



**Gladstone Area Water Board:
Projected Demand for Water -
2000/01 to 2019/20**

March 2001

FOREWORD

The Premier and the Treasurer (the Ministers) have declared certain business activities of the Gladstone Area Water Board (GAWB) to be government monopoly business activities and have directed the Queensland Competition Authority (the Authority) to investigate the pricing practices of GAWB in relation to these activities.

The demand for water is a key determinant of the infrastructure needs of GAWB, the associated cost of providing water, and thus its price. The Authority has developed projections of the aggregate demand for water required to be supplied annually by GAWB over the next 20 years. The projections have also been prepared for raw water and treated water, and for customer groups and geographic areas as prices may need to be established on such a basis.

The projections do not represent the views of the Authority on the most likely demand for water over the next 20 years. They are an aggregation of the views of existing and potential customers, the Department of State Development and the Department of Local Government and Planning (DLGP) and GAWB. Their views in turn reflect existing water prices, technology, market outlook, water supply agreements, maintenance of current service quality and environmental requirements.

Some of these factors may change over the course of the investigation. In particular, demand may need to be reassessed if price changes resulting from the review are found to be significant. The Authority will also consider the implications of any submissions for these projections and for the regulatory framework.

On this basis, the total demand for water in the Gladstone area is projected to increase from almost 41,000 ML in 1999/00 to some 80,000 ML by 2009/10, or 95 per cent. Over the period 2010/11 to 2019/20 demand is projected to increase to about 111,000 ML, or 39 per cent.

A significant proportion of projected growth in demand is attributable to the requirements of a small number of large customers. The most significant potential users up to 2009/10 are Callide Power Management, Stuart Shale Oil, Astral Calcining and Comalco, which account for almost 87 per cent of total projected growth in demand. For the period 2010/11 to 2019/20, Comalco and the Stuart and Nagoorin Shale Oil projects account for about 91 per cent of projected growth in demand.

Growth in industrial demand for raw water is expected to focus on four broad geographic areas, at Awoonga Dam, Gladstone, Yarwun Industrial Area and the new Aldoga Industrial Area. Growth in demand for treated water is expected to be centred around the Gladstone City area and Calliope Shire. Further growth in demand is also expected in the Yarwun, Hummock Hill and Miriam Vale areas.

Submissions regarding the methodology and conclusions of this paper should be forwarded to the Authority by close of business on **Monday 23 April 2001**.

SUBMISSIONS

Written submissions should be sent to the address below. While the Authority does not require submissions in any particular format, it would be appreciated if submissions could be provided in electronic form (on disk in Microsoft Word format) or by e-mail. If this is not possible, it would be appreciated if two printed copies could be provided. Submissions, comments or inquiries regarding this paper should be directed to:

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The **closing date** for submissions is **23 April 2001**

Confidentiality

In the interests of transparency and to promote informed discussion, the Authority would prefer submissions to be made publicly available wherever this is reasonable. If a person making a submission does not wish that submission to be public, that person should claim confidentiality in respect of the document or any part of it. Claims for confidentiality should be clearly noted on the front page of the submission and the relevant sections of the submission should be marked as confidential, so that the remainder of the document may be made publicly available. It would also be appreciated if submissions could be provided in electronic form (on disk in Microsoft Word format) or by e-mail. If this is not possible, it would be appreciated if two printed copies could be provided. Where it is unclear why a submission has been marked “confidential”, the status of the submission will be discussed with the person making the submission.

While the Authority will endeavour to identify and protect material claimed as confidential as well as exempt documents within the meaning of the *Freedom of Information (FOI) Act 1989*, it cannot guarantee that submissions will not be made publicly available. As stated in s187 of the *QCA Act*, the Authority must take all reasonable steps to ensure information is not disclosed without the person’s consent, provided the Authority is satisfied the person’s belief is justified and disclosure of the information would not be in the public interest.

Public Access to Submissions

Subject to the above, submissions will normally be made available for public inspection at the Brisbane office of the Authority, or on its website at www.qca.org.au

Information on the role and current activities of the Authority, including copies of reports, papers and submissions are located on the Authority’s website.

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GLOSSARY

CSO	Community Service Obligation
DLGP	Department of Local Government and Planning
GAWB	Gladstone Area Water Board
ML	Megalitre, or one million litres
QAL	Queensland Alumina Limited
QCL	Queensland Cement Limited

1. OVERVIEW

1.1 The Direction

The Premier and the Treasurer (the Ministers) have declared certain business activities of the Gladstone Area Water Board (GAWB) to be government monopoly business activities and have directed the Queensland Competition Authority (the Authority) to investigate the pricing practices of GAWB.

The declared business activities relate to bulk water storage, delivery and treatment services.

1.2 The Gladstone Area Water Board

GAWB is a Category 1 Water Authority under the *Water Act 2000*.

GAWB is currently responsible for the supply of both raw and treated water to industrial and local government consumers in the Gladstone region. The *Water Act 2000* does not restrict GAWB's area of operations.

Details of GAWB's water supply system are shown in Figure 3. A schematic diagram showing GAWB's raw and treated water supply systems and location of customers is shown in Figure 4.

In 1999/00, the total volume of water supplied by GAWB was almost 41,000 ML. This consisted of raw water used mainly for industry (73 per cent of total supply) and treated (potable) water mainly for urban and commercial purposes (27 per cent of total supply).

In late 2000, GAWB initiated a works program to raise the storage level of Awoonga Dam by 10 metres to increase available supply capacity from 49,000 ML to 90,000 ML, as part of a long-term plan of augmentation to meet the expected future growth in demand.

1.3 Purpose of this Report

The demand for water is a key determinant of the infrastructure needs of GAWB, the associated cost of providing water, and thus its price.

The Authority has developed projections of the aggregate demand for water required to be supplied annually by GAWB over the next 20 years. The projections have also been prepared for raw water and treated water, and for customer groups and geographic areas as prices may need to be established on such a basis.

1.4 Approach

In projecting the demand for GAWB's water services, the Authority consulted:

- GAWB and its existing and potential customers to assess the volumes and timing of their future demand for water. Major customers contacted included Queensland Alumina Limited, CS Energy, Callide Power Management, Stuart Shale Oil, Comalco, NRG (Gladstone Power Station), Boyne Smelters, Gladstone Port Authority, Gladstone City Council and Calliope Shire Council; and,
- relevant government agencies and relevant organisations including the Department of State Development, the Department of Local Government and Planning and the Department of Natural Resources and Mines.

1.5 Projected Demand for Water

Details of the projected demand for water, for total treated water and raw water, are summarised in Table 1, and Figures 1 and 2. Further details appear in Appendix A.

Table 1 Projected Growth in Annual Demand for Water (ML)

Type of Supply	2000/01	2001/02	2002/03	2003/04	2004/05	2009/10	2019/20	Growth 1999/00 to 2019/20
Total treated water	12,255	12,548	12,868	13,342	13,565	15,620	18,301	65%
Total raw water	31,395	40,368	42,570	42,793	51,615	64 078	92,537	212%
Total Demand	43,650	52,916	55,438	56,135	65,180	79,698	110,838	172%

The projections reflect rapid anticipated growth in raw water demand over the next 20 years (2000/01 to 2019/20). This is primarily driven by a small number of large customers, such as Callide Power Management, Suncor Energy (Stuart Shale Oil), Astral Calcining and the Comalco Alumina Project, which together account for 87 per cent of total growth in demand through to 2009/10. For the period 2009/10 to 2019/20, the major growth in demand is expected from the Stuart and Nagoorin Shale Oil projects and Comalco, which account for about 91 per cent of projected growth.

For the treated water sector, the projections were based on expected population trends and demand by commercial and light industry developments, primarily in Gladstone, Boyne/Tannum Sands and Calliope. The impact of new industrial projects on population growth was also recognised.

In developing these projections, the wide range of factors relevant to the likelihood of major projects precluded the assignment of probabilities to the demand for water associated with each project. Accordingly, demand was categorised according to whether it relates to existing users, or whether it relates to committed or prospective projects (Figure 2 refers). Committed projects are considered to only include Callide Power Management's Callide C power station and Stage 2 of Stuart Shale Oil.

The remaining projects have been classified as prospective users of water from GAWB, although each one will no doubt have their own views about the certainty of their projects proceeding. In the case of industrial customers, water is used as an input to a production process and is driven essentially by demand for commodities and outputs produced by the various industries. Over the longer term such projects may be deferred or delayed, as has happened in the past.

The Department of State Development is confident that major projects will come forward for Gladstone over the next 10 years, but acknowledges that it is almost impossible to predict specific projects, their timing and demand for water with any degree of certainty.

Figure 1: Historic and Projected Demand for Water

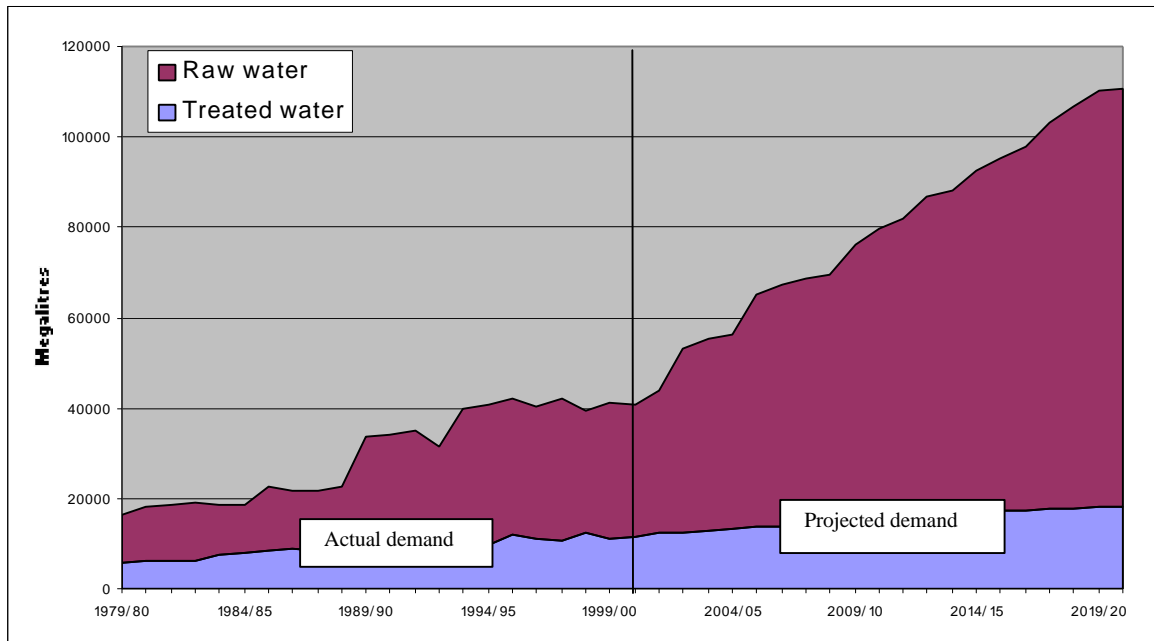
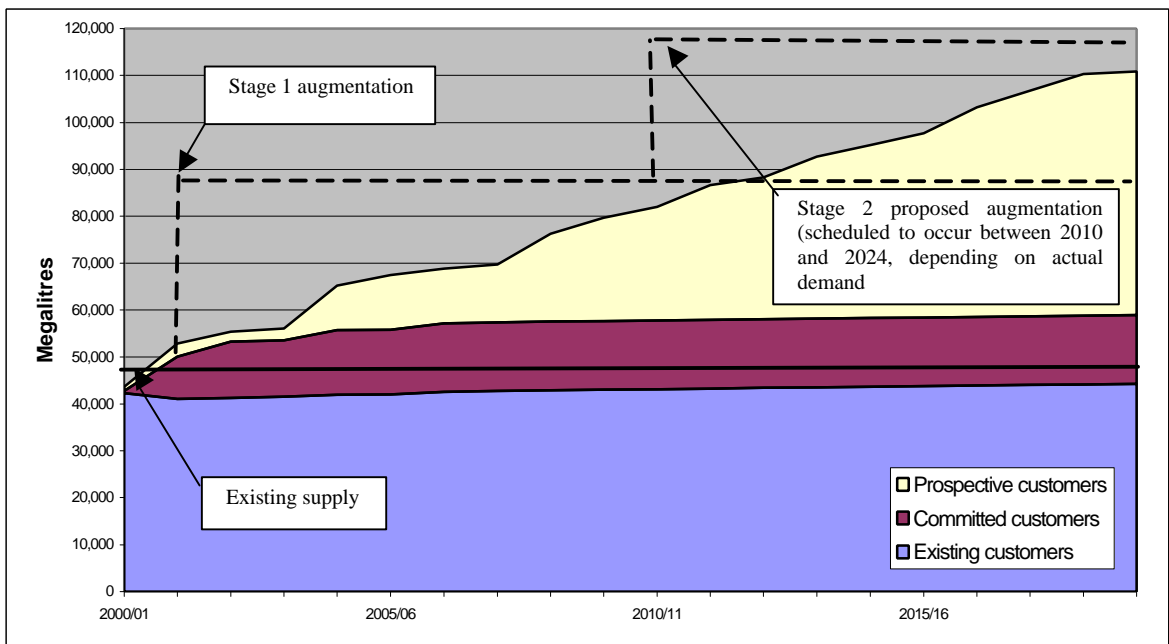


Figure 2: Projected Demand for Water and Planned Augmentation



Assessment of Raw Water Demand

By 2004/05, annual industrial demand for raw water is projected to reach 52,000 ML compared to 30,000 ML used in 1999/00. By 2009/10, industrial demand for raw water is projected to be 64,000 ML. Annual industrial demand for raw water is projected to increase to 93,000 ML by 2019/20, predominantly from Comalco, and the Stuart and Nagoorin Shale Oil projects.

Growth in industrial demand for raw water is expected to be centred on four broad geographic areas, at Awoonga Dam, Gladstone, Yarwun, and Aldoga. A small volume of additional demand is expected at Mt Larcom.

Generally, GAWB's major industrial customers have reported limited capacity to adjust their demand for water in the short term. This reflects their existing high levels of water use efficiency, an inability to change production technology in the short run, and the high cost of substituting water supply. Also, for most major industrial users, water represents a minor proportion of their total input costs.

However, in the longer term, customers can be expected to modify their demand for water from GAWB in response to changes in the price of water and other influences by the adoption of water efficiency techniques, changes in production technology, environmental constraints, water trading, use of alternative sources of water and changes in water supply contractual arrangements.

1.6 Assessment of Treated Water Demand

Growth in demand for treated water of 7,000 ML, from 11,000 ML in 1999/00 to 18,000 ML in 2019/20, is expected to result from an increase in demand based on population growth associated with increased employment in the Gladstone City Council area and the Calliope Shire. Further growth in demand for treated water is also expected in the Yarwun, Hummock Hill and Miriam Vale areas.

Urban demand for water is largely dependent on population growth and is responsive to consumption based charging. Where two-part tariff regimes have been introduced household consumption has generally reduced by around 15 per cent on a seasonally adjusted basis (Marsden Jacob Associates, 2001). Projections of growth in demand by Gladstone City Council have been adjusted by a conservative 10 per cent to reflect the introduction of these reforms to which Gladstone City Council has committed to under the Local Government Financial Incentives Payment Scheme.

Industrial demand for treated water from GAWB will also be determined by the demand for commodities.

1.7 Limitations

While the projections reflect the views of existing and potential users, it should be noted that these are based on existing water prices, technology, market outlook for industrial users, water supply agreements, and environmental requirements. It was also assumed that current service quality is to be maintained. Some of these factors, including prices, may change in the course of the investigation. The projections of demand will need reflect these, and any submissions.

2. INTRODUCTION

2.1 The Direction

On 14 September 2000 the Premier and Treasurer declared, under Section 19 of the *Queensland Competition Authority Act 1997 (QCA Act)*, the following business activities of the Gladstone Area Water Board to be government monopoly business activities:

- (i) bulk water storage, including water storage for another person;
- (ii) bulk water delivery services;
- (iii) bulk water treatment services; and,
- (iv) supplying water to another person, other than supplying bottled or containerised water.

On the same date, under Section 23 of the *QCA Act 1997*, the Premier and the Treasurer referred the declared government monopoly business activities of the Gladstone Area Water Board to the Queensland Competition Authority (the Authority) for the following investigations:

- (a) an investigation about pricing practices relating to the declared activities; and,
- (b) investigations for monitoring the pricing practices relating to the declared activities.

Under Section 24 of the *QCA Act 1997* the Premier and Treasurer also directed the Authority to:

- (a) investigate:
 - (i) the weighted average cost of capital proposed by the Gladstone Area Water Board;
 - (ii) appropriate pricing for excess capacity and capacity augmentation;
 - (iii) identification and pricing of contributed assets; and,
- (b) report on progress of the investigation to Ministers within three months of this referral.

2.2 Gladstone Area Water Board

The Gladstone Area Water Board (GAWB) is a Category 1 Water Authority under the *Water Act 2000* on 1 October 2000. GAWB is currently responsible for the supply of both raw and treated water to industrial and local government consumers in the Gladstone region. The *Water Act 2000* does not restrict GAWB's area of operations.

In 1999/2000 the total volume of water supplied by GAWB was 41,000 ML. This consisted of raw water used mainly for industry (73 per cent of total supply) and treated water mainly for urban and commercial purposes (27 per cent of total supply). Refer to Table 2.

Details of GAWB's water supply system are shown in Figure 3. A schematic diagram showing GAWB's raw and treated water supply systems and location of customers is shown in Figure 4.

Figure 3: Map of GAWB's Water Supply System

Figure 4: Gladstone Area Water Board – Water Distribution System - 2001

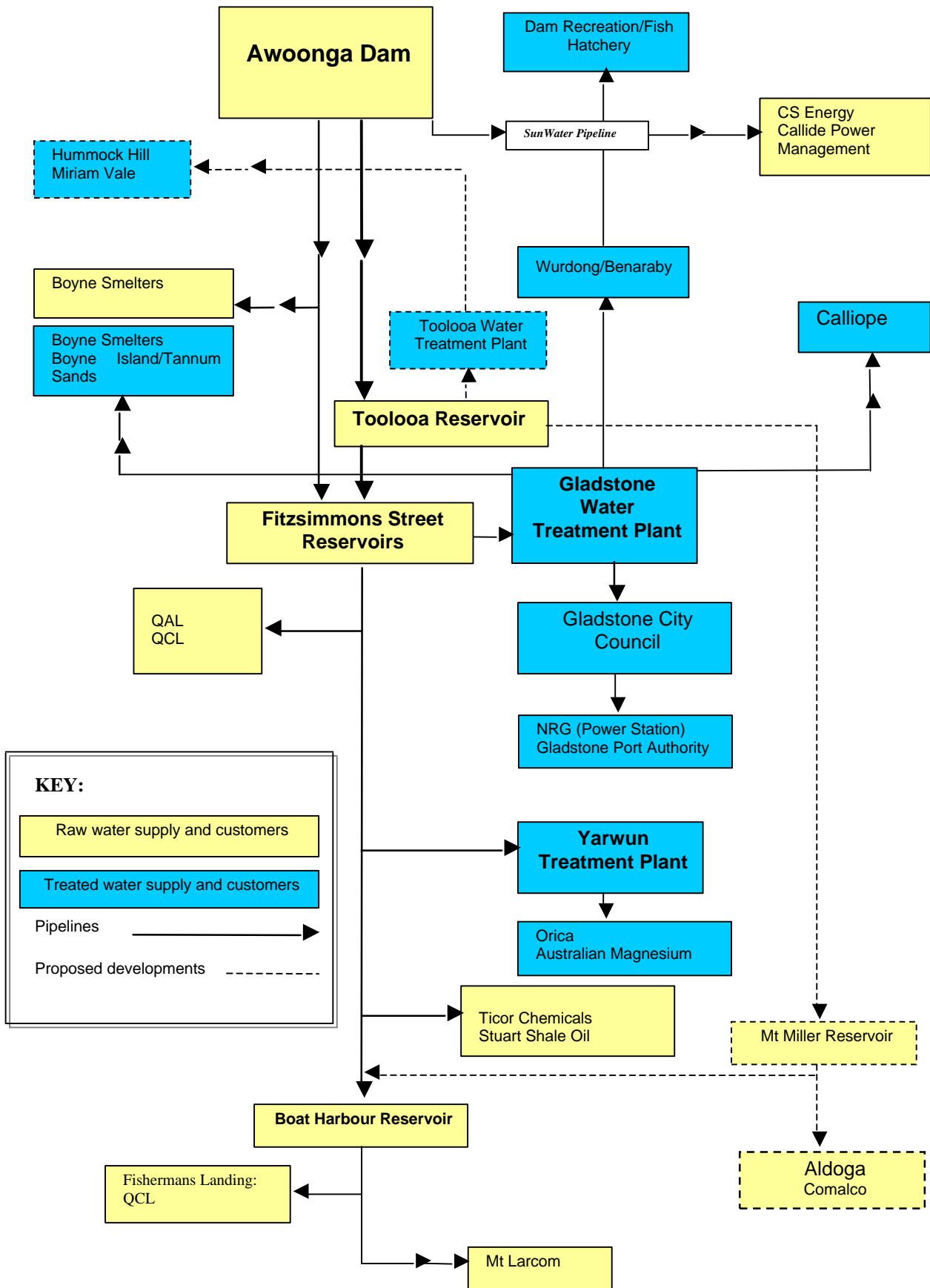


Table 2: Water Demand in 1999/00 (ML)

Market sector	Raw Water		Treated Water		Total	
Industry	16,232	(55%)	1,059	(9%)	17,291	(43%)
Local Government	0	(0.%)	8,721	(79%)	8,721	(21%)
Electricity Generation	13,463	(45%)	1,314	(12%)	14,777	(36%)
Totals	29,695	73%	11 094	27%	40,789	100%

Source: Gladstone Area Water Board

GAWB's customers, and their demand for 1997/98, 1998/99, and 1999/00 are shown in Table 3.

Table 3: Water Demand by Customer – 1997/98 to 1999/00

Customer	1997/98 (ML)	1998/99 (ML)	1999/00 (ML)
Queensland Alumina Limited	13,700	13,606	14,098
CS Energy	12,961	14,166	13,463
Gladstone City Council	6,646	6,526	6,277
Calliope Shire Council	2,458	2,428	2,444
Gladstone Power Station*	1,221	1,196	1,314
Orica Australia**	947	987	966
Boyne Smelters – raw	811	726	704
– treated	103	100	93
Stuart Shale Oil	35	561	542
Gladstone Port Authority*	280	357	363
Queensland Cement Limited	243	337	335
Ticor Chemicals	147	159	170
Australian Magnesium Corporation	35	41	20
TOTAL	39,587	41,190	40,789

Source: Gladstone Area Water Board

Note: * Customer of Gladstone City Council

** Customer of Calliope Shire Council

In late 2000, GAWB initiated a works program to raise the storage level of Awoonga Dam by 10 metres to increase available supply capacity from 49,000 ML to 90,000 ML as part of a long-term plan of augmentation to meet the expected future growth in demand.

3. PROJECTED DEMAND FOR WATER

3.1 Approach

In projecting the demand for GAWB's water services, the Authority consulted:

- GAWB and its existing and potential customers to assess the volumes and timing of their future demand for water. Major customers contacted included Queensland Alumina Limited, CS Energy, Callide Power Management, Stuart Shale Oil, Comalco, NRG (Gladstone Power Station), Boyne Smelters, Gladstone Port Authority, Gladstone City Council and Calliope Shire Council; and,
- relevant government agencies and relevant organisations including the Department of State Development, the Department of Local Government and Planning and the Department of Natural Resources and Mines.

3.2 Projections – Total Water Demand

The projected demand for water for 2000/01 to 2019/20, for total treated water and raw water, is summarised in Table 4 and presented in more detail in Appendix A.

The projections reflect rapid anticipated growth in raw water demand over the next 20 years. This is primarily driven by a small number of large customers, such as Callide Power Management, Suncor Energy (Stuart Shale Oil), Astral Calcining and the Comalco Alumina Project, which together account for 87 per cent of total growth in demand through to 2009/10. For the period 2009/10 to 2019/20, the major growth in demand is expected from the Stuart and Nagoorin Shale Oil projects and Comalco, which account for about 91 per cent of projected growth.

Table 4 Projected Growth in Annual Demand for Water (ML)

Type of Supply	2000/01	2001/02	2002/03	2003/04	2004/05	2009/10	2019/20	Growth 1999/00 to 2019/20
Total treated water	12,255	12,548	12,868	13,342	13,565	15,620	18,301	65%
Total raw water	31,395	40,368	42,570	42,793	51,615	64,078	92,537	212%
Total Demand	43,650	52,916	55,438	56,135	65,180	79,698	110,838	172%

By 2004/05, annual industrial demand for raw water is projected to reach 52,000 ML compared to 30,000 ML used in 1999/00. By 2009/10, industrial demand for raw water is projected to be 64,000 ML. That is, over a 10-year period, projected demand for raw water by industry is expected to more than double. Annual industrial demand for raw water is projected to increase to 93,000 ML by 2019/20, predominantly from Comalco, and the Stuart and Nagoorin Shale Oil projects.

For the treated water sector, the projections were based on expected population trends and demand by commercial and light industry developments, primarily in Gladstone, Boyne/Tannum Sands and Calliope. The impact of new industrial projects on population growth was also recognised. Urban, commercial and industrial demand for treated water is projected to reach 14,000 ML in 2004/05, and 16,000 ML in 2009/10, compared to 11,000 ML

in 1999/00. If realised, this would represent a significant increase of 41 per cent over a 10-year period.

3.3 Assessment of Raw Water Demand

Background

GAWB's key business activity is the provision of raw water storage and distribution services for a small number of major industrial customers. Raw water demand projections are focused on future demands by existing customers and forecast uptake by new customers. This segment of GAWB's business is characterised by lumpy demand increments over time. For example, Callide Power Management's additional demand will boost total raw water demand by about 40 per cent over two years. However, once established, industrial demand has tended to be stable.

Raw Water Demand Patterns

In the case of industrial customers, water is used as an input to a production process and is driven essentially by demand for commodities and outputs produced by the various industries. The key industrial users can be grouped into three main categories – power generation, metals processing and other industrial, and the oil shale industry.

In the electricity industry, water is mainly used for cooling. There is limited potential for substitution of water without substantial capital investment in alternative cooling technology. CS Energy and Callide Power Management are reliant on Awoonga Dam for water supplies, but NRG's Gladstone Power Station uses sea-water for cooling purposes.

The metals processors are generally subject to world market pressures. QAL's alumina plant is one of GAWB's largest customers. Demand for water is stable on an annual basis, but has declined since 1996 with the adoption of alternative processes for red mud disposal using a seawater transportation system. Comalco's proposed alumina refinery will also be subject to world market forces, but in both cases, water is a relatively minor input in cost terms.

The oil shale developments have the potential to become a third major industrial user category for GAWB. Future demands are subject to the resolution of processing technology issues and are sensitive to world oil prices. Environmental requirements may mean that recycling of groundwater from mine-sites is viable as a substitute for water from Awoonga Dam.

In general, water is a relatively minor cost for the major industry users, and water demand tends to be relatively stable from year to year. Table 5 shows the projected demand for raw water.

TABLE 5: Demand for Raw Water by Key Industry Categories – 1999/00 to 2019/20

Source of demand	Demand in 1999/00 (ML)	Demand in 2009/10 (ML)	Demand in 2019/20 (ML)	Total Growth – 1999/00 to 2019/20 (megalitres percentage)	
Power generation	13,463	26,200	26,400	12,937	96%
Industrial users	15,690	28,478	33,737	18,047	115%
Shale oil industry	542	9,400	32,400	31,858	5,878%
Total	29,695	64,078	92,537	62,842	210%

GAWB's raw water supply system involves specific infrastructure to supply to customers in defined geographic areas. The major geographic areas for the supply and distribution of raw water by GAWB are:

- Awoonga Dam. Currently, this is GAWB's only source of raw water. Raw water is supplied directly from the dam for transmission by SunWater to CS Energy's power station near Biloela. Callide Power Management will source its requirements in a similar manner;
- Gladstone. This includes the distribution system from Awoonga Dam to the terminal reservoirs at Gladstone. From this part of the system, raw water is distributed to the Gladstone Water Treatment Plant, to QAL, to Boyne Smelters and to the Hansen Road pipeline for distribution to industrial customers to the north of Gladstone;
- Yarwun Industrial Area and Fisherman's Landing. From this part of the system, raw water is supplied to the Yarwun Water Treatment Plant, Ticor, Stuart Shale Oil, and to QCL and the Gladstone Port Authority at Fisherman's Landing. It also supplies the pipeline to Mt Larcom; and
- Mt Larcom, where raw water is supplied to the QCL Mine and Mt Larcom township.

It is proposed that the new Aldoga Industrial Area, where Comalco is to be located, will be supplied with raw water by the proposed Kirkwood Road pipeline from Toolooa and a new reservoir at Mt Miller.

Projected demand for these geographic areas appear in Table 6.

Table 6: Location of Growth in Demand for Raw Water

Location	Additional Demand		Total Additional Demand by 2019/20
	1999/00 to 2009/10 (ML)	2010/11 to 2019/20 (ML)	
Raw Water			
Awoonga Dam	12,737	200	12,937
Gladstone	-102	-400	-502
Yarwun	8,985	23,250	32,235
Aldoga	12,600	5,480	18,080
Mt Larcom	63	29	92
Total	34,283	28,559	62,842

Matters Relevant to Raw Water Demand Projections

In developing these projections, the wide range of factors relevant to the likelihood of major projects precluded the assignment of probabilities to the demand for water associated with each project. Accordingly, demand has also been categorised according to whether it relates to existing users, or whether it relates to committed or prospective projects. Committed projects are considered to include Callide Power Management Callide C power station and Stage 2 of Stuart Shale Oil.

The remaining projects have been classified as prospective users of water from GAWB, although each one will no doubt have their own views about the certainty of their projects proceeding. In the case of industrial customers, water is used as an input to a production process and is driven essentially by demand for commodities and outputs produced by the various industries. Over the longer term such projects may be deferred or delayed, as has happened in the past.

Demand for raw water associated with the Astral Calcining project is subject to completion of a feasibility study and planned development by Stuart Shale Oil is subject to the outcome of new technology currently being piloted at Gladstone. Further development by Stuart Shale Oil is also subject to resolution of some water reuse and environmental issues. While implementation of Stage 2 of the plant is expected in 2004/05, major growth in demand associated with the Stage 3 development is not expected until 2008/09. Stage 4 development is scheduled to commence in 2012/13. Given there is still some uncertainty about technology developments it is reasonable to expect delays, especially given the long time frame involved.

Stuart Shale Oil has advised that there may be delays of up to 5 years for the commencement of Stages 3 and 4. Further, it is possible that the use of alternative sources of water and adoption of more efficient water recycling technology may result in a significant reduction in estimated demand for shale oil processing. Stuart Shale Oil is currently investigating these matters, but outcomes from the investigations are not expected for some time. In the absence of conclusive results from these investigations, the Authority's projections for demand incorporate the requirements for the shale oil producers. These projections should be reviewed as events unfold, with potential implications for the timing of GAWB's Stage 2 augmentation.

Demand associated with the Nagoorin Shale Oil's development, scheduled to commence in 2016/17, is also considered to have a high level of risk in terms of timing and volume required.

The Department of State Development is confident that major projects will come forward for Gladstone over the next 10 years, but acknowledges that due to the lumpy and irregular nature of developments associated with major industries, it is almost impossible to predict specific projects, their timing and demand for water with any degree of certainty.

Responsiveness of the Demand for Raw Water to Price Changes

Generally, the demand for water of commercial and industrial customers does not respond to increases in the price of water in the short term because:

- water is a necessity for operations;
- the cost of water is a small part of the total costs;
- there is a high cost required to reduce consumption through recycling or substituting the current source of supply;
- a high cost and length of time is required to substitute alternative water efficient production technology for existing industries; and,
- there is a lack of suitable substitutes for water used in most commercial and industrial processes.

GAWB's major industrial customers have reported limited capacity to adjust their demand for water in the short term. This reflects their existing high levels of water use efficiency, an inability to change production technology in the short run, and the high cost of substituting water supply. Also, for most major industrial users, water represents a minor proportion of their

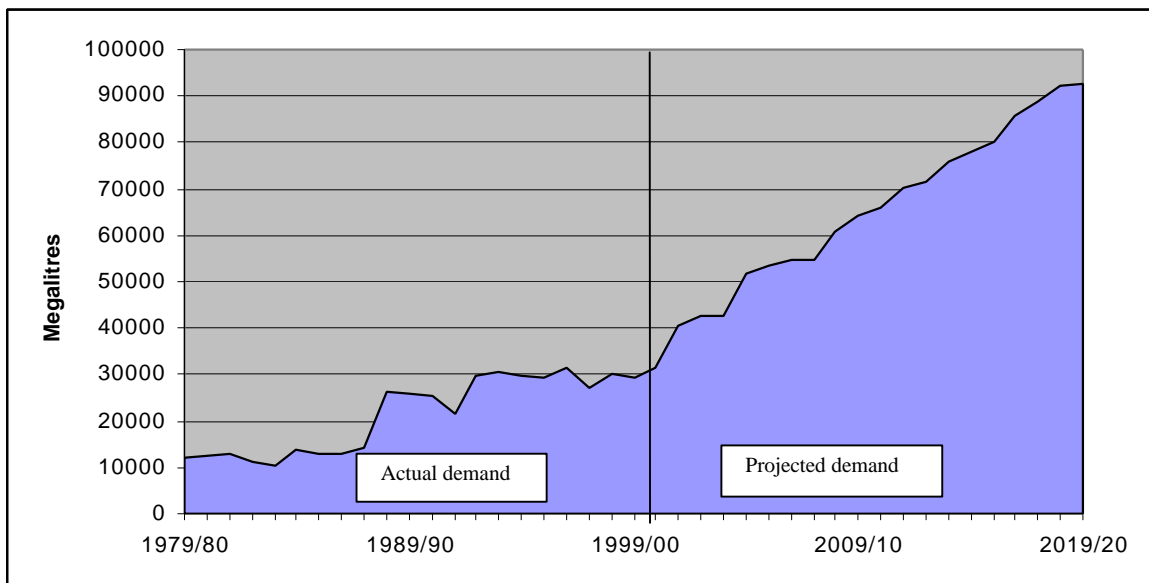
total input costs. Water represents only 0.14 per cent of costs for aluminium smelting and 2.26 per cent of costs for power generation (Marsden Jacob Associates, 2001).

However, in the longer term, industrial customers can be anticipated to modify their demand for water from GAWB in response to changes in the price of water and other influences such as adoption of water efficiency techniques, changes in production technology, environmental constraints, water trading, use of alternative sources of water and changes in water supply contractual arrangements.

Potential future demand changes may be more in response to environmental pressures than to price. Industrial companies face increasing pressure to minimise off-site disposal of waste products to reduce their water use through recycling, pre-treatment or process re-design. These pressures have been instrumental in Sydney Water's observation of a 50 per cent reduction in industrial demand per property between 1975 and 1995 (Marsden Jacob Associates, 2001). Such pressures may lead to modification of water demand by the oil shale industry.

Historic and projected demand for raw water appear in Figure 5.

Figure 5: Historic and Projected Demand for Raw Water



3.4 Assessment of Treated Water Demand

Background

GAWB provides treated water from its Gladstone Water Treatment Plant and smaller treatment plants at Yarwun and Awoonga Dam. Its major customers for treated water are the Gladstone City Council (including urban and commercial supply) and supply to NRG (Gladstone Power Station), and the Gladstone Port Authority, Calliope Shire Council (including Calliope, Boyne Island and Tannum Sands), Orica Australia and Australian Magnesium. Currently, demand for treated water by urban and commercial users in Gladstone City Council and Calliope Shire Council accounts for about 80 per cent total treated water supply, with the balance used by industrial customers.

Treated Water Demand Patterns

GAWB's treated water customers fall clearly into three categories – urban, commercial and industrial. Urban demand includes residential use, parks and gardens and recreational areas, while commercial demand encompasses light industry and businesses such as shops, hotels etc.

Urban and commercial demand typically responds to seasonal conditions within-year, and to population trends over time. The impact of major industrial developments, such as the planned Comalco Alumina Project and the oils shale projects, are also reflected in urban and commercial demand, through their impacts on employment and population growth.

Industrial demand for treated water from GAWB is likely to have the same derived demand characteristics as raw water. The demand projections for treated water for the three user categories over the period to 2019/20 appears in Table 7.

Table 7: Projected Demand for Treated Water (ML)

Type of Supply	2000/01	2001/02	2002/03	2003/04	2004/05	2009/10	2019/20	Growth 1999/00 to 2019/20
Urban	8,100	8,316	8,411	8,640	8,687	10,026	11,496	50%
Commercial	1,097	1,115	1,141	1,184	1,208	1,366	1,550	46%
Industrial	3,058	3,117	3,316	3,518	3,670	4,228	5,255	121%
Total	12,255	12,548	12,868	13,342	13,565	15,620	18,301	65%

The major geographic customer groups consist of Gladstone, Calliope, South Gladstone to Awoonga Dam, Boyne Island and Yarwun. GAWB also proposes to construct a new water treatment plant at Toolooa in 2005 to meet expected growth in demand for treated water in the Hummock Hill and Miriam Vale areas. Details of the location in growth in demand by key geographic area are summarised in Table 8.

Table 8: Location of Growth in Demand for Treated Water

Location	Additional Demand		Total Additional Demand by 2019/20 (ML)
	1999/00 to 2009/10 (ML)	2010/11 to 2019/20 (ML)	
Treated Water			
Gladstone Treatment Plant	2,595	1,690	4,285
• Gladstone City	1,404	1,007	2,411
• Calliope Shire	1,191	683	1,874
Yarwun Treatment Plant	843	478	1,321
Toolooa Treatment Plant (proposed)	1,088	513	1,601
Total	4,526	2,681	7,207

Matters Relevant to Treated Water Demand Projections

The projected growth for urban demand is based on historic and projected population for Gladstone City and Calliope Shire from DLGP's "medium series" population growth projections.

The DLGP's projections have been modified to include additional growth based on new employment to be created by the Comalco and Stuart Shale Oil developments. Demand for treated water by the two Councils has varied considerably during the last 10 years and shows a strong inverse correlation to the level of annual rainfall.

This has made it difficult to identify an average level of consumption on which to base projections. However, the Authority has adopted an allowance of 160 kilolitres per head for Calliope Shire based on recent consumption levels.

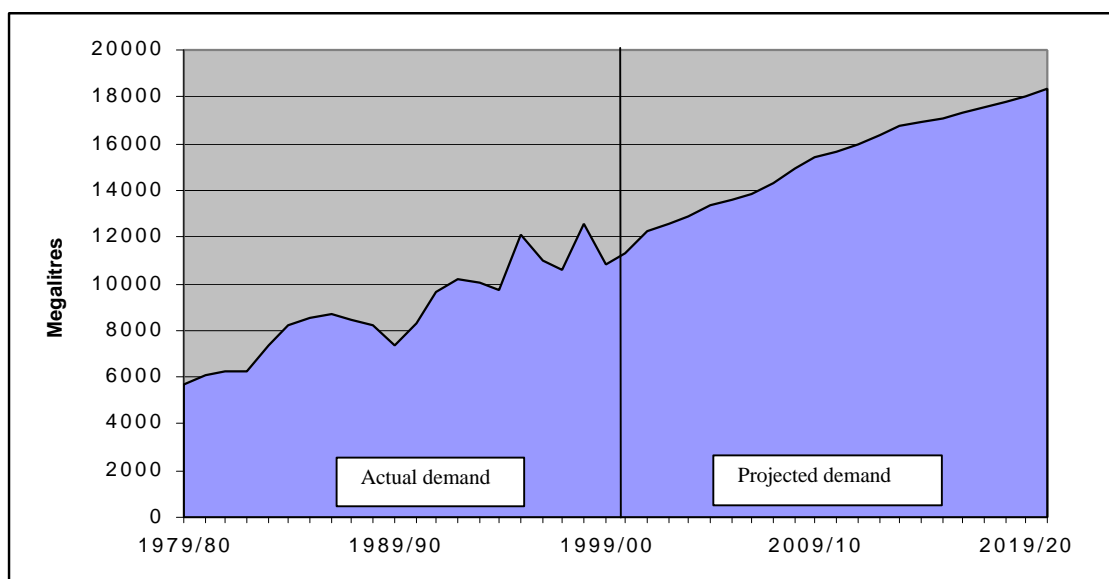
In the case of Gladstone, the Authority has adopted an allowance of 230 kilolitres per head of population based on the average consumption in recent years. On the basis of available information, consumption for business and commercial demand has been about 35 kilolitres per head of population, demand for council requirements has been about 35 kilolitres per head of population, and urban consumption at 160 kilolitres per head of population.

Gladstone City Council is yet to implement a two-part tariff, but is committed to do so within the next two years under Queensland's local government reform process. Marsden Jacob Associates has reported reductions in gross water usage, on a seasonally adjusted basis of around 15 per cent as a result of the introduction of two-part tariffs. The actual reduction achieved depends on the size of the free allowance that previously existed, the effectiveness of the consumption based charging structure that replaces it, and the climate.

In the case of Gladstone, the Authority has adopted a conservative expected response of up to 10 per cent, given that Gladstone City Council has a relatively high free allowance of 500 kilolitres per household. The higher level of household consumption in Calliope Shire is a result of the higher proportion of rural residential consumers.

Historic demand for treated water by the Gladstone City Council and Calliope Shire Council and relevant projections appear in Figure 6.

Figure 6: Historic and Projected Demand for Treated Water



Responsiveness of the Demand for Treated Water to Price Changes

Evidence collected from across Australia shows that for every 10 per cent increase in price, domestic customers reduce their consumption by 3 per cent on average. The effect varies between 2 and 7 per cent (Marsden Jacobs, 2001). Demand responses to a change in price tend to be higher in summer when outdoor use is higher, and also higher for warm climates where there is generally a higher level of discretionary use.

Studies in the USA have shown that a 10 per cent increase in price results in a 14 per cent decrease in use (Marsden Jacob Associates, 1997). Responsiveness is also influenced by climate and season. In warm dry climates, a price increase of 10 per cent results in a reduction in demand of between 2.5 to 5 per cent, whereas warm humid climates typically have slightly higher elasticities with responsiveness at 6 per cent. (Marsden Jacob Associates, 1997).

The responsiveness of demand to prices is also :

- affected by level of household income - the lower the income, the higher the response;
- dependant on the level of existing prices. Where water price is already high, a further price percentage increase will have a much greater proportional effect than a similar percentage price increase on low prices.

Any significant change in tariffs by the councils as a result of revised pricing by GAWB could be expected to impact on household demand, particularly for outdoor use.

Commercial customers tend not to be responsive to increases in the price of water. For most schools, hospitals, offices, small businesses and the like, water is a necessity and is a small part of the total costs. Further, the cost of water is often bundled in with commercial rental or lease arrangements and price signals are not passed through to the consumer.

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APPENDIX A: PROJECTED ANNUAL DEMAND FOR WATER

Year	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Total treated water	12,255	12,548	12,868	13,342	13,565	13,839	14,273	14,959	15,379	15,620	15,969	16,347	16,719	16,887	17,098	17,334	17,571	17,813	18,055	18,301
Total raw water	31,395	40,368	42,570	42,793	51,615	53,638	54,560	54,733	60,855	64,078	66,050	70,323	71,546	75,819	78,092	80,365	85,658	88,951	92,244	92,537
TOTAL DEMAND	43,650	52,916	55,438	56,135	65,180	67,477	68,833	69,692	76,234	79,698	82,019	86,670	88,265	92,706	95,190	97,699	103,229	106,764	110,299	110,838

APPENDIX B: COMPARISON WITH GAWB'S DEMAND FORECASTS

GAWB developed three water demand scenarios based variously on existing demands and commitments, projected probable projects and all known projects. The “medium growth scenario” is based on the same projects as are incorporated in the projections prepared by the Authority based on the perceptions of existing stakeholders. Details of GAWB’s projected demand for water are summarised in Table B.1.

Table B.1: GAWB’s Projected Demand for Water (ML)

Type of Supply	2000/01	2001/02	2002/03	2003/04	2004/05	2009/10	2019/20
Total treated water	12,630	13,038	13,765	14,277	14,799	17,197	22,228
Total raw water	31,045	40,193	44,221	46,928	53,105	64,228	90,287
Total Demand	43,675	53,231	57,976	61,205	67,904	81,425	112,515

Source: Gladstone Area Water Board

The projections in this report differ from those of GAWB in that:

- GAWB’s projections were prepared on information available in mid-2000;
- GAWB’s projections showed a higher rate for treated water demand as a result of higher expectations of growth in demand by commercial users and the absence of an allowance the introduction of two-part tariffs by the Gladstone City Council.

The aggregate impact of these differences is minimal as is evidenced in Figure B.1. However, differences in projected treated water differ by up to 5,000ML by 2019/20 - see Figure B.2.

Figure B.1: Comparison of Projections of Total Water Demand – 2000/01 to 2019/20

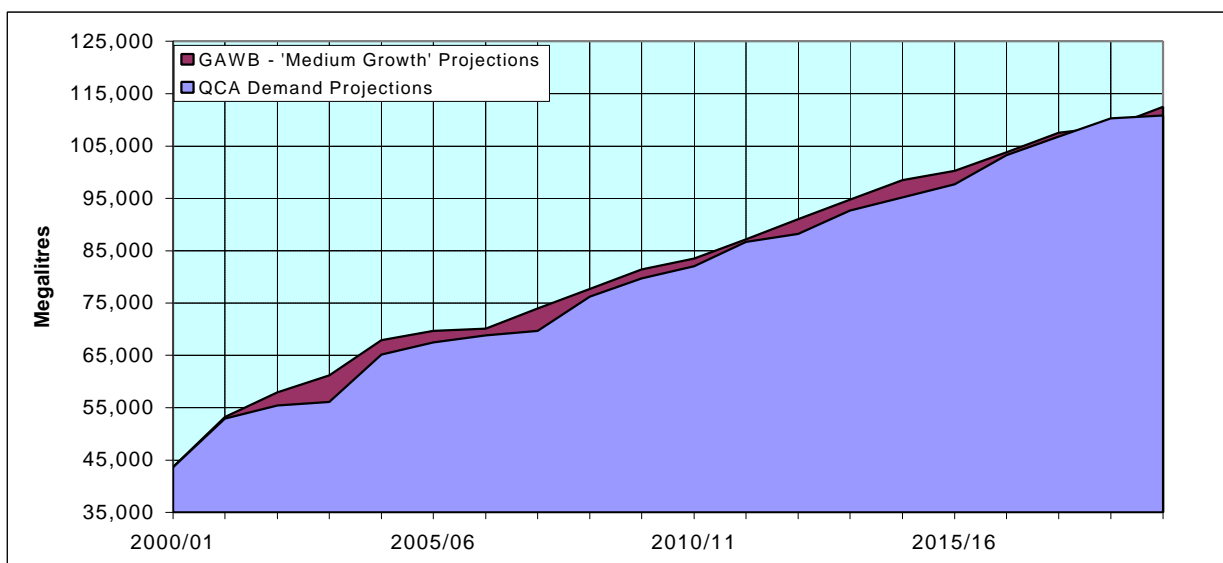


Figure B.2: Comparison of Projected Growth in Demand for Treated Water

