carryover of efficiency gains may represent the most appropriate approach to encourage efficiency improvements as it shares the benefits between the consumer and the service provider. However, DNRM acknowledged the introduction of such a scheme may need to be delayed until the next price review.

QCA Analysis

The potential for an ECM was not considered for GAWB in the previous investigation. However, it was recommended that 'whether an improved means of ensuring efficiency gains can be established should be considered prior to the next review'.

A general consensus appears to be emerging amongst regulators that, of the alternative forms of ECM, a rolling ECM has the least distortions, minimises the potential for gaming and is most consistent with competitive markets.

Under the rolling carryover mechanism, efficiency gains (losses) are calculated annually as the difference between actual expenditures and projected expenditures for each year of the pricing period. Annual efficiency gains (losses) are retained for a pre-determined number of years, at least equal to the term of a pricing period. This is consistent with GAWB's preferred approach.

In response to issues raised by GAWB, the ECM should incorporate only efficiency gains achieved through effort, and exclude windfall gains, on the basis of consistency with properly functioning competitive markets. However, the Authority concurs with GAWB that it may at times be complex to separate efficiency from windfall gains and that, in competitive markets, the service provider may retain windfall gains for a time. Adding to this complexity, as noted by GAWB, is that an ECM could be applied to both operating and capital costs, and may need to be assessed in regard to impacts on service quality and reliability.

At this stage, however, the Authority agrees with GAWB and DNRM, that adoption of an ECM is not appropriate for GAWB at this time due to the relative immaturity of the water industry regulatory framework. Other issues are:

- the complexity of implementing and monitoring an ECM, especially given that operational costs form a relatively small portion of GAWB's revenue requirement and that there are no significant capital expenditures planned;
- the potential impact on GAWB's administrative capacity; and
- related uncertainty over cost effectiveness, given that further efficiency gains achievable by GAWB are likely to be only marginal.

The Authority considers that, while an ECM may provide incentives for GAWB to innovate, it is not considered appropriate at this time.

10. ONGOING REGULATORY ARRANGEMENTS

Summary

The Authority recommends that material exogenous changes in expected costs be passed through to customers, subject to approval by the Authority. Eligible costs include those caused by changes in taxation; changes in government charges such as resource management charges; changes in compliance requirements; changes in law; or changes in government policy. A material change is considered to be one which affects the annual revenue requirement by more than 1%.

A price review should be triggered if there is, or expected to be, a sustained variation in aggregate revenues of at least 15%.

Annual pricing adjustments are proposed to reflect actual inflation within the regulatory period. It is proposed these be based upon the Brisbane All Groups CPI.

Where prices are smoothed over a planning period greater than the regulatory period, prices in the next regulatory period should incorporate an adjustment to account for the effects that price smoothing may have on investment incentives.

The Authority recommends that the QCA Act 1997 be amended to allow the Authority to mediate or arbitrate disputes over the application of Ministerially approved pricing practices. In the absence of such a power the Authority recommends that it review all prices and contractual arrangements prior to their completion.

Given the nexus between prices and service quality, there is a need for ongoing monitoring of proposed service standards. It is recommended that GAWB annually publicly report service quality against the standard adopted for contractual purposes and submit the report to the Authority. The form of the report is to be developed in consultation with the Authority.

10.1 Ongoing Regulation

The key issues in relation to ongoing regulation are:

- the potential for competitive pressures to emerge for certain of GAWB's services (that is, the loss of monopoly status);
- the appropriate framework for responding to changes in circumstances;
- adjusting for inflation and inter-period cash flow adjustments; and
- the monitoring of pricing practices (including prices and contractual arrangements).

10.2 Loss of Monopoly Status

GAWB has submitted that, while most of its business activities have monopoly supply characteristics, technological change (in particular related to sea water technologies) will increasingly impose competitive pressure. GAWB foresees that it may face true competition across its products and services, within the life-cycle of current assets.

QCA Analysis

The Authority notes that its jurisdiction to investigate activities of government monopoly business activities ceases if the activities become subject to competitive pressures (s.28 of the *QCA Act*).

10.3 Responses to Changes in Circumstances

Cost Pass-Through Arrangements

In its previous GAWB investigation (2002), the Authority recommended that material variations in exogenous costs due to the following factors may be passed through to the customer – taxation and regulatory compliance, law, water allocations and operating requirements, estimated yield resulting from a review of hydrology or climate change, and government policy.

The issue of cost pass-through is generally resolved by deciding:

- whether the change in costs could have been anticipated and thus managed or avoided by the service provider, and
- whether the impact of the change in costs on either the service provider or the customer is material.

Other Jurisdictions

The ESC's first regulatory period for water regulation is three years, and has signalled a preference for dealing with unforeseen events by adjusting prices at the start of the next pricing period. However, for future periods it has provided for within-period adjustments in response to changes in legislative obligations not foreseen at the time the Water Plan was approved and which had a material impact on expenditure. Materiality is measured as 5% of the business' revenue over a regulatory period less any offset such as insurance.

Stakeholder Comment

In initial submissions, GAWB proposed an additional cost pass-through category to those already provided for by the Authority in its previous investigation, namely where 'reasonable costs are incurred as a consequence of a government-declared emergency, disaster or extraordinary circumstance'.

CS Energy and DNRM submitted that pass-through pricing is just a cost-plus arrangement which does not by itself provide desirable incentives for GAWB and that unanticipated gains (or losses) should not be part of regular price adjustment arrangements.

CSC submitted that the investigation consider cost pass-through arrangements, in particular the impact of significant changes in hydrology on the timing of projected augmentation.

The Authority received no submissions on this issue in response to the Draft Report.

QCA Analysis

The Authority considers that within-period adjustments should only be made where significant exogenous and unforeseen events (that is, events outside the control and influence of the regulated service provider) impact significantly, either up or down, upon the returns of the

regulated business. These adjustments should be limited to those which do not require a major review. Such events may include:

- changes in taxation;
- changes in government charges, for example, water resource charges;
- changes in the regulatory compliance requirements - for example, those related to health, water quality, dam safety, and environmental standards;
- changes in law or pursuant to a law; and
- other major changes in government policy.

Changes in GAWB's water allocation or changes in estimated yield resulting from reviews of river hydrology or climate change which could bring forward storage augmentations would generally require a review of the pricing model and could not be considered to be simple cost pass-through events.

It is recommended that any pass-through of costs in proposed prices should be subject to an assessment of their materiality and be subject to approval by the Authority. A material change is considered to be one which affects the annual revenue requirement consistent with the approved pricing practices by more than 1%.

In response to issues raised by GAWB, the Authority considers that costs incurred as a consequence of government-declared emergency, disaster or extraordinary circumstance should not automatically pass-through to customers, as:

- the impact of these events is often severe and the response proposed by GAWB may be contentious and unacceptable to users without some form of regulatory scrutiny, at least over the attribution of costs and the form of response; and
- the extent of prior action by GAWB to mitigate the impact of such events will often be a key consideration in efficient pricing.

The Authority's recommended pricing practices related to managing the risks of such events were dealt with in Chapter 3.

Approved pass-through of costs is typically implemented in revised prices for the next financial year, with the full NPV effect recovered. In order to ensure a timely cost pass-through into revised prices, sufficient information for these events would be required by the Authority as soon as is reasonably possible after their occurrence. Should the Authority consider an unreasonable delay has occurred, it may disallow the recovery of any additional costs incurred prior to the receipt of sufficient information. Although depending on the event and relevant circumstances, the Authority considers an unreasonable delay to be at least 3 months.

The Authority considers that material exogenous changes in expected costs may be passed through to customers, subject to approval by the Authority. Eligible costs include changes in taxation; changes in government charges such as resource management charges; changes in compliance requirements; changes in law; or changes in government policy. A material change is considered to be one which affects the annual revenue requirement consistent with the approved pricing practices by more than 1%.

Review Triggers

Review triggers prompt an unscheduled review. They are generally defined in terms of an impact on a provider's revenues or costs, arising from events that diverge significantly from initially forecast.

In its previous investigation of GAWB (2002), the Authority recommended that reviews within a regulatory period could be triggered if demand changes have a significant impact on aggregate revenue. A significant impact was considered to be one which affected the annual revenue requirement consistent with the approved pricing practices by more than 15%.

Other Jurisdictions

IPART has not established review triggers for water pricing, nor does it carry forward revenue deviations between forecast and actual revenue performance for the purposes of setting future prices.

Ofwat makes provision for reviews during the regulatory period by way of interim determinations.[5] To qualify for an immediate review, the change must satisfy a materiality condition of a 10% change in revenue, otherwise it is carried forward until the end of the regulatory period before being considered.

The ICRC has defined various review triggers relating to its retail price direction for non-contestable electricity customers including: changes in regulations or codes; significant and fundamental wholesale market adjustments affecting price; demand forecast errors; insolvency of a counter-party; and significant changes to the obligations or costs associated with the ACT retailer of last resort arrangements or metrology procedures or policy (ICRC 2003).

Under approved gas distribution access arrangements in Queensland, triggers allow for a review of the access arrangements in any financial year during access arrangement period where total gas delivery varies from forecast by more than 15%, or gas delivery for any customer class varies from forecast by more than 10%.

Stakeholder Comment

In initial submissions, GAWB indicated that current arrangements for review triggers are adequate for most but not all contingencies. GAWB's submission proposed an additional 'limited review' trigger where 'significant unanticipated investment' in excess of $5 million is required, which was not contemplated at the previous regulatory review.

CS Energy argued that unscheduled price reviews should only apply when there is a significant change in GAWB's asset base or customer base.

Queensland Treasury suggested it may be appropriate to review whether 15% is the correct level for the trigger given the relatively low beta and that as information is examined on a historical basis, there could be a large lag between a breach and a review. Queensland Treasury also requested that the Authority include a review trigger based on hydrology and demand such that, in the event of unforeseen circumstances, augmentation requirements and the revenue cap could be re-examined prior to the next regulatory period.

[5] Ofwat correspondence to all managing directors of water and sewerage companies and water only companies, 1 May 2003.

In response to the Draft Report, DNRM submitted that the proposed trigger arrangements were appropriate. However, DNRM preferred that the review trigger be based on actual rather than forecast variations of more than 15%.

GAWB requested clarification of the duration that would constitute a sustained aggregate revenue variation of 15%.

GCC considered that it is vital that demand estimates are accurate given the price cap approach. It suggested a minor regulatory review if actual demand significantly differs from projected demand.

QCA Analysis

In the interests of maintaining price certainty, minimising the costs associated with price reviews, and providing incentives for robust estimates of costs and demand, regulators generally limit within period reviews to those situations involving a significant change in anticipated revenues or costs. In relation to GAWB's proposal, the Authority considers that an unanticipated investment of $5 million is insufficient to warrant a review. Pricing impacts of such investments may be incorporated in the next scheduled review.

The Authority notes the Treasury submission that, because of time lags in information, there could be a lag between a breach and a review. In this regard, the Authority considers that review triggers should be forward-looking to the extent possible. In regard to DNRM's comment, the Authority considers that a review could be triggered if a forecast variation was known with certainty. Given the lead times, it is appropriate that reviews commence in advance where practical.

The Authority proposes that a review should be triggered if there is, or there is expected to be, a sustained variation of 15% or more in GAWB's aggregate revenue. A sustained variation is considered to be a permanent change which has occurred, or is expected to occur with a high degree of certainty. Such variations would include significant demand changes as suggested by GCC.

The Authority considers that a price review should be triggered if there is, or expected to be, a sustained variation in aggregate revenues of at least 15%.

10.4 Pricing Adjustments

Annual Indexation of Prices

Under the nominal cash flow approach adopted by the Authority, a forward looking estimate of inflation is incorporated into the estimated prices to apply in each year of the regulatory period. This inflation rate is based on the difference between the nominal bond rate and capital indexed bond rate over the same maturity period (Chapter 7). However, the actual rate may diverge from the inflation rate assessed at the start of the regulatory period, and an appropriate index is required to allow GAWB to establish nominal prices each year.

The previous investigation recommended that GAWB's initial price caps (and corresponding elements of the two-part tariff) be adjusted by the consumer price index (CPI) each year of the regulatory period.

The Authority was not explicit about whether GAWB should apply the national CPI (based on eight capital cities), or the CPI for Brisbane (as a proxy of price movements in Queensland) for the purpose of indexing prices.

Other Jurisdictions

IPART has adopted the national CPI for price indexation of water businesses in NSW.

The ICRC (2004) has adopted the national CPI for ACTEW's price indexation, noting consistency with the rate of inflation assumption used for WACC and that many of the inputs required for service delivery are soured from a national market. ACTEW indicated a preference for the Canberra CPI claiming that the use of the weighted average of eight capital cities had 'little or no bearing on its costs'.

Stakeholder Comments

In its initial submission, GAWB did not support 'a price path with annual CPI increases' because of its preference for a revenue cap. However, GAWB noted a preference, where indexation is required, for the Brisbane All Groups March Quarter CPI, as it allows price changes to be communicated to customers before becoming effective on 1 July each year.

In response to the Draft Report, GAWB agreed with the use of CPI but considered that the March quarter adjustment could be used to allow time for escalation to be reflected in contracts.

QCA Analysis

CPI price indexation is intended to allow GAWB to manage general inflationary risks which are beyond its control.

There is no *a priori* requirement that the CPI be used, only that the prices are consistent with the real movement in costs of service over time. In its previous investigation, the Authority noted that there was not a reliable water industry index that could be used in place of CPI. However, the CPI is readily available, timely and not subject to revision and is commonly used in commercial contracts for the purpose of price escalation. It is considered that the Brisbane All Groups CPI provides the most suitable available and relevant measure of inflation for GAWB.

The Authority considers that a CPI measure based on the Brisbane All Groups classification should be used for the purpose of annual price adjustments between price reviews.

Pricing Adjustments over Time

In its Final Report, the Authority noted that 'as a general principle, any future review should take into account the basis used for the current pricing recommendations, so that GAWB is able to achieve a commercial return on its assets over the life of its assets. Regulatory consistency in approach for subsequent reviews is a desirable objective. However, as regulatory principles and methods are still evolving, it is recommended that no specific constraints be placed on the basis for future investigations.'

In is Draft Report, the Authority recognised that, by setting prices smoothed over a planning period in excess of a regulatory period, prices in the current regulatory period may generate revenues higher or lower than that required to achieve a the rate of return to maintain investment within the regulatory period.

To ensure appropriate incentives to invest are in place, the Authority proposed that smoothed price in future regulatory periods should incorporate an adjustment to reflect the effects of past price smoothing. This can be achieved, for example, by a carry-over adjustment for any past over or under provision of revenues.

The adjustment should be based on the difference between the smoothed price revenue and the annual revenue that would result from the use of the building block approach, with annual differences capitalised to the commencement of the next pricing period using the WACC applicable for the previous assessment. The sum of the capitalised amounts carried forward from the previous assessment should be subject to price smoothing on a forward looking basis, in a similar manner to the other elements of the revenue requirement.

This needs to be distinguished from unders and or overs accounts typically used under revenue caps. The proposed adjustment does not reflect changes in revenue resulting from a difference between actual and expected revenues. Rather, the proposed adjustment addresses a known methodological issue.

Other Jurisdictions

The Authority's final determination for electricity distribution (2001) recommended that any unders or overs (associated with the revenue cap) be indexed by the WACC to maintain their value in NPV terms.

IPART for electricity distribution (2004b) recommended that, in moving from a revenue cap to a weighted average price cap, any outstanding balances on unders and overs accounts attract the nominal rate of return to compensate for the time value of money.

Stakeholder Comment

GAWB's initial submission proposed that adopting a fixed revenue cap with an unders and overs account that is rolled forward across regulatory periods (earning or paying interest at the regulated WACC rate) would provide a simple and effective mechanism.

In response to the Draft Report, GAWB agreed with the Authority's proposed mechanism for adjusting prices where price smoothing occurs over a period longer than the regulatory period. However, GAWB considered it unreasonable that planned under-recovery in the current period is ignored.

QCA Analysis

As noted above, the Authority accepts that an adjustment of the nature outlined above is required to ensure that an entity would receive a desired rate of return over the longer term and proposed to proceed on the basis established in its Draft Report.

In response to GAWB's comment, notwithstanding the magnitude of the impact of the changes in circumstances, it is proposed to incorporate a pricing adjustment for carry-over from the current period (ending 30 June 2005) to the next period. The effect is a small increase in recommended maximum prices for some segments. For other segments, such as the Mt Miller pipeline, there is a slight reduction in price. This occurs because the previous estimate of the cost of the Mt Miller pipeline exceeded the actual cost, and this resulted in an over-recovery in this segment.

The Authority recommends that, where prices are smoothed over a planning period greater than the regulatory period, prices in the next regulatory period incorporate an adjustment to account for the effects that price smoothing may have on investment incentives.

10.5 Monitoring Framework

The Ministerial Direction requires the Authority to recommend an appropriate framework for monitoring pricing practices (including prices and contractual arrangements) relating to GAWB's declared business activities.

Under the Ministerial Direction relating to its previous investigation, the Authority was required to monitor prices included in contractual arrangements entered into during and after the period of the initial investigation.

In its previous investigation, the Authority recommended that any monitoring by the Authority be limited to assessment of cost pass-throughs and review triggers.

Pricing Practices (including prices and contractual arrangements)

Under the proposed regulatory framework, GAWB's pricing practices would be subject to regulatory reset every five years, and earlier if a review were triggered.

Other Jurisdictions

Ofwat (2002b) monitors compliance with its price determinations to check that customers are receiving the appropriate level of service and that companies are making satisfactory progress in the improvement programs. Ofwat requires regulated water businesses to lodge annual returns with Ofwat detailing regulated activities, service, expenditure and performance levels; and to publish regulatory accounts in accordance with Regulatory Accounting Guidelines issued by Ofwat.

Ofwat relies on Reporters to verify the various information returns of service providers. Reporters are professional certifiers of the regulated activities of the businesses. They ensure that regulatory information is consistent, comparable, reliable and accurate.

Stakeholder Comment

In its initial submission, GAWB proposed that, as part of its proposed revenue cap approach, the Authority should have an opportunity to ensure appropriate application of the Ministerially directed pricing principles through the annual reference tariff approval process.

However, GAWB submitted that the scope of any power to intervene in individual contract disputes by the Authority must be carefully defined to:

- avoid vexatious appeals;
- prevent the Authority from becoming the de facto price setting body; and
- facilitate general resolution of disputes where interpretation errors affect several customers.

GAWB also submitted that the Authority should have the power to:

- consider appeals from customers where the QCA considers that there is a prima facia case that GAWB has manifestly erred in its interpretation of Ministerially directed pricing principles; and

- issue a clarification decision or recommendation binding on all parties subject to the dispute.

In response to the Draft Report, GAWB supported the wider use of QCA to resolve pricing related disputes and to issue decision clarifications where appropriate. However, GAWB was opposed to the QCA taking on a monitoring role of contracts prior to finalisation.

Similarly, DSDI submitted that the Authority's proposed approach of monitoring all new contracts before they are finalised represents 'a heavy handed approach to regulation and has the potential to complicate contractual negotiations.' DSDI seeks a reversal of this proposal or an explanation of how it may be practically applied.

DNRM submitted that QCA's jurisdiction should not be extended to cover the ongoing management of GAWB in relation to annual monitoring of prices, contractual arrangements and service standards. DNRM's view was that is more appropriately a role undertaken by the water authority's senior managers with the endorsement of the Board of Directors.

Comalco's view was that the Authority's recommendation for ongoing monitoring of contracts provides an unnecessary layer of bureaucracy and cost. Comalco proposed that GAWB's Board structure be changed, to either a co-operative model (with 2 or 3 members from GAWB's industrial base), or a 'competency style' model similar to GOCs with members experienced in running water utilities. Currently, GAWB's Board comprises the CEO, Government appointees and council representatives. Comalco indicated that a revised Board structure would fill the role suggested by the Authority.

QCA Analysis

Proposed contractual arrangements, the drought management plan and contracts for differences have yet to be established and may be applied and customised on an individual basis. Accordingly, there may be considerable opportunity for disputes to arise in relation to the interpretation and application of Ministerially approved principles.

The Authority therefore concurs with GAWB's proposal in its initial submission that the Authority should have an opportunity to ensure the appropriate application of Ministerially approved pricing principles.

In regards to the options available for this purpose, approval and continuous monitoring of all contracts, contract provisions, and performance targets and service quality outcomes would provide a comprehensive means ensuring compliance. However, such an approach would not appear to be cost effective for the purposes of monopoly prices oversight alone.

Monitoring of agreements after they have been entered into could be ineffective as it would occur after the event and, even if upon direction from shareholding Ministers GAWB were to seek to alter the agreements retrospectively, would be inefficient administratively.

The Authority's proposal to review contracts prior to their finalisation would ensure performance and leave contract performance to legal resolution. The Authority, however, recognises that this would complicate contractual negotiations.

The preferred alternative, not to monitor prices and contractual arrangements in an on-going manner, but to mediate or arbitrate on disputes which may arise regarding the application of Ministerially approved pricing practices would appear to be the least intrusive and effective means of ensuring compliance. However, it is not currently available to the Authority. Under the *QCA Act 1997*, there is presently no provision for the Authority to mediate or arbitrate on

disputes arising from contractual negotiations between GAWB and customers. Dispute resolution roles only relate to private sector water suppliers and SEQWater.

To expedite resolution of any matters, the Authority recommends that consideration be given to amending the *QCA Act* to enable the Authority to resolve at least such matters where both parties agree for the Authority to become involved. Further, consideration should also be given to the Authority assuming a role in resolving disputes where there is a unilateral request subject to meeting the concerns of GAWB that the Authority would not accept vexatious disputes and become the de facto price setting body and facilitate resolution of issues which may be found to affect several parties.

The provision of maximum indicative prices alone may provide some assistance to stakeholders to determine whether prices charged by GAWB are consistent with those the Authority would generally consider appropriate at least at the time of the investigation. However, the prices provided to stakeholders could become dated over the proposed 5 year regulatory period and may not be relevant to different service quality levels or future services, which are yet to be established or defined and over which disputes may arise.

Further, the Authority is unable to release all supporting information used in the current investigation which could be relevant to averting or resolving any future disputes, as in doing so prices for other stakeholders would become relatively easy to estimate. Industrial customers have previously indicated that such information is commercially sensitive.

Release of the Authority's model to GAWB to allow GAWB to estimate the impact of changes in parameters or to allow for different service quality or services, would not remove the need for oversight by the Authority as it would not be available to stakeholders and could be subject to inappropriate manipulation.

The Authority has received submissions that the Authority should establish reference tariffs and provide price floors and caps to guide future contractual negotiations. The maximum indicative prices should provide some basis for such negotiations. The estimation of price floors falls outside the objectives of the provisions of the *QCA Act* forming the basis for this reference and is a matter for consideration by Government.

Comalco also suggested a change in the composition of GAWB's Board with specific responsibility for monitoring contracts. Such a proposal would not necessarily remove the need for monopoly prices oversight as even under the co-operative model there is the possibility of a conflict between customers' interests and new entrants could be discriminated against.

In the absence of a dispute resolution power, the Authority is persuaded by the argument that it should not become involved prior to the entry into contracts. To do so would adversely impact the negotiation process. However, in order to ensure due consideration is given to adherence to the approved pricing practices, all contracts must be advised to the Authority within one month of their being entered. The Authority will advise its Ministers if there is any departure from the approved pricing practices. While it could be argued that reporting could be done annually, the small number of contracts and the need to ensure that any departures are quickly addressed, lead to the requirement of individual advice within one month of contracts being entered.

With respect to DNRM's view that the Authority's role should not be extended to monitoring prices and contractual arrangements and that is more appropriately a role undertaken by the water authority's senior managers with the endorsement of the Board of Directors, the Authority considers that this represents the least preferred option for ensuring on-going compliance by GAWB.

The Authority recommends that the *QCA Act 1997* be amended to allow the Authority to mediate or arbitrate disputes over the application of Ministerially approved pricing practices.

In the absence of a dispute resolution power, the Authority recommends that GAWB advise the Authority of all contracts entered into with customers within one month of becoming effective, with the Authority being obliged to advise its Ministers if any contract substantively departs from the approved pricing practices.

Monitoring Service Standards

Regulatory pricing is typically specified in relation to a certain standard of service. This is necessary as specifying pricing practices, prices or revenues means little to customers should the provider allow service standards to decline below acceptable levels in an effort to increase short term profitability. Thus, the Authority has recommended that GAWB's pricing practices reflect the efficient costs of providing a defined standard of service and that GAWB should develop a full product description incorporating operational standards of service for contractual purposes.

On the basis that detailed service standards are defined, the key issues are:

- to what extent service standards should be monitored over time; and
- the appropriate response to any increase or decrease in reported levels of service, including whether financial incentives or penalties should be applied.

Other Jurisdictions

Most domestic regulators of regulated electricity services monitor service quality (ACCC, IPART, ESCOSA and ESC). In Queensland, the Authority requires regulated electricity distribution service providers to provide data on service quality on a quarterly and annual basis.

ORG's successor, the ESC, has an explicit function to monitor, report and audit the performance of Victoria's regulated water industry. In July 2004, the ESC released a decision paper on a performance reporting framework for metropolitan and regional water businesses. The performance indicators cover the key areas for retail businesses of baseline explanatory data, drinking water quality, water and sewerage network reliability, water consumption and reuse, environmental issues, drainage services, customer service and affordability. The ESC noted that many water businesses had already implemented GSLs voluntarily, but noted that information issues and limited consultation time may constrain the ability of regional businesses to implement GSLs in the first regulatory period.

The ERA's water licensing framework requires service providers to establish customer service charters to safeguard quality and service standards.

Under the *Water Supply and Sewerage Services Act 2000,* the NT Utilities Commission requires service providers to establish and publish customer contracts. The contracts must set out the rights and responsibilities of customers. Licensees are also obliged to lodge an annual report with the Commission on their performance against key indicators specified under their licence and any other information requested in writing by the Commission.

Ofwat assesses each service provider's overall performance and makes price adjustments for those with the best and worst service. The scale of price adjustment ranges between a 0.5% increase for the top performers and a 1.0% decrease for the worst performance.

Stakeholder Comment

In response to the Draft Report, GAWB noted that it is proposing to publish an annual disclosure document on such issues as water availability, delivery capacity, demand forecasts, proposed capital projects and price forecasts. GAWB is opposed to the QCA taking any formal technical regulatory or standards monitoring role, as this can be managed within contract mechanisms.

QCA Analysis

Given the nexus between price and service quality, the Authority considers that an appropriate framework for monitoring pricing practices, including prices, must also provide for the monitoring of service quality. Under current arrangements, the Authority does not have a specific role to monitor GAWB's performance against a range of service indicators. DNRM is the technical regulator and sets both technical standards and monitors entities performance against those standards. This situation is unchallenged.

GAWB's customers should be well placed to directly negotiate different levels of service quality, associated thresholds, guaranteed service levels and corresponding prices should this be considered desirable.

To support customers, the Authority considers that GAWB should annually report on service quality against the standard adopted for determining maximum allowable prices which is reflected in product descriptions provided in customer contractual arrangements.

It is noted that quality of service could become an issue in the event of disputation over prices. In that context, relevant performance criteria, appropriate definitions and an acceptable process for gauging performance will be required. Such information will also be invaluable in the future for determining whether to introduce service quality/performance incentives.

To ensure the Authority is well placed to address any future disputes that could arise, and to provide a sound base for the future consideration of service quality/performance incentives, the Authority proposes that the annual public reports be submitted to the Authority. The form of the report will be developed in consultation with GAWB but the Authority will retain the right to determine its ultimate form.

The Authority considers that an appropriate framework for monitoring pricing practices must involve the monitoring of service standards.

It is recommended that GAWB annually publicly report service quality against the standard adopted for contractual purposes, and submit the report to the Authority. The form of the report is to be developed in consultation with the Authority.

11. IMPLICATIONS OF PROPOSED REGULATORY AND PRICING ARRANGEMENTS

Summary

Compared to the previous investigation, GAWB's aggregate revenue requirement is significantly lower, primarily reflecting lower demand. In addition, the recommended maximum indicative prices are based on a slightly lower WACC, reflecting changes in the capital markets since the last review.

The increases in maximum indicative prices are not uniform, as the demand reductions have been different across the different segments.

It is recommended that price increases for existing customers be transitioned over 3 years, subject to a minimum annual price increase of 10%.

GAWB's operating profit remains negative until 2009-10, while its cash balance continues to trend upwards from current levels. The Authority does not recommend any adjustments to the proposed pricing practices based on a consideration of public interest matters.

The Authority proposes to assist GAWB develop a joint pricing model to assist in establishing appropriate prices for 1 July 2005 and to respond to changes in service quality requirements or superior information available in the future.

11.1 Introduction

To maintain confidentiality, the Authority has reported on the implications of the pricing recommendations at the aggregate level. Consistent with the Ministerial Direction, it is proposed to provide individual customers with maximum indicative prices consistent with the Final Report recommendations.

However, customers should be aware that the maximum indicative prices have been based on information available to the Authority at the time of the investigation. Further information may become available prior to the finalisation of prices, and some of the parameters underlying the Authority's estimates may also vary.

Furthermore, the maximum indicative prices are based on the risk free rate averaged over the 20 business days ending 4 March 2005 and actual prices will need to be adjusted to take account of the risk free rate over the 20 business days ending 1 July 2005.

11.2 Aggregate Revenue Projections

Table 11.1 provides a comparison of projected revenues for the current investigation with those of the Final Report recommendations from the previous investigation. The first comparison assumes that existing contract prices continue where these are in place. The second comparison assumes that there is no constraint on pricing imposed by existing contracts as from 1 July 2005.

Table 11.1: Summary of Aggregate Revenue Projections ($m)

	2005-06	*2006-07*	*2007-08*	*2008-09*	*2009-10*	*2014-15*	*2019-20*	*2024-25*
2002 projected revenue (existing contract prices where in place)	32.74	33.88	35.33	36.30	41.81	52.50	61.37	n/a
Current projected revenue (existing contract prices where in place)	22.54	23.64	24.72	27.78	31.99	40.02	48.80	59.43
Current projected revenue (assuming no contractual constraints)	22.30	23.40	24.48	27.41	31.61	39.65	48.46	59.12

There is a significant reduction in GAWB's aggregate revenue requirement as compared to the previous investigation. The major factors in this change are:

- significantly lower demand over the regulatory review period. In 2005-06, demand is 30.7% lower than previously forecast, while in 2009-10, demand is 23.6% lower due to permanent changes following drought;
- in line with this reduced demand, operating costs are about 12% lower in 2009-10, although they are slightly higher in the first two years of the regulatory period;
- a lower return on capital due to a lower risk free rate and a lower debt margin. These both reflect changes in capital markets since the last review. The WACC applied is 8.05% compared to 8.72% previously; and
- the regulatory asset base is around 2% lower at 2009-10 than previously, due to some assets previously anticipated in the future being excluded and some optimisation of treated water distribution assets.

11.3 Implications for Pricing Arrangements

Tariff Structures

The Authority recommends that a two-part tariff be adopted consisting of a fixed (or access) charge and a volumetric (or usage) charge. The Authority also recommends separate tariffs for storage and delivery services to provide greater transparency, equity and efficiency in pricing arrangements. The fixed charge is to be based on the contracted volume for storage services and the instantaneous flow rate for delivery services. The volumetric charge is to be based on the LRMC of the storage and delivery assets respectively.

However, Table 11.2 provides a summary of LRMC as a percentage of the revenue requirement for 2005-06 for the key system segments.

Table 11.2: LRMC by System Segments (2005-06)

Segment	*LRMC as a % of revenue requirement*
Awoonga Dam	7.2
Raw water delivery	44.6
Urban treated water delivery	59.5

GAWB's revenue requirement exceeds LRMC in all segments. Hence, if prices were based solely on LRMC, revenue would fall short of that required to sustain the business and provide a return on capital invested. In the storage segment, LRMC is now relatively low, as no significant augmentations are planned for the 20-year planning horizon and GAWB has only recently invested in additional storage capacity.

In the raw water delivery segments, LRMC comprises an average 44.6% of total revenue, reflecting electricity and pumping costs. GAWB has recently upgraded its major pipeline to Gladstone and installed the Mt Miller pipeline, so that augmentation costs are largely now complete. The LRMC for urban treated water incorporates electricity and chemicals costs as well as minor planned augmentations.

The fixed access charges are proposed to be established on the basis of contracted volumes or reservation amounts to be defined in new customer contracts from 1 July 2005. In some cases, customers have reservation volumes specified in existing contracts. However, the Authority found that these reservation volumes were in some cases much lower or much higher than actual consumption, and new reservation volumes need to be negotiated which better reflect current customer needs. In other cases, no reservation volumes have yet been defined.

Accordingly, in the absence of firm estimates for contracted reservation amounts, the Authority has assessed maximum indicative tariffs based on estimated demand rather than reservation amounts.

Transitional Pricing

The changes in GAWB's circumstances following the drought, particularly in regard to supply and demand for water, have led to increases in maximum indicative prices for most customers. In many cases, these increases follow significant increases that were recommended in the Authority's previous investigation for existing customers.

GCC submitted that a transition period should be considered, particularly for Council customers.

The magnitude of price increases for each major segment is summarised in Table 11.3. The table compares the maximum indicative prices that result from the current investigation with those that would have applied had the recommendations of the Authority's previous investigation been applied, adjusted to March 2005 values.

Table 11.3: Price Increases for Selected Segments, % change from Previous Recommendations

Segment	*% Change – Change in Prices implied by current investigation*
Awoonga Dam	+19.9%
Raw water delivery to Gladstone	+14.2%
Raw water delivery to northern industrial area	-0.3%
Urban treated water delivery	+13.7%

These increases are not indicative for individual customers, whose maximum indicative prices include adjustments for capital contributions, spur-lines or other factors. They are also not necessarily indicative for Council customers as their price also includes the cost of Councils distribution services.

Key issues are that:

- the increase in price for services at Awoonga Dam primarily reflects the reduction in overall demand over the 20-year planning horizon. In addition, the value of the dam is slightly higher as the previously optimised additional dam crest is now included to meet dam safety requirements for a maximum possible flood. It is also higher because the value of the dam has increased, despite depreciation, as a result of inflation;

- raw water delivery to Gladstone incorporates the higher cost at the dam, modified by some savings in operating costs as peak-time pumping is minimised due to lower demand and previously planned augmentations are also deferred due to lower demand;

- the price for raw water delivery to the northern industrial area incorporates the higher cost at the dam, offset by a lower capital cost for the Mt Miller pipeline and lower operating cost due to gravity feeding from Toolooa rather than pumping; and

- for urban water, the reduction in treated water demand is the key reason for the increased price, with no corresponding savings achievable in terms of optimisation of the capital investment. This results in a higher increase in price than at the dam.

Stakeholder Comment

CPM suggested that the Authority should also clarify the extent of the increase from 2002 to 2005.

QCA Analysis

The revised Table 11.3 above addresses CPM's concerns.

The Authority notes there are significant increases in maximum indicative prices in some segments. Apart from the increases caused by the effect of reduced demand, there have been delays in some instances in the implementation of the previously recommended pricing practices, that were themselves to include transitioning. The Authority recommends that

increases in the prices currently charged to existing customers be transitioned over 3 years, subject to a minimum annual price increase of 10%.

The Authority recommends that increases in the prices currently charged to existing customers be transitioned over 3 years, subject to a minimum annual increase of 10%.

11.4 Implications for GAWB's Financial Viability

Operating Profit and Cash Balance

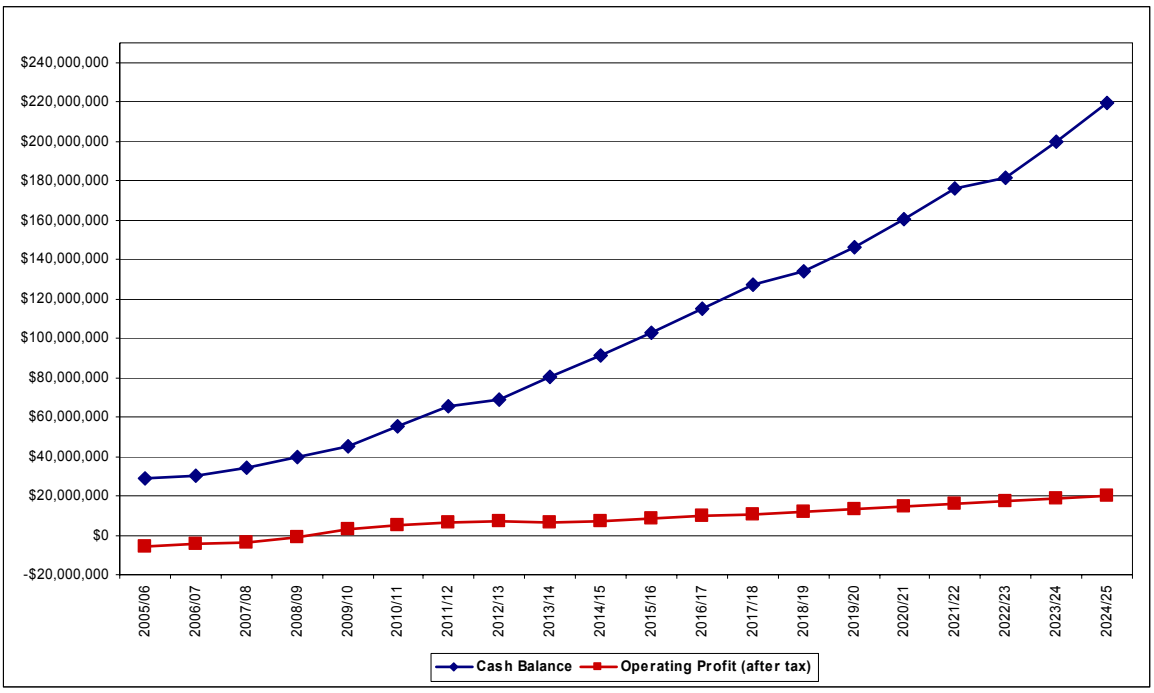
The Authority has assessed the financial viability of GAWB based on the projected revenues, taking into account existing contracts over the period to 2024-25. As far as operating profit is concerned, GAWB commences making an operating profit in 2009-10 (Figure 11.1). The annual profit increases to $20.2 million in 2024-25.

Over the whole period, GAWB remains cash positive, with the cumulative cash surplus (in the absence of the payment of dividends) rising from $29.2 million in 2005-06 to $219.5 million in 2024-25.

In general, under the recommended pricing practices, any reduction in revenue due to lower than projected demand and/or loss of a customer would be borne by GAWB and result in a lower operating profit until the subsequent regulatory review. However, demand projections include only contracted and relatively certain demand, with only a small component for undetermined demand. Hence, the downside risks in the near term are limited.

In addition, a price review will be triggered if GAWB's revenues in a year fall more than 15% below the current estimate for that year.

Figure 11.1: GAWB's Operating Profit and Cash Balance



11.5 Public Interest

Introduction

Under the *QCA Act,* the Authority is required to take into account a range of non-economic matters in framing its recommendations. These requirements largely relate to resource allocation, equity, safety, environmental and regional development considerations.

In undertaking the investigation into the pricing practices of GAWB, the Authority was aware that:

- Gladstone is a region of particular economic and regional significance from both a state and a national perspective;
- to fulfil Gladstone's potential, GAWB must deliver water to meet the requirements of local industry on a sustainable and least cost basis; and
- at the same time, there are a wide range of related matters that are required to be considered to ensure that the public interest is advanced.

Against this background, the Authority has sought to identify those matters which will affect the nature of the pricing practices adopted by GAWB, including those matters which will ensure the lowest possible price for GAWB's services while at the same time meeting other key objectives.

Efficient Resource Allocation, Competition, and Protection of Consumers

Efficient resource allocation, competition and the protection of consumers have been explicitly taken into account in previous sections that established the Authority's preference for a two-part pricing structure with the volumetric component based on LRMC.

It was noted that such a price structure would provide effective signals to both GAWB and consumers for long term decision-making. For GAWB, it should provide the basis for long term capacity decisions. For consumers, it should provide a consistent and forward looking estimate of the costs associated with establishment in the Gladstone region. Furthermore, LRMC should provide an effective basis for the comparison of the cost of alternative sources of supply, should they exist, thus promoting competition in their development.

The general approach to pricing recommended by the Authority provides protection to consumers in that prices based upon those recommendations reflect the maximum prices that would be expected to prevail in a competitive market.

Cost of Service, Standard of Service, Rate of Return on Assets, Effect of Inflation and the Environment

Pricing structures such as those based on LRMC reflect the future costs of the service to be provided. Considerations of revenue adequacy seek to ensure that the entity receives appropriate revenues to cover reasonable costs of service provision, including a rate of return on assets involved in the provision of services at the requisite standard. The Authority has further identified cost efficiencies in finance and asset management that require an initial capital investment in new technologies.

In its investigation, the Authority has proceeded on the basis that the current standard of service is suitable to the needs of GAWB's customers. The Authority has received no submissions

suggesting otherwise. However, operational costs for customer service and liaison are included in view of GAWB's increased regulatory responsibility under the *Water Act 2000*.

The effect of inflation is specifically factored into the Authority's methodology for ensuring revenue adequacy.

The capital and operating cost implications of managing assets related to the maintenance of the environmental integrity of GAWB's facilities have been explicitly incorporated in the Authority's consideration in terms of both pricing and revenue adequacy.

Demand Management, Social and Equity Considerations, Social Impacts, Availability of Goods and Services

Demand management and water use efficiency initiatives have featured prominently in the response of GAWB and its customers to drought conditions experienced in 2002-03 (Chapter 5). Such measures have resulted in a permanent reduction in some customers' demands.

Social and equity issues mainly relate to pricing for urban customers. In the Draft Report, the Authority recommended that pooled bulk water prices for the CSC and GCC be maintained on the basis of historical arrangements.

Stakeholder Comment

The Authority received 91 submissions from individuals and businesses in the Gladstone area. The key issues raised in these submissions related to:

- the impact of price increases on Mt Larcom residents, particularly with regard to affordability and the impact on community groups, property values and employment. Mt Larcom residents indicated that their water charges were significantly higher than in other urban water systems;
- the impact of the general increase in bulk water prices for the two Councils; and
- concerns that community efforts to reduce water consumption as a result of the drought were being penalised with higher prices.

QCA Analysis

Mt Larcom

In relation to Mt Larcom, the Authority found that it was not provided with all relevant information prior to the preparation of the Draft Report. Subsequent to the release of its drat report the Authority was provided with additional information focusing on historical arrangements for the supply of water to Mt Larcom.

As noted in previous chapters, the Authority has found that GAWB and CSC had agreed to include water supplied to Mt Larcom in the pooling arrangements, and that the pooled price was to benefit from payments made by Cement Australia. Accordingly, the Authority has recommended that GAWB charge CSC a single price for water. The impact of including water supplied to Mt Larcom in that price adds less than 1% to the price paid by CSC.

The actual price paid by Mt Larcom residents is set by CSC, not by GAWB or the Authority.

Under the current Ministerial reference, the Authority has no power to review or establish the prices or pricing practices of CSC or GCC, nor review the appropriateness of CSC's decision to charge Mt Larcom residents a higher fixed cost charge for water than it charges other residents.

Given that GAWB has, since 2002, applied a pooled price for all residents in both Councils, including Mt Larcom, the current higher charges for Mt Larcom represent a conscious policy decision by CSC.

Increase in Prices for Councils

The recommended maximum indicative prices for the Councils have been revised downwards since the Draft Report to take account of additional optimisations of the Calliope, Benaraby and Mt Larcom pipelines (Chapter 6). In addition, treated water demand is slightly increased, which has the effect of reducing the price per ML of water.

Despite these adjustments, there remains an increase in prices for Councils implied by the pricing practices since the previous investigation reflecting changes in hydrology, demand and other factors. The Authority undertook an analysis to compare the potential prices for GCC and CSC residents with those of 28 other major Councils in Queensland, assuming that the full increase is passed through. The Authority examined the range and average household bill for three usage scenarios: 250kL/year, 350kL/year and 500kL/year. For all scenarios, CSC and GCC's current residential charges were close to or lower than the average for the 28 other Councils.

Cities and towns such as Mount Isa, Warwick, Hervey Bay, Beaudesert, Toowoomba and Maryborough would generally have higher residential water charges than CSC and GCC.

Notwithstanding the above, the Authority has recommended that the price increase should be phased in over 3 years to allow the Councils time to manage the impact of the increases. That transition though is subject to a minimum increase of 10% per annum.

The Authority is also aware that an arrangement was put in place in March 1999 by Cabinet Decision for dividends (and tax equivalents) to be returned to the Councils. This was ostensibly in recognition that commercialisation of GAWB was thought likely to lead to a price increase for bulk water. The previous Queensland Government promised that it would distribute collected tax equivalents and dividends to customer Councils to assist in offsetting potential price impacts. While the return of dividends is not likely to be a short term consideration for the Councils, the future flow of dividends would provide benefits for the Councils typically not available to other Councils which source water from external bulk water suppliers. It is open to Councils to return this dividend to their customers.

However, the Authority notes that, should such a policy approach be adopted, Councils will need to adhere to Local Government Bulletin 06/01 which states that 'payments to council from the water business should not be paid back to the water business (other than in a duly authorised CSO) either to offset the revenue requirements or to be used to subsidise water prices, as this would negate the economic benefits of Full Cost Pricing'.

Impact of Reduced Consumption

In response to submissions that reductions in consumption have led to increased prices, the Authority notes there have been significant changes in GAWB's circumstances as a result of the drought. A reduction in demand would under normal circumstances have led to lower costs, by extending the life of existing assets or allowing some assets to be optimised or made redundant. However, in GAWB's case, the historic no failure yield of Awoonga Dam was significantly reduced due to the drought, which has removed the potential benefit of such cost savings. Some

minor optimisations were possible in the treated water distribution system, in terms of the Mt Larcom, Calliope pipeline and Benaraby pipelines, as identified in Chapter 6, but were not sufficient to offset the impact of reduced supplies.

It is noted that, in the water sector, the benefits of water conservation typically take the form of long term benefits in the form of deferred augmentation of storage and delivery infrastructure. In the short term, the recovery of fixed operational costs is necessary to ensure the ongoing viability of the service provider.

In addition, it is noted that, under the Authority's approach and in the absence of a Drought Management Plan, GAWB has carried the costs of the past drought.

Legislation Relating to Ecologically Sustainable Development, Occupational Health and Safety and Industrial Relations

Under the *Water Resources Act 1989* and the *Water Act 2000*, the 'use, flow and control' of all water in Queensland is vested in the State. The State is empowered with the responsibility for determining how water is allowed to flow, or how it is to be extracted, stored, diverted or interfered with in any way. GAWB's entitlement to utilise water resources is provided under its licensing conditions, primarily administered by the Department of Natural Resources and Mines.

Before a water entitlement can be granted, certain conditions must be met to ensure the ecological sustainability of the project including:

- a Water Resource Plan (WRP) that identifies both the flow regimes required to sustain agreed environmental values and a hydrological model on a catchment basis;
- a Resource Operations Plan that sets out infrastructure operation rules, water sharing rules, water transfer rules, environmental management rules, the operational responsibilities of the service provider; and
- completion of a satisfactory Environmental Impact Study for new augmentations.

As part of the approval process for the current, as well as any future augmentations, GAWB must comply with a number of issues under the *Water Act 2000,* including:

- infrastructure standards, such as continuity of service, pressure/flow conditions, and other service level objectives, will need to be reported in the form of a total management plan;
- customer service standards, including the type of water service, billing procedures and complaints procedures;
- dam safety standards, specifying dam operation and maintenance conditions, water release procedures and reporting and inspection requirements; and
- other requirements, such as flood mitigation operations and planning, provision of a firefighting water service and urban sewerage and water supply requirements.

The fact that GAWB has been provided with all the appropriate licences by the State provides prima facie evidence that it meets the relevant legislative requirements pertaining to environmental and safety matters and the Authority accepts that this is the case.

With the exception of the issues raised above relating to the management of water resources that impact on the availability of water, there is no known legislation, or government policies on these matters that is material to the Authority's investigation of current pricing practices.

Economic and Regional Development

As indicated earlier, Gladstone is a growing industrial base of national and state significance. Although there are supplies of water consistent with the requirements of existing and currently projected demand over the next 20 years, the availability of further significant sources of water is yet to be confirmed through the WRP process.

The recommended pricing framework should promote the best use of the region's resources. It is also noted that the proposal not to differentiate between the prices charged to existing and new users for similar services ensures that new projects do not solely assume responsibility for the funding of augmentations. Such an alternative approach would, over the longer term, result in higher prices being imposed on new projects and thus reduce the attractiveness of the Gladstone region to new investment.

However, should the Government seek to promote development in this region beyond the level which fully cost-reflective prices would imply, it is open to Government to provide CSO's wherever lower prices or greater augmentations are desired than are considered by GAWB to be commercially appropriate.

Any Directions given by the Government to the Government Agency

The Authority is not aware of any directions by the Queensland Government to GAWB which would affect the Authority's recommendations.

Other Matters

In responding to the Authority's Draft Report, GAWB noted some concerns, including that:

- the direction for the Authority to disseminate indicative prices to customers but not to GAWB has caused substantial problems;
- the Authority should publish its calculated prices after consultation and joint modelling with GAWB, and provide customers on a confidential basis with details of any non-standard arrangements. GAWB proposed that, in future, the QCA and GAWB should jointly model prices, noting that this has occurred in the electricity price review in Tasmania and the electricity and gas price reviews in NSW and Victoria;
- even with a schedule of 'QCA determined prices', any attempt by GAWB to check the calculations is difficult. GAWB suggested that a more sensible approach would be for the QCA to make available its pricing model to GAWB (and indeed its customers); and
- decisions not to charge the QCA calculated indicative maximum price will be based on either: a GAWB belief that QCA has not applied pricing principles accurately to a set of facts, there is a commercial reason not to charge the full price, need to reflect outcomes of commercial negotiations regarding such issues as specific risk or non-standard service levels, not yet incorporated all issues such as drought.

Firstly, the Authority notes that the approach to the dissemination of indicative prices reflected the Ministers' Direction which in turn reflected requests by stakeholders during the Authority's first investigation. That the Direction does not require the Authority to provide prices to

GAWB may reflect the availability of the prices from the Ministers to whom they were also provided.

Secondly, the release of the model to all stakeholders is not appropriate as the Authority's model contains information industrial customers have previously indicated was commercially sensitive. There is also a risk that, if the model is released and the prices published, the Authority may be seen to be assuming a deterministic role, or be perceived as not being sufficiently removed from GAWB's commercial functions.

At the same time, the Authority notes GAWB's difficulty in confirming the Authority's calculations.

Accordingly, the Authority proposes to assist GAWB with the development of a pricing model suitable for use for establishing prices at 1 July 2005.

The Authority does not recommend any adjustments to the proposed pricing practices based on a consideration of public interest matters.

APPENDIX 1 – ESTIMATING LONG RUN MARGINAL COST

The estimation of LRMC involves the determination of values for two elements – the SRMC or marginal operating costs and the marginal capacity cost (MCC). The two widely accepted methods used for determining LRMC include the Turvey (1976) approach, also referred to as the Present Worth of Incremental Costs or 'perturbation' method and the average incremental cost (AIC) method (Mann et al. 1980).

Turvey Method

The concept of the Turvey approach is not well defined in the literature and Turvey has himself proposed a number of variations on the estimation procedure.

The 'Turvey method' is most commonly defined as the present worth of the increment in system costs resulting from a permanent increment in consumption at the beginning of year t, minus the present worth of the increment in system costs resulting from the same permanent increment in consumption starting in year t+1.

The central argument of the Turvey approach is that augmentations required to meet the preferred planning demand forecast are unavoidable, and that it is not the total costs of a system augmentation that require examination, but rather the consequences of a marginal change in the rate of demand growth. Turvey argues that the cost savings from deferral of augmentation are relevant to the marginal cost measure, not the cost saving from abandoning it entirely. Hence, the Turvey approach is related to an opportunity cost concept of delaying or bringing forward infrastructure augmentation.

The Turvey method was expressed in formulaic terms by Mann et al (1980), and derived from Turvey (1968), as the present worth of incremental system costs:

$$PWISC_t = \frac{\left(O_{t+x} - O_t\right) + \left(\frac{I_k}{(1+i)^{k-t}} - \frac{I_k}{(1+i)^{k+1-t}}\right)}{Q_{t+1} - Q_t}$$

where:
- O_t = Operation and maintenance costs in year t
- I_k = Capacity investment in year k
- Q_t = Water demand in year t
- i = Opportunity cost of capital

This perturbation approach is consistent with Ofwat's interpretation of the Turvey method. Another interpretation is provided in Turvey (1976), where he includes a numerical example in which he amortises the present value of the capital expenditure and divides by the demand volume increment. This approach always gives a higher estimate of LRMC than the more generally accepted interpretation noted above.

The Turvey method gives an estimate of LRMC that becomes larger as the augmentation becomes imminent. Key issues with the Turvey approach are that:

- in Turvey's research (1968) there is an implicit assumption that investments take place each year. The Turvey approach appears more relevant to smaller frequent augmentations than to larger infrequent augmentations;

- in Turvey's original research, the approach is based on taking only the first augmentation and consumption increment. As noted by Marsden Jacob Associates, this would result in instability in the estimated LRMC as successive augmentations are considered over time. However, it would be a simple matter to adapt the method to incorporate planned future augmentations over a longer planning period;

- Turvey does not specify whether a residual value should be applied. However, as the resulting estimate of LRMC is effectively an annualised estimate, residual values should not need to be considered;

- the Turvey method uses the consumption increment in the year of the augmentation as the denominator. In lumpy investments characteristic of the water industry, the volume of demand growth in the year of the augmentation could be small relative to the expanded capacity, resulting in a high LRMC estimate. Alternatives are to use expected consumption growth over the planning period or to use capacity as the denominator; and

- Marsden Jacob Associates note that there is some lack of clarity as to whether SRMC in the Turvey method is based on current operating costs or the change in operating costs arising from the augmentation, which may include one-off (or stepped) increases in the scale of operating costs, such as for example, an increase in labour costs to manage and operate the augmented facilities. A more appropriate approach may be to estimate SRMC as the difference between operating costs after the augmentation and current operating costs.

The lack of clarity in the Turvey method is an issue and the various possible adaptations of the approach effectively align it more closely to the AIC approach. The method as originally intended by Turvey provides a conceptually sound approach to estimating LRMC in examples where there are regular capacity increments to meet demand increments, and for this reason, is less suited to lumpy investments in water infrastructure where there may be lengthy periods of spare capacity.

Average Incremental Cost (AIC) Method

The Average Incremental Cost (AIC) method bases LRMC on a measure of the incremental costs of all system augmentations taken over a planning period. Mann et al (1980) note that AIC is calculated by:

> *'discounting all incremental costs which will be incurred in the future to provide for estimated additional demand over a specified period, and dividing that by the discounted value of the incremental output over the period'.*

In other words, AIC is the present value of the stream of (least cost) capital expenditure needed to satisfy the projected demand divided by the present value of the stream of demand itself. In conceptual terms, the formula is:

$$AIC_t = \frac{NPV\ (Capex\ ) + NPV\ (Opex\ )}{NPV\ (demand\ )}$$

A precise formula is provided by Mann et al (1980):

$$AIC_t = \frac{\sum_{k=1}^{T}\left[\frac{I_{t+k-1} + (O_{t+k} - O_t)}{(1+i)^{k-1}}\right]}{\sum_{k=1}^{T}\left[\frac{Q_{t+k} - Q_t}{(1+i)^{k-1}}\right]}$$

where:
- O_t = Operation and maintenance costs in year t
- I_t = Capacity investment in year t
- Q_t = Water produced in year t
- i = Opportunity cost of capital
- T = Years for which expenditure and output are forecast (the planning horizon)

This formula provides an 'annualised' value for capital costs enabling consistency with annualised operating costs. It effectively generates an 'average marginal' capacity cost as part of the LRMC measure. Consistent with average cost pricing approaches, capex should be determined over the full life of the asset or, if determined over a shorter planning horizon, a residual value should be incorporated.

The AIC definition thus gives marginal cost estimates which smooth out lumps in expenditure over time while at the same time reflecting the general level and trend of future costs which will be incurred as water consumption increases.

REFERENCES

ACCC. 1999. ***Information gathering for ring fencing and other regulatory purposes***. Paper prepared for the Utility Regulator's Forum. October.

ACCC. 2002a. ***GasNet Australia Access Arrangement Revisions for the Principal Transmission System***. Final Decision. November

ACCC. 2002b. ***Pricing of Unconditional Local Loop Services (ULLS)***. Final Report. March.

ACCC. 2003. ***East Australian Pipeline Limited Access Arrangement for the Moomba to Sydney Pipeline System***. Final Approval. December.

ACCC. 2004. ***Review of the Regulatory Test for Network Augmentations***. Decision. August.

ACTEW. 1999. ***Electricity, Water and Sewerage Charges for 1999/2000 to 2003/2004 – Price Direction***. ACT.

Cannavan, D., Finn, F. and Gray, S. 2003. The Value of Dividend Imputation Tax Credits in Australia. ***Journal of Financial Economics***. forthcoming.

Agrell, P. and Bogetoft, P. 2002. ***Ex-post Regulation***. PreProject 2 – Final Report. 2002-12-20. http://www.sumicsid.com/reg/

Agrell, P. and Bogetoft, P. 2004. ***Evolutionary Regulation: From CPI-X towards contestability***. 2004-01-01. http://www.sumicsid.com/reg/

ARMCANZ (Agriculture and Resource Management Council of Australia and New Zealand). 1998. ***COAG Water Reform – Implementation Progress***. Water Meeting Number 12. Hobart. February.

Cannavan, D., Finn, F. and Gray, S. 2003. The Value of Dividend Imputation Tax Credits in Australia. ***Journal of Financial Economics***. forthcoming.

CIE (Centre for International Economics) 2004. ***Water Price Restructuring and the Role Of Sydney's Wholesale Water Price***. Prepared for IPART. April.

DNRM (Department of Natural Resources and Mines). 2003. ***Boyne River Basin Resource Operations Plan***.

Dimson, E., Marsh, P. and Staunton, M (2002), Triumph of the Optimists, Princeton University Press, Princeton.

EnergyAustralia 2001, **Form** ***of Regulation to Apply to NSW Electricity Distribution Network Service Providers***, Energy Australia's Supplementary Submission on IPART's Discussion Paper (DP 48), September.

ESC (Essential Services Commission). 2002. ***Melbourne's retail water and sewerage companies performance reports July 2001 – June 2002***.

ESC. 2004. ***Guidance to Urban Water Businesses on Assessment of Water Plans***. June.

ESC. 2004b. ***Economic Regulation of the Victorian Water Sector: Consultation Paper No.1***. February.

ESC. 2004c. ***Decision Paper: Performance Reporting Framework for Metropolitan and Regional Businesses***. July.

ESC. 2004d. ***Final Framework And Approach: Volume 1 Electricity Distribution Price Review***. Guidance Paper.

ESC (2005), **Metropolitan and Regional Businesses' Water Plans, Draft Decision 2005-06 to 2007-08**, March.

ESCOSA. 2003. ***Ports Price Review : Final Report***. November.

Farrier Swier Consulting. 2003. ***Incentive Regulation and Implementation***. Presentation at Stamford Hotel, Melbourne. Friday, 9 May 2003.

GPOC. 1998. ***Investigation Into the Pricing Policies of Hobart Water, North West Regional Water Authority, Esk Water: Final Report***. December.

GPOC. 2004. ***Investigation Into the Pricing Policies of Hobart Regional Water Authority, Esk Water Authority and Cradle Coast Water: Final Report***. July.

Gray, S (2003), **Issues in Cost of Capital Estimation**, SFG Consulting, September.

Hanke, S.H. 1981. On the marginal cost of water supply, ***Water Engineering and Management***. February: 60-64.

ICRC. 1999. ***ACTEW's electricity, water and sewerage charges for 1999/2000 to 2003/2004 – Price Direction***.

ICRC. 2003. ***Final Determination - Investigation into Retail Prices for Non-Contestable Electricity Customers in the ACT***. May.

ICRC. 2004. ***Final Report and Price Direction: Investigation into prices for water and wastewater services in the ACT***. March.

IPART. 2001. ***Department of Land and Water Conservation Bulk Water Prices from 1 October 2001***. Draft Report.

IPART. 2002. ***Review of Metropolitan Water Agency Prices***. .Issues Paper. June.

IPART. 2002b. ***Review of Prescribed Distribution Services NSW Distribution Network Service Providers' Submission on IPART's Discussion Paper (DP54)***. 15 July.

IPART. 2003. ***Determination for Prices of water supply, wastewater and stormwater services for Sydney Water Corporation from 1 July 2003 to 30 June 2005***.

IPART. 2003b. ***Sydney Water Corporation Prices of water supply, wastewater and stormwater services***. May.

IPART. 2003c. ***Hunter Water Corporation - Prices of Water Supply, Wastewater And Stormwater Services. Prices from 1 July 2003 to 30 June 2005***. Determination No 3, 2003.

IPART. 2003d. ***Gosford City Council - Prices of Water Supply, Wastewater And Stormwater Services. Prices from 1 July 2003 to 30 June 2005***. Determination No 1, 2003.

IPART. 2004. ***Draft Report on NSW Electricity Distribution Pricing 2004-05 to 2008-09***.

IPART. 2004b. ***NSW Electricity Distribution Pricing 2004/05 to 2008/09 Final Report***. June.

Lally, M. (2004). **The Cost of Capital for Regulated Entities**, Report prepared for the Queensland Competition Authority, October.

Mann, P.C. 1993. ***Water utility regulation: rates and cost recovery***. National Regulatory Research Institute. Policy Study 155. March.

Mann, P.C., Saunders, R.J, and Warford, J.W. 1980. A Note on Capital Indivisibility and the Definition of Marginal Cost. ***Water Resources Research***. June. 16 (3): 602-604.

Marsden Jacob Associates (MJA). 2004. ***Estimation of Long Run Marginal Cost (LRMC)***. Research report commissioned by the Queensland Competition Authority, October.

National Electricity Code Administrator. ***National Electricity Code***. Version 1.0 Amendment 9.3.

National Electricity Market Management Company Limited. 1999. ***Treatment of Loss Factors in the National Electricity Market***. November.

National Third Party Access Code for Natural Gas Pipeline Systems

Officer, R. 1994. The Cost of Capital of a Company Under an Imputation Tax System. ***Accounting and Finance*** (34):1-17.

Ofgem. 2000. ***Report on Services for Electricity Customers***.

Ofwat. 1999. ***Director General's Proposed revisions to the Guaranteed Standards Scheme***. Application to the Secretary of State for the Environment, Transport and the Regions, and the Welsh Assembly Secretary for the environment and Local Government. September.

Ofwat. 2001. ***Guidance on LRMC Estimation***. MD170 Report C. May.

Ofwat. 2002. ***Periodic review 2004, Setting price limits for 2005-10: Framework and approach.*** Consultation Paper. 15 October.

Ofwat. 2002b. ***Levels of service for the water industry in England and Wales : 2002-02 report***.

Ofwat. 2002c. ***International comparison of water and sewerage service: 2000-01 report***. December.

Ofwat. 2003. ***Correspondence to all managing directors of water and sewerage companies and water only companies***. 1 May.

ORG. 2000. ***Electricity Distribution Price Determination 2001-05***. September 2000.

OTTER (2003), **Investigation of Prices for Electricity Distribution Services and Retail Tariffs on Mainland Tasmania: Final Report and Proposed Maximum Prices**, September.

PC (Productivity Commission). 2001. ***Review of the National Access Regime***. Inquiry Report.

PC. 2002. ***Price Regulation of Airport Services***. Inquiry Report.

Posner, R. and Rosenfield, A. 1977. Impossibility and Related Doctrines in Contract Law: An Economic Analysis. ***The Journal of Legal Studies*** (6):83-118.

Queensland Treasury 1999. **Community Services Obligations : A Policy Framework**, March.

QCA. 1997. ***Criteria for the Identification of Government Monopoly Business Activities***. December.

QCA. 2000. ***Statement of Regulatory Pricing Principles for the Water Sector***. December.

QCA. 2001. ***Final Decision Proposed Access Arrangements for Gas Distribution Networks: Allgas Energy Limited and Envestra Limited***. October.

QCA. 2001b. ***Regulation of Electricity Distribution.*** Final Determination. May.

QCA. 2001c. ***Decision on QR's 2001 Draft Access Undertaking***. December.

QCA. 2002. ***Gladstone Area Water Board: Investigation of Pricing Practices***. Final Report. September.

QCA. 2003. ***Burdekin Haughton Water Supply Scheme: Assessment of Certain Pricing Matters relating to the Burdekin River Irrigation Area***. Final Report. April.

QCA. 2003b. ***General Pricing Principles for Infrastructure Investments made in response to Extraordinary Circumstances***. Draft Report. August.

QCA. 2004. ***Dalrymple Bay Coal Terminal Draft Access Undertaking***. October.

QCA. 2004b. ***Service Quality Incentive Scheme for Electricity Distribution Services in Queensland : Draft Decision***. February.

QCA. 2004c. **Efficiency Carryover Mechanism**. September.

SAIIR. 2002. ***Electricity Distribution Price Review Framework***, Discussion Paper, March.

Train, K. 2001. ***Optimal Regulation: The Economic Theory of Natural Monopoly***. MIT Press. available at http://emlab.berkeley.edu/books/regulation.html

Turvey, R. 1976. Analysing the Marginal Cost of Water Supply, ***Land Economics***. 52(2). May.

Utilities Commission, 2003. ***Networks Pricing: 2004 Regulatory Reset – Final Discussion Paper: Price Regulation Methodology***, November.

Water Resource (Boyne River Basin) Plan 2000 available at http://www.legislation.qld.gov.au/Legislation%20Docs/CurrentW.htm