Queensland Government

Premier of Queensland
and Minister for Trade

FOR REPLY PLEASE QUOTE: TN112339/PD15/DI

The Honourable Bill Heffernan
Senator and Chair
Standing Committee on Rural and Regional Affairs and Transport
PO Box 6100
PARLIAMENT HOUSE ACT 2600

Dear Senator

I am pleased to submit the Queensland Government's Submission to the Senate Standing Committee on Rural and Regional Affairs and Transport *Inquiry into Additional Water Supplies for South East Queensland – Traveston Crossing Dam.*

I note that the Committee is proposing to hold public hearings in Gympie on 17 April 2007, and in Brisbane on 18 April 2007, and that the Committee will undertake a tour of the proposed site for the Traveston Crossing Dam and the existing Borumba Dam on the afternoon of 16 April 2007.

I understand my colleague, the Honourable Anna Bligh MP, Deputy Premier, Treasurer and Minister for Infrastructure has previously written to you advising that Mr Graeme Newton, Chief Executive Officer of Queensland Water Infrastructure, will be available to accompany the Committee on its tour.

Yours sincerely

PETER BEATTIE MP
PREMIER AND MINISTER FOR TRADE

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The State of Queensland

Submission

The Senate Standing Committee
on Rural and Regional Affairs and
Transport

Inquiry into
Additional Water Supplies for
South East Queensland –
Traveston Crossing Dam

4 April 2007

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Overview

SEQ is facing unprecedented circumstances with the worst drought in 100 years and significant population growth. Inflows to bulk storage catchments, have deteriorated recently and rapidly.

In response, the Queensland Government has developed a multi-faceted strategy, underpinned by significant analytical work. This response incorporates demand management strategies and a major infrastructure program, which includes as well as new surface water sources, a major desalination plant, introduction of purified recycled water, and the development of the SEQ Water Grid, a network of water transmission pipes that will allow water to be delivered from different sources to the point of most need.

A single solution to the long-term water needs of SEQ does not exist. While desalination, recycling and demand management will constitute important components of the response to current water supply circumstances and future needs, there is a clear need to secure and develop high yield surface water storages. These new storages will address the balance between water supply and demand, and to allow sufficient contingency to ensure that in times of drought, Queenslanders to not have to suffer through difficult water restrictions in the future.

Traveston Crossing Dam's location was selected as a preferred site as a result of as comprehensive review of all available surface water options. It is clearly the highest yield surface water supply option available in SEQ. Since its selection, technical and engineering analysis has confirmed the appropriateness of this option.

All major water projects in Queensland will undergo appropriate environmental review. In the case of the proposed Traveston Crossing Dam, this requires that an EIS be prepared. The EIS process is under way, and will be subject to rigorous review and assessment by the Coordinator-General in conjunction with the Commonwealth Environment Minister under the relevant legislation.

The decision to investigate construction of a dam at Traveston Crossing has created a range of social and economic issues that cause difficulty and anxiety for the affected community, individuals and businesses. The Queensland Government is cognisant of this and, through a range of mechanisms, is making every effort to comprehensively and sensitively address these matters.

While acknowledging these issues, the need for a secure supply of reliable water is an essential requirement for the future growth of SEQ.

Executive Summary

Introduction

The Senate Standing Committee on Rural and Regional Affairs and Transport (***the Committee***) has invited submissions to its inquiry into "Additional Water Supplies for SEQ – Traveston Crossing Dam" (***the Inquiry***). The Inquiry's Terms of Reference are to conduct:

"…an examination of all reasonable options, including increased dam capacity, for additional water supplies for SEQ, including:

(a) the merits of all options, including the Queensland Government's proposed Traveston Crossing Dam as well as raising the Borumba Dam; and

(b) the social, environmental, economic and engineering impacts of the various proposals."

This document is the Submission by the Queensland Government to the Inquiry. It incorporates input from all relevant Queensland Government agencies. In particular, this Submission incorporates the position of both the Queensland Water Commission (***QWC***) and Queensland Water Infrastructure Pty Ltd (***QWI***).

Overview

The provision of reliable and high quality water supplies is an issue that goes to the heart of the economic sustainability and quality of life for any region. For large communities like those in SEQ, the social and economic consequences of supply failure are too devastating to contemplate.

SEQ is of major economic and social importance to Queensland and Australia. If Queensland is to continue to grow, SEQ will require significant quantities of additional highly reliable water supplies. In turn, Queensland's economic future is dependent on maintaining the growth of SEQ. Without the provision of extra water for SEQ, anticipated growth will not be possible. Consequently, failure to provide adequate water into the future will have serious impacts on all Queenslanders and, in particular, families and young new job seekers.

SEQ is experiencing the compound effects of the worst drought in more than 100 years, a booming population and the prospect of continuing irregular rainfall due to natural climate variability and long-term climate change.

The drought has exposed a vulnerability of the region's water supplies, previously thought to be secure and able to support long-term growth. Some dam levels are currently or have recently been at record lows. Without additional water supplies, there will be numerous adverse social

impacts, even with adoption of new water- efficient technologies and substitute sources. Without additional supplies of water the region will be forced to endure long-term restrictions on supply. Such long-term restrictions would impact on the benefits supplied by public parks, sporting activities, and residential gardens. They may also have severe impacts on the manner in which water is used indoors.

The provision of additional sources of water to meet the region's growing needs is a major priority for the future.

The Queensland Government is committed to providing assured supplies of water to meet the needs of the existing population and of growth and development in SEQ. The Queensland Government is promoting principles of best practice including strategies for reducing the demand for water and delivering water supplies in an economical and sustainable way that best meets the very long-term water needs of the State.

The Queensland Government has committed to a process of regional planning, water planning and institutional reform to deliver coordinated, safe and secure water supplies. It is also delivering a substantial infrastructure program, with projected expenditure in the order of $7 - 9 billion over the next 5 years, as well as addressing demand management.

In developing the Queensland Government's response to the drought, there has been extensive collaboration with local government. The best available processes and technologies have been used. This applies to land management, population and demand projections used in the region, and assessments of supply availability and processes to balance supply and demand.

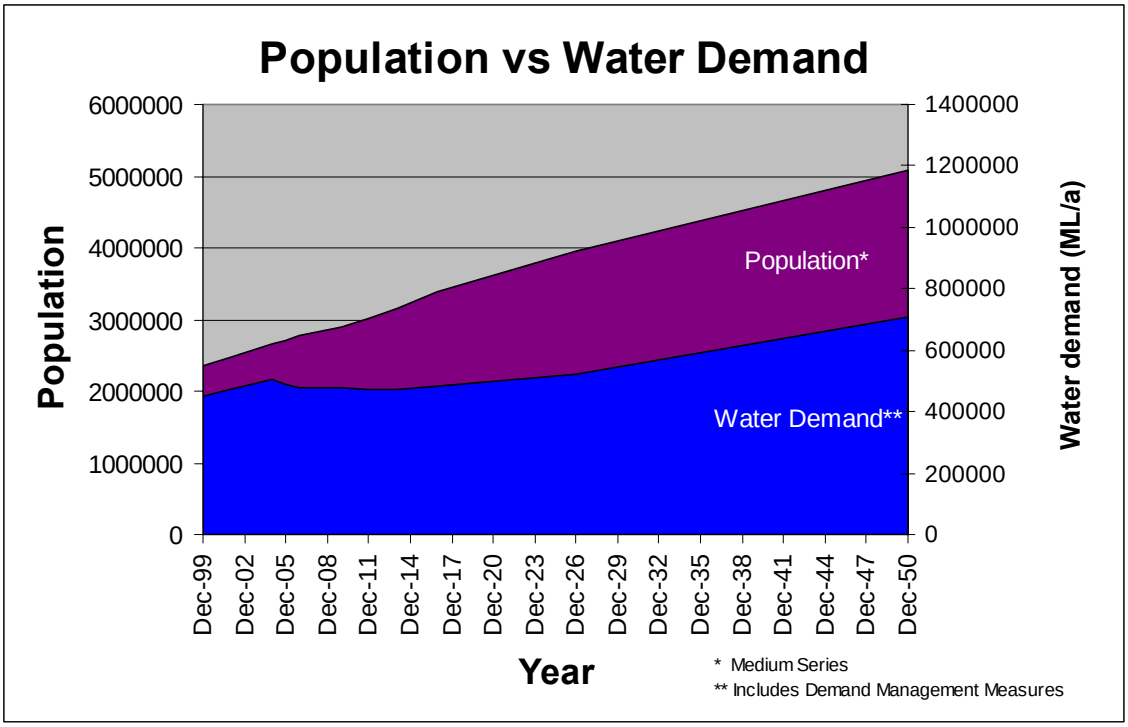
While the State has long had a clear role as a planner and regulator of water supply, over the past year it has significantly reasserted its lead role as provider of water supply infrastructure to ensure the timely delivery of SEQ drought contingency projects and thereby ensure security of supply in the face of the ongoing drought and significant population growth.

The 19 major urban surface water storages are operated by 12 separate owners. These are SEQWater, SunWater, local governments and a local government cooperative. From an efficiency and planning perspective, such diverse ownership and control is not ideal. The State has provided substantial funding to support the investment required in water infrastructure. While local governments have some capacity and willingness to invest and participate in the delivery of water infrastructure, Councils' funding capacity will not be sufficient to implement the full drought contingency program required by the region.

SEQ water demand and supply – the current situation

Regional growth has accelerated to the point where up to 60,000 new South East Queenslanders must be accommodated each year. Under this pressure, SEQ's current population of around 2.7 million will be swollen by more than 1.25 million by 2026, bringing the total to almost 4 million. Projections anticipate that this growth will reach 5 million by 2051.

Unrestricted existing urban and industrial water demands are about 480,000 ML/a. The early implementation of water use efficiency and customer side source substitution measures is likely to reduce SEQ urban and industrial demand projections by about 30,000 ML/a. With demand management measures, SEQ water demands are anticipated to be about 520,000 ML/a in 2026 and 710,000 ML/a in 2051. If high series population projections eventuate, the equivalent 2026 and 2051 demands are 590,000 and 1,100,000 ML/a.



Source: Data from "Water for South East Queensland: A Long Term Solution"

The effects of population pressure, protracted increased demand and climatic variability and change must be addressed if regional water supply is to match the needs of Queenslanders. While assessing the effects of population and demand is comparatively easy, those of climate change are far less certain. Climatologists cite a clear downward trend in regional rainfall over the past 30 years as possible evidence of climatic change. While the magnitude and nature of the

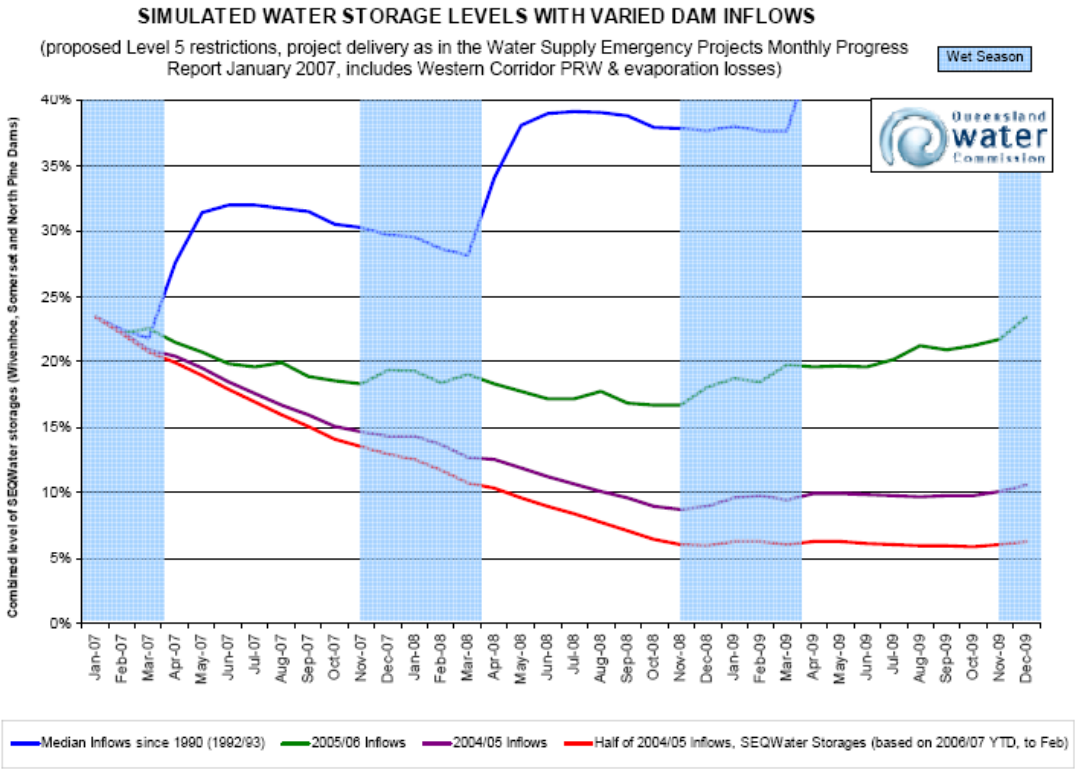
change are far from certain, we need to be prepared for the eventuality that our dams may yield less water than has been the case in the past.

The development of a SEQ Regional Water Supply Strategy in one form or another has been ongoing since the early 1990s. Three milestone documents produced over the past 15 years still have a significant bearing on planning directions in SEQ. These are:

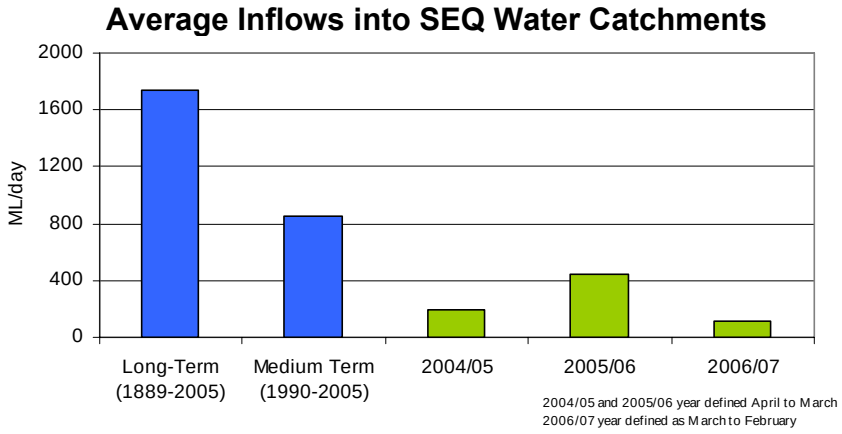
- The 1991 *SEQ Sources Study*, which identified the Wyaralong and Glendower dam sites and the possibility of raising Borumba Dam (Queensland Water Resources Commission 1991);
- The 1999 *SEQ Water and Wastewater Management and Infrastructure Study*, which analysed infrastructure augmentation requirements based on the then existing demands and existing yield assessments (GHD/Kinhill 1999). The study identified that there was a potential short-term need for infrastructure to be augmented in the Gold Coast to the Logan corridor. However, overall regional water availability was considered to be adequate over the medium to long-term and further work was delayed until 2003; and
- The 2004 Stage 1 *SEQ Regional Water Supply Strategy Report* (SEQ Regional Organisation of Councils and Department of Natural Resources and Mines 2004), which confirmed the need for new infrastructure in the southern areas, but more importantly highlighted there would be significant reductions in the historically determined yields of dams on the basis of hydrologic modelling undertaken to develop Water Resource Plans. This underscored the need for additional water supplies to support growth across SEQ.

Using data available at the time, all of these studies indicated that there were ample existing regional supplies well into the future. None of the studies predicted there was an impending water crisis, though there was an indication that Gold Coast would need to upgrade its water supplies by 2003 and progressively over the next twenty years there would need to be augmentation of water supplies for Toowoomba, Sunshine Coast, Beaudesert and the Brisbane metropolitan area. Significant surplus capacity was thought to exist in the Wivenhoe, Somerset and North Pine Dam system.

SEQ is currently experiencing the worst drought in more than 100 years. The Wivenhoe, Somerset and North Pine dams that supply more than 70% of regional demand south of Caloundra are at 20.5% of capacity in April 2007. Dams servicing Toowoomba and surrounding areas are at less than 15.5% of capacity. Strict water restrictions are in place across much of the SEQ region, with Level 5 restrictions applying from 10 April 2007.



The above chart indicates that had rainfall in the Wivenhoe, Somerset and North Pine catchments remained similar to recent history, dam levels, rather than diminishing to risky levels, would actually have increased. This clearly demonstrates that the impact of the drought on SEQ water supplies is dramatic and recent. Dam inflows from April 2004 to March 2005 were the worst full year on record and about 11% of the long-term trend in median historical inflows. However, the eleven month period from April 2006 to February 2007, has seen inflows into the major dams of Wivenhoe, Somerset and North Pine decline further. At the end of February the year to date inflows recorded into these storages were 56% of those recorded for the 2004/05 year.



Under past approaches to water supply planning, the worst droughts on record were used as a basis for establishing water infrastructure requirements and how well supplies would cope with the perceived climatic cycle. Restrictions were applied in times of severe drought.

It is now evident that existing policies on the security of supply need to be updated and a much more precautionary approach adopted. For large communities like those in SEQ, the social and economic consequences of supply failure are too devastating to contemplate.

Modelling indicates that the yield of the existing water supplies in SEQ should be de-rated to about 440,000 ML/a.

Because of rapid growth and development in SEQ and constraints on establishing any new major water source, it is critical that the Queensland Government identifies and preserves the region's best long-term sources of supply and prevents those sources from being made unsuitable through inappropriate development.

SEQ is heavily developed and few sound opportunities for additional surface and ground water supplies exist. Many of those that do exist have small catchments and therefore supplies obtained from them are inherently less reliable than can be achieved from dams commanding a larger catchment area. The comprehensive planning that has been undertaken by the Queensland Government to develop Water Resource Plans has highlighted the limitations on surface water availability that exist in SEQ, and clearly demonstrates how few opportunities there are to build dams in the future.

In summary, combined with the growing population, rainfall in SEQ has been well below average for the past six years. This has led to major storage 'deficits' in SEQ's water storages which will take well above average rainfall to restore.

The Queensland Government's response

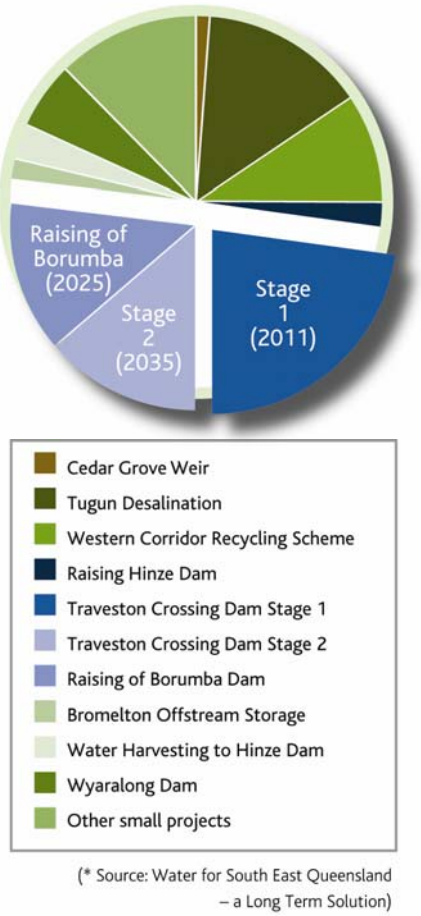
For regions with very large urban populations, the consequences of an unreliable supply or a failure of supply are unacceptable.

In order to meet the gap between supply and demand, it is not possible to rely on demand side measures alone. This is not only because of the inherent uncertainty in achieving demand side benefits, but also because the size of the gap between supply and demand is so large, especially when it necessary to identify and preserve in advance contingency supplies for very severe droughts. Long-term planning in SEQ must identify water infrastructure capable of meeting projected demands as well as non-climate dependent sources which can be developed in severe droughts.

The Queensland Government's response is a multi-faceted strategy, underpinned by significant analytical work. Traveston Crossing Dam is a critical element of this response, which also includes demand management strategies and SEQ Water Grid infrastructure under development.

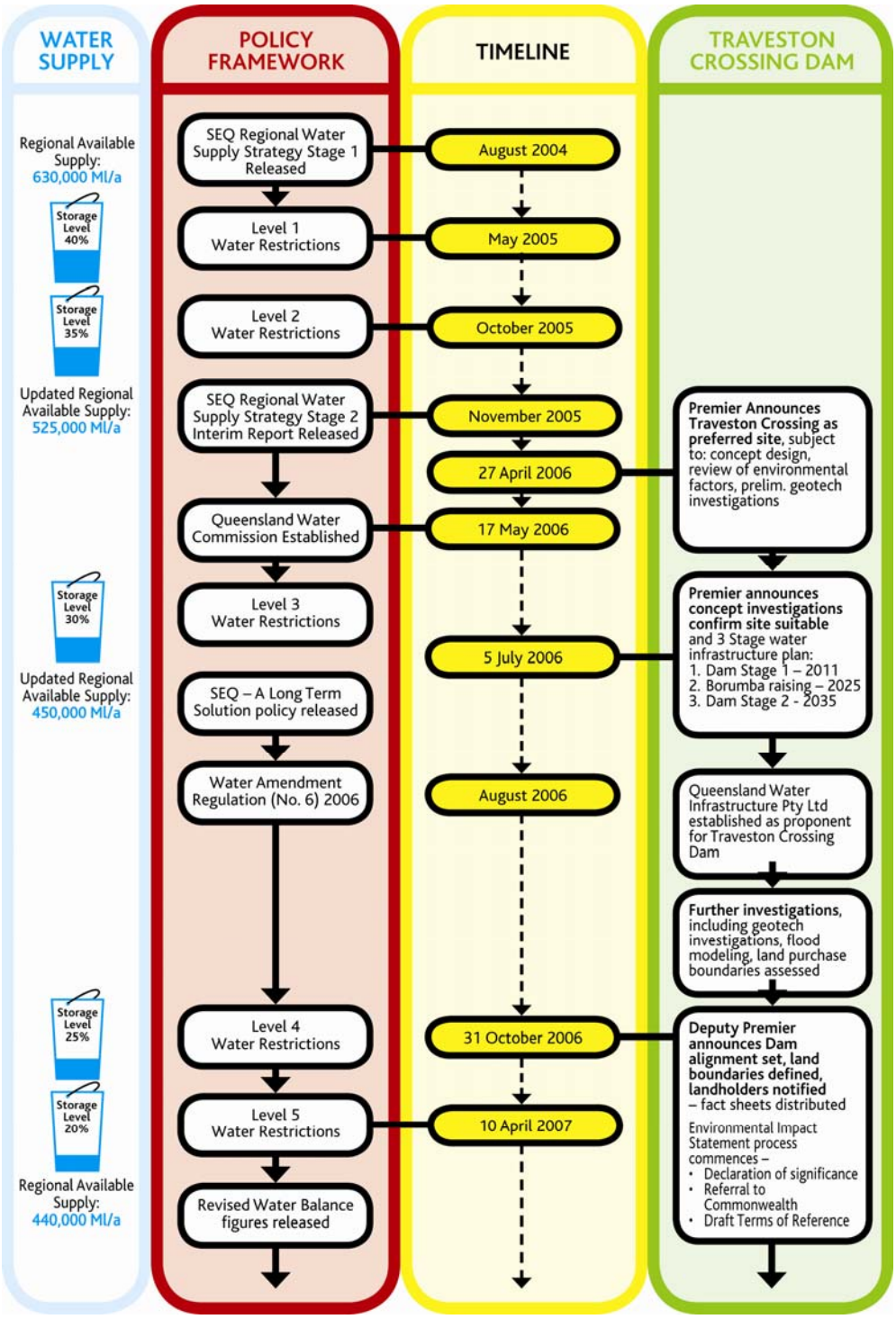
The following figure demonstrates that the proposed Traveston Crossing Dam Stages 1 and 2, in conjunction with the raising of Borumba Dam, will deliver approximately half of the additional water supply needed to meet expected demand by 2051.

Anticipated Yield of Proposed Infrastructure*



(* Source: Water for South East Queensland – a Long Term Solution)

The following diagram illustrates the relationship between the diminishing availability of regional water supplies, Queensland Government policy decisions on water supply and demand and decisions relating to the proposed Traveston Crossing Dam.



Demand management

The Queensland Government has implemented a range of initiatives that will ensure that the best use is made of available supplies, both as part of the drought response and longer term.

Business and industry

In consultation with stakeholders, the Queensland Government has implemented a package of measures that will deliver long-term savings for businesses while minimising risks to economic production and employment. Water intensive businesses are required to prepare water efficiency management plans to demonstrate the business is water efficient or how it plans to reduce its business water consumption by a minimum of 25% in the near future.

The Queensland Government has established a $40 million business water efficiency program to assist business implement water saving measures. This program is on target to yield water savings of approximately 8.4 million litres per day by May 2007. This is forecast to increase to savings of 20 million litres per day by May 2008.

Residents

In July 2006 the Queensland Government in partnership with the councils across SEQ established the Home WaterWise Service. The service subsidises the cost of having a licensed plumber install a range of water efficient devices, such as showerheads and kitchen taps and advise home owners about water saving strategies. Over 75,000 homes are on target to be retrofitted with water efficient devices by May 2007, yielding water savings of more than 4 million litres of water per day. More than 200,000 retrofits are anticipated by July 2008, saving up to 11.6 million litres per day.

In June 2006 the Queensland Government launched a series of rebate schemes to promote the take-up of water saving appliances. Rebates of up to $1000 are available for water tanks, $200 for four star water rated washing machines or better and $150 for dual flush toilets. In December 2006, a separate rebate scheme was introduced for defined garden products. The Queensland Government will provide a one off 50% rebate on the cost of approved plants and garden products up to $50.

The Queensland Government has committed over $50 million to the rebate programs. Rebates will be available statewide until June 2009.

Pressure and leakage management

Significant water savings up to 60 million litres of water per day can be achieved by reducing water loss resulting from leaking and burst water mains and pipes. The Queensland Government has expanded its subsidies to local government to accelerate the implementation of the pressure and leakage management program by councils. The Queensland Government will contribute a subsidy of 40% of capital costs up to $32 million.

Supply options and the Queensland Government's Infrastructure Program

SEQ urban communities rely on water from 19 surface water storages (dams and weirs) with limited use of ground water.

Historically, available supplies in SEQ total about 530,000 ML/a. This supply capacity has been de-rated as a result of the drought to about 440,000 ML/a.

Given the significant ramifications of running out of water, it is essential strategies are put in place in SEQ to ensure that the managers of water supplies can demonstrate that they are always in control and able to manage water supply risks. This includes the ability to deal with any unforseen climate variability and climate change circumstances.

It is clear that significant upgrades to supply are necessary across the region.

The main bulk supply options to meet the projected demands in SEQ are additional ground water supplies, desalination, recycling, and new dams and weirs.

A single solution to the long-term water needs of SEQ does not exist. A multi-faceted and diversified response is required. An effective suite of supply sources includes various options that are diverse in terms of their risk. This principle has been considered in making the decision on the forward program of infrastructure in SEQ.

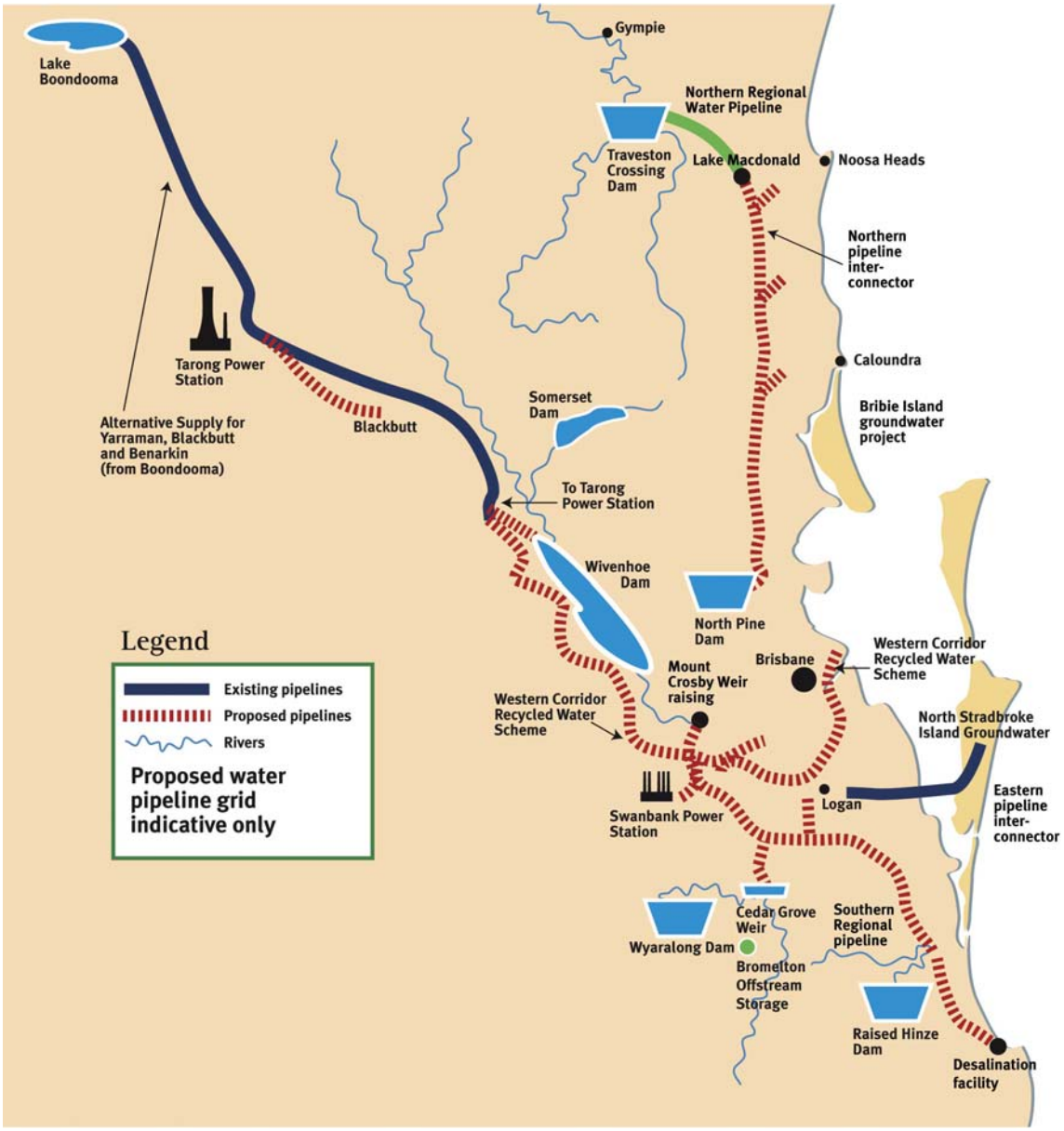
Infrastructure Program

The Queensland Government is fast-tracking a significant infrastructure investment program that is targeted at addressing both the immediate impacts of the drought, and also at securing long-term supplies of water for SEQ.

Central to the infrastructure component of the solution to the SEQ water situation is the concept of the SEQ Water Grid. The water grid will:

- provide a network of two-way pipelines to connect major bulk water sources in the region;

- allow water from areas of water surplus to be moved to areas that face a shortfall;
- allow risk to be managed at a regional level rather on a storage basis; and
- allow the coordinated use of all major SEQ water supply sources, including the Wivenhoe/Somerset system, Hinze Dam, the proposed Traveston Crossing and Wyaralong dams, the desalination plant at Tugun on the Gold Coast, and the Western Corridor Recycled Water Scheme.



A summary of the key elements of the infrastructure program is provided below.

Western Corridor Recycled Water Project

This project is a bulk recycled water supply initiative linking Luggage Point on Brisbane's east to Caboonbah in the north-west. It is Australia's largest water recycling project, the 3rd largest advanced recycled water treatment project in the world and the 4th largest recycled water scheme in the world. This water will be used by power stations, industrial users and possibly for agriculture, as well as providing additional supplies into Wivenhoe Dam to supplement potable water supplies.

The overall length of pipelines is approximately 200 km with a combined capacity to supply 210 ML/day of purified recycled water.

The stages of the project will involve:

- Stage 1A: An advanced water treatment plant at Bundamba will treat water from existing wastewater treatment plants at Bundamba and Goodna to supply Swanbank power station by 31 August 2007;
- Stage 1B: The advanced water treatment plant at Bundamba will be expanded to incorporate additional volumes of water from existing wastewater treatment plants at Oxley and Wacol. A pipeline will then link to Caboonbah for off-take to supply recycled water to Tarong power station. This stage is scheduled for completion in 30 June 2008; and
- Stage 2: Two new advanced water treatment plants to be constructed alongside existing wastewater treatment plants at Luggage Point and Gibson Island will provide larger volumes of purified recycled water for delivery to Wivenhoe Dam scheduled for completion by 31 December 2008.

SEQ (Gold Coast) Desalination Project

The SEQ (Gold Coast) desalination facility based at Tugun will desalinate seawater to a potable water standard. It will have the capacity to produce up to 125 ML/day for distribution across SEQ.

The project involves three components:

1. The desalination plant;
2. Intake and outlet tunnels; and

3. A 23 km network integration pipeline capable of transferring up to 125 ML/day from Tugun to Worongary and then connecting to the Southern Regional Water Pipeline.

The SEQ (Gold Coast) desalination plant is due for completion in November 2008.

Southern Regional Water Pipeline

This project comprises a bulk treated water supply network between Brisbane and the Gold Coast, linking Brisbane, Ipswich, Logan, and Gold Coast City Councils and Beaudesert Shire Council. The pipeline length is approximately 100 km. It will be built with two way flow capacity, ensuring water can be distributed to the most drought affected areas. The system will have capacity to transport up to 130 ML/day. It is due for completion in November 2008.

Northern Pipeline Interconnector

This pipeline will deliver 65 ML/day connecting Mary River (Noosa) and Landers Shute Water Treatment Plant (Baroon Pocket Dam) with the SEQ Water Grid at North Pine. It is based on sustainable access/connection to Baroon Pocket, Borumba and Ewen Maddock dams and the Landsborough aquifer.

The project includes up to 90 km of large diameter pipelines, a new water treatment plant at Ewen Maddock Dam, and capacity upgrades of the existing Mary River pumping station.

While the dam at Traveston Crossing would ultimately utilise the Northern Pipeline Interconnector to transport water to Brisbane, the project is progressing independently of the dam project, and is principally a means of delivering two way flow capability between water sources on the Sunshine Coast and Brisbane.

The project is due for completion by 31 December 2008.

Eastern Pipeline Interconnector

This pipeline will deliver 22 ML/day connecting Redland Shire bulk water sources with the SEQ Water Grid at Logan City (Kimberley Park), based on sustainable access to the North Stradbroke Island aquifer and Leslie Harrison Dam.

The project includes approximately 9 km of 600mm diameter pipelines, new reservoirs and pumping stations, augmentation of the existing water treatment plant on North Stradbroke Island, new central borefield and associated connecting pipelines.

Cedar Grove Weir

The proposed Cedar Grove Weir will be located on the Logan River, near Jimboomba, and will deliver approximately 7 ML/day. This weir will operate in conjunction with the Wyaralong Dam. The project is scheduled for completion in December 2007.

Bromelton Offstream Storage

This project will contribute at least 5,000 ML/a through water harvesting from the Logan River. It is scheduled for completion in December 2009.

Wyaralong Dam

The Wyaralong Dam on Teviot Brook, between Boonah and Beaudesert, is an integral element of the storage system in the Logan River basin comprising the Cedar Grove Weir and the Bromelton Offstream Storage. The Wyaralong Dam (in conjunction with the Cedar Grove Weir) will contribute 21,000 ML/a of the projected additional need for SEQ region by 2051, and its construction is due for completion by 2011.

QWI has been appointed by the Queensland Government to progress the design and construction of the dam. The project is currently in its preliminary stages as QWI undertakes geotechnical investigations and assesses likely environmental social and economic opportunities and potential impacts of the project ahead of commencing the formal assessment and approval processes.

	Completion
Anticipated annual yield:	21,000 ML/a
Elevation above sea level:	63.6 metres
Water depth at dam wall:	28 metres
Average depth: (in river channel)	14 metres
Average depth: full supply limit	8.3 metres
FSL Area:	1,230 ha
Total capacity:	103,000 ML
Scheduled completion:	By Dec 2011
Total project cost:	$500 million
Properties affected:	18

Completion	
Houses required:	Nil
Road relocation:	10.7 km

Traveston Crossing Dam

Because of the rapid development in SEQ and the difficulty in establishing any new major water source (whether it is surface water, ground water, desalinated water or recycled water), an imperative now is to identify and preserve the region's best long-term sources of supply and prevent them from being made unsuitable or uneconomic by continued development.

The Queensland Government proposes to develop water infrastructure in the Mary River catchment in three phases to provide 150,000 ML/a per year by 2035, specifically:

- construction of Stage 1 of the Traveston Crossing Dam by the end of 2011;
- raising the existing Borumba Dam by approximately 30 metres by 2025; and
- construction of Stage 2 of the Traveston Crossing Dam by 2035, as required by demand.

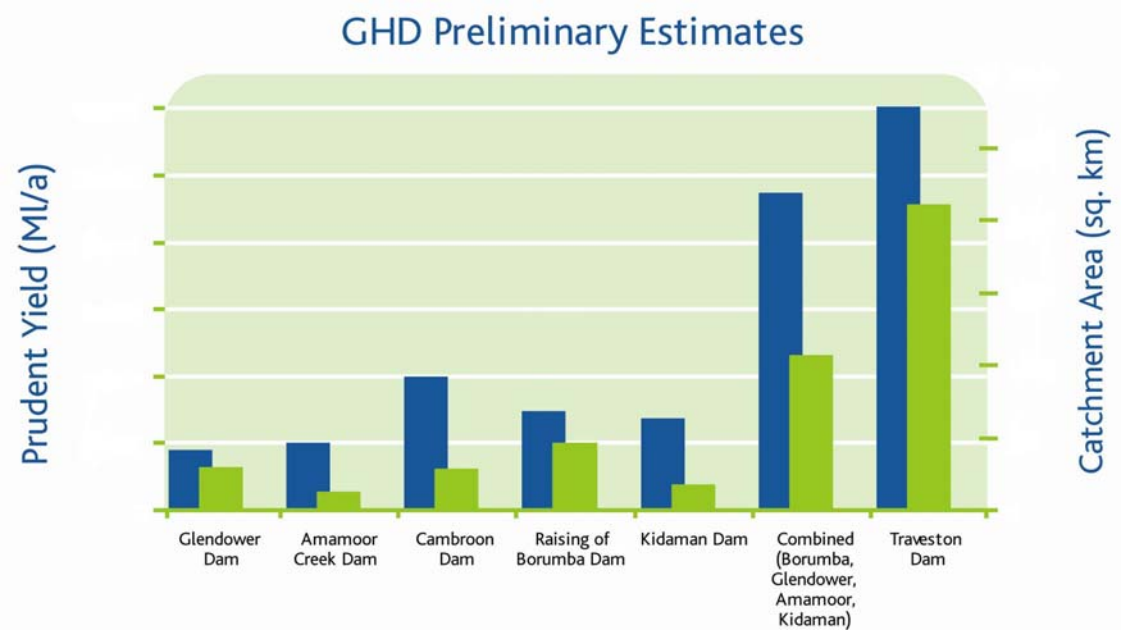
The Traveston Crossing Dam site is located on the Mary River at approximately Adopted Middle Thread Distance 207.6 kilometres, approximately 27 kilometres upstream of Gympie.

	Stage 1	**Stage 2**
Anticipated annual yield	**70,000 ML/a**	*110,000-150,000 ML (includes 70,000 from Stage 1)*
Elevation above sea level	**71 metres**	*79.5 metres*
Water depth at dam wall	**24 metres**	*32.5 metres*
Average depth (in river channel)	**12 metres**	*16.25 metres*
Average depth	**5 metres**	*8 metres*
Full supply area	**3,000 ha**	*7,135 ha (includes Stage 1 area)*
Total capacity	**153,000 ML**	*570,000 ML (includes Stage 1 capacity)*
Length of Mary River inundated	**36.5 km**	*50.7 km*
Properties affected	**332**	*597 (includes 332 from Stage 1)*
Houses required for dams and roads	**76**	*204 (includes 76 from Stage 1)*
Highway relocation	**11.94 km**	-
Road relocation	**37.29 km**	*69.63 km (includes 37.29 from Stage 1)*
Rail relocation	**-**	*3.99 km*
Scheduled completion	**2011**	*2035 (subject to SEQ demand)*

Based on extensive preliminary geotechnical investigations, the proposed site of the Traveston Crossing Dam is suitable for a design comprising a roller compacted concrete centre section, an earth embankment on the northern bank and concrete spillway on the southern bank. It is proposed that a fish passage device will also be incorporated into the dam design.

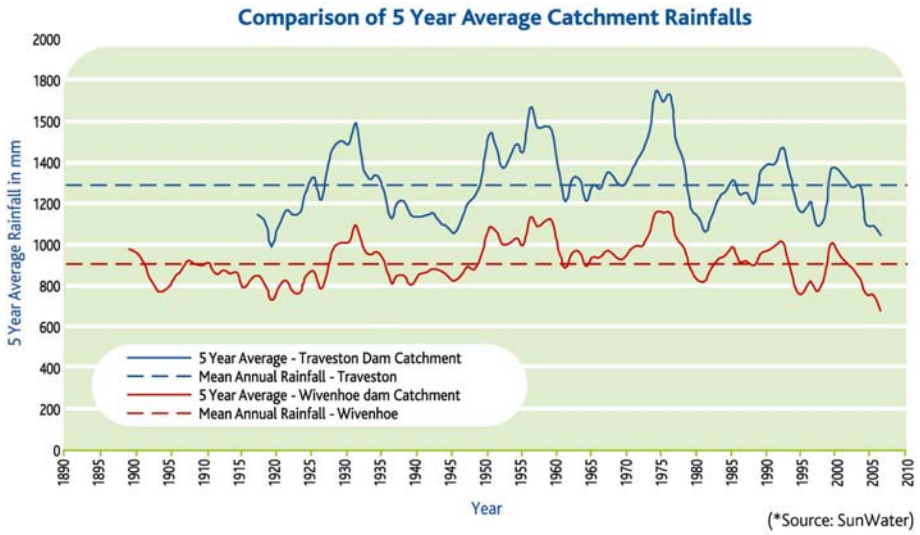
The detailed description of the project may change during the environmental impact assessment process as detailed designs are further developed from the original concept, and an assessment of environmental, social and economic impacts and mitigation measures are considered.

Traveston Crossing was selected as a site for further examination as a result of a detailed desk top study undertaken by independent expert advisers GHD. This study examined some 80 potential surface water sites throughout SEQ, and conclusively determined that the proposed Traveston Crossing Dam provides by far the largest yield and most secure potential future dam site in SEQ. This derives from the much greater catchment commanded by the dam site in a comparatively wet area as compared to other areas of SEQ.

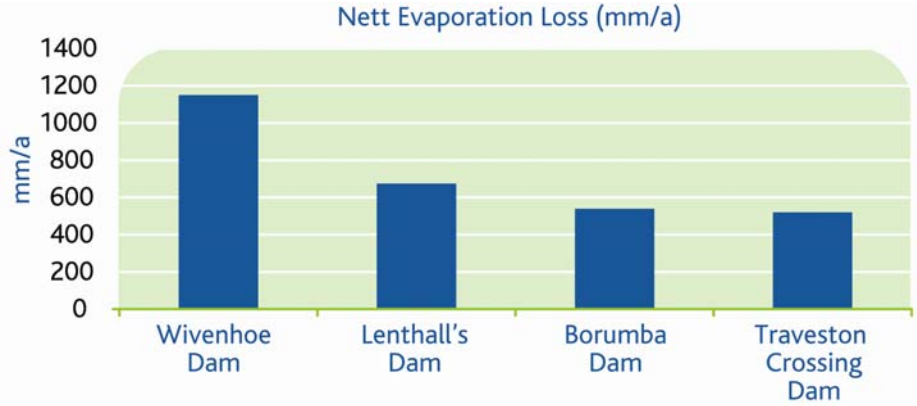


Traveston Crossing Dam has an upstream catchment area of some 2,000 square kilometres. The combined catchment area of any prospective alternative combination of dams that might be built in SEQ to deliver a similar capacity to Traveston Crossing Dam will be much smaller and produce much smaller inflows. For example, the combined catchment area of the potential Glendower, Amamoor Creek, Cambroon and Borumba Dams is 1,400 square kilometres. Combinations of the smaller dams alternatives would also result in dam levels being low for longer resulting in longer periods of restrictions.

The site is located within a coastal rainfall catchment, which provides for higher rainfall patterns than the Wivenhoe Catchment. The Upper Mary Valley is a hydrologically efficient catchment that receives up to 55% more rain on average than the Wivenhoe Dam catchment and has outperformed the Wivenhoe/Somerset system since 1913.

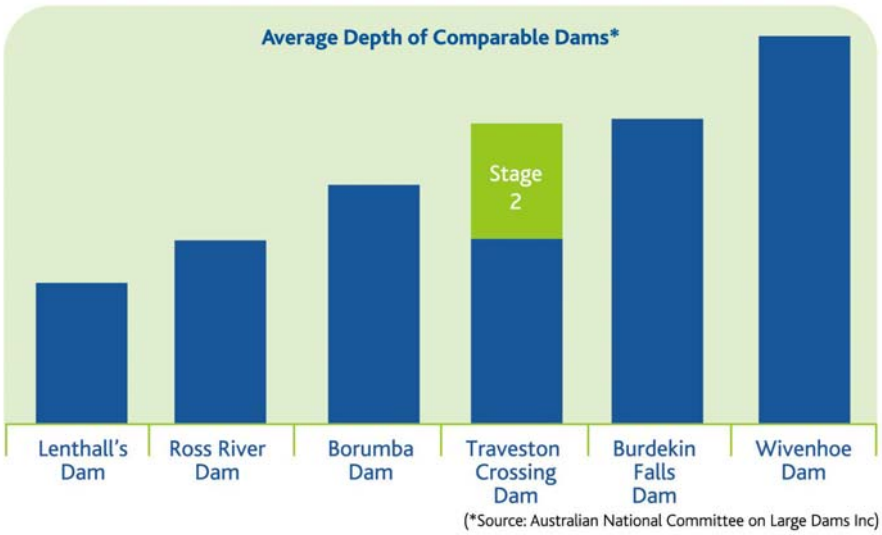


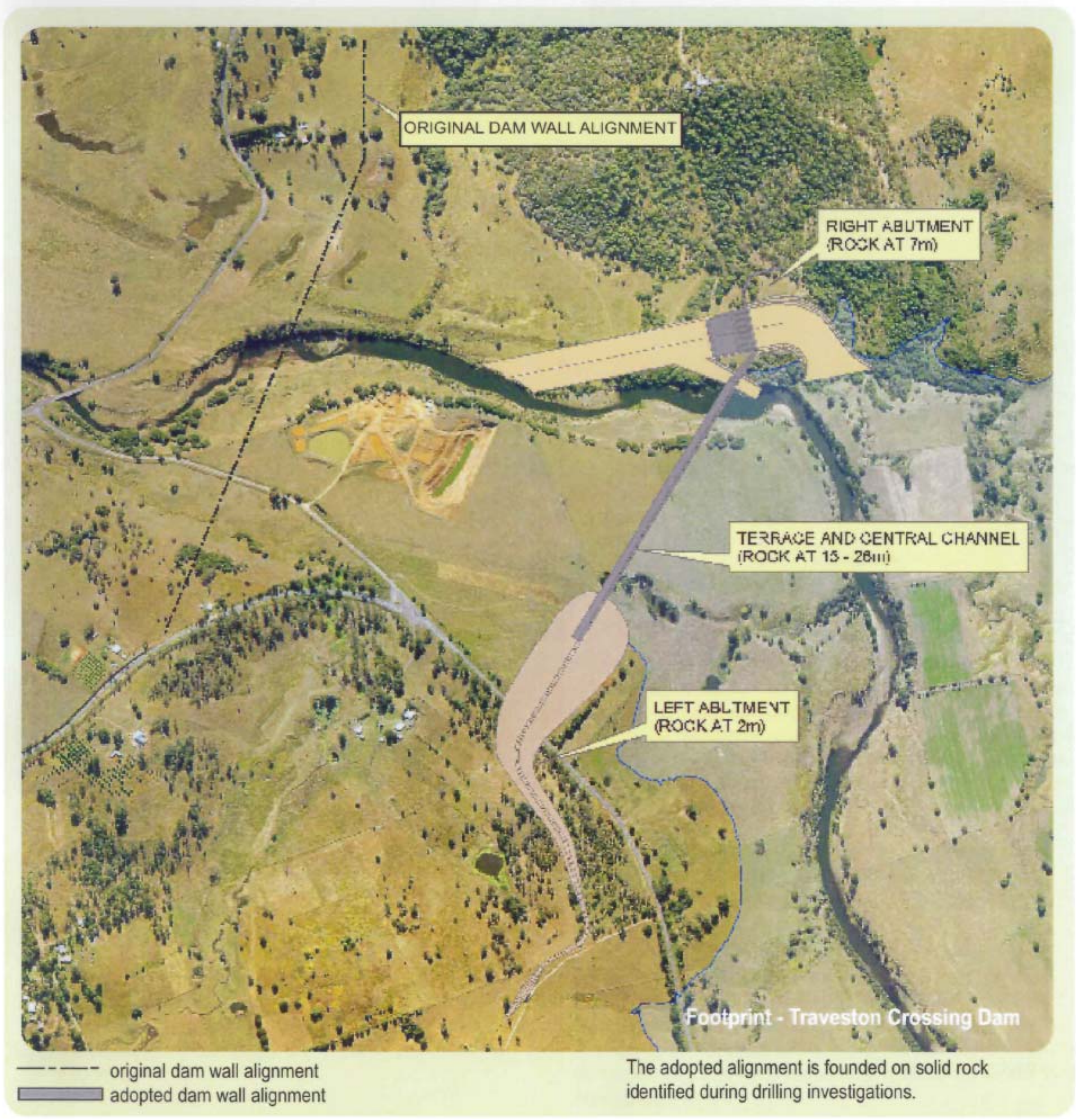
Recent hydrological investigations indicate that the Traveston Crossing Dam will be full or near full (defined as to within two metres of the Full Supply Level) more than 80% of the time. The proposed dam is of similar depth to a number of other Queensland dams, and, in addition, modelling suggests evaporation rates at Traveston Crossing Dam would be lower than at Wivenhoe Dam and Borumba Dam.



Storage	Nett Evaporation Loss (mm/a)	Period of Record
Wivenhoe Dam	1150	1993 - 2005
Lenthall's Dam	674	1976 - 2005
Borumba Dam	539	1976 - 2005
Traveston Crossing Dam	520	1975 - 2005

The overall average depth of the proposed Traveston Crossing Dam is 5 metres at Stage 1 and 8 metres at Stage 2 and is comparable to other major dams in Queensland is shown in the graph below.





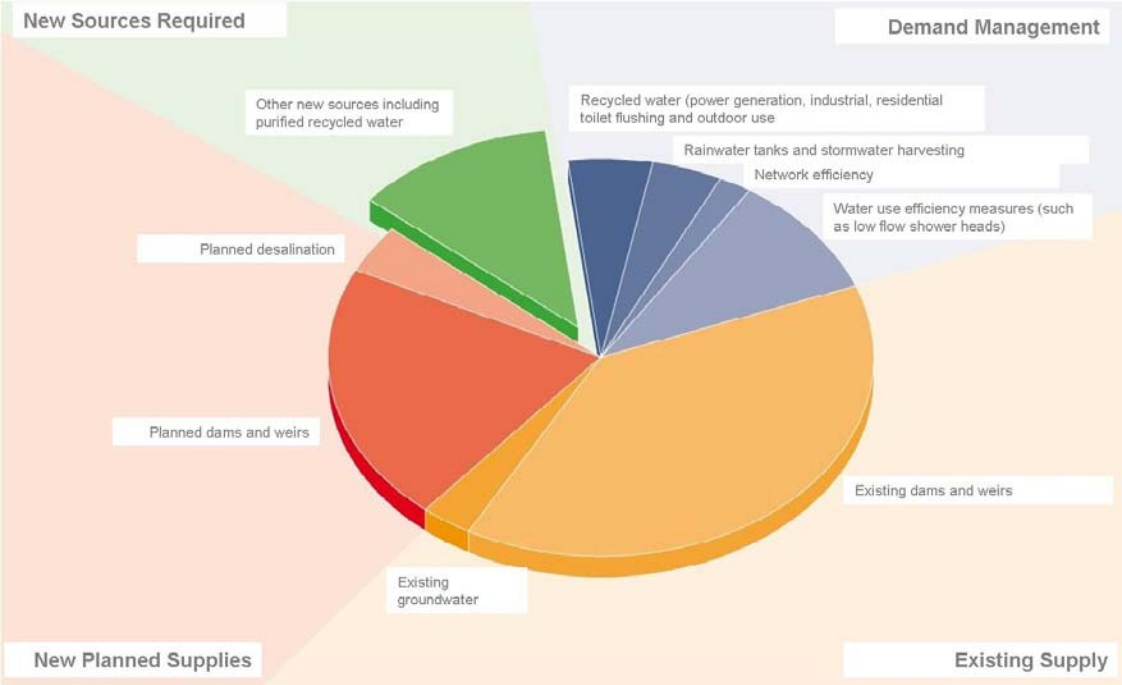
The Traveston Crossing Dam will have a significant beneficial impact on downstream lands in the Mary River Valley through the mitigation of adverse flood peaks and flood levels. Peak water levels in major recent floods would have reduced between 3.5-4.0 metres had Traveston Crossing Dam been in existence at the time. This would have significantly reduced the extent of flood damage.

*Actual flooding in Gympie CBD – 1999**

*Modelled flooding area in Gympie CBD 1999 – with the proposed Traveston Crossing Dam in place**

(*Source: SunWater)

In summary, the graph below demonstrates the break-up of water supply by source by 2051, with implementation of the currently proposed infrastructure program.



Environmental Impact Statement process

The proposed Traveston Crossing Dam and Wyaralong Dam will be subject to a rigorous and transparent assessment process before a decision is made on whether the project is able to proceed, and if so, under what conditions of approval.

Impacts of both the projects will be assessed by the Coordinator-General under Queensland's *State Development and Public Works Organisation Act 1971 (Qld)*, and will incorporate the assessment requirements of the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*. This assessment approach is in accordance with the Queensland-Australian Government Bilateral Agreement on Environmental Assessment and has been commonly used to assess a large number projects throughout Queensland. These projects will require approval by the Federal Minister for the Environment and Water Resources, after detailed and thorough investigations in the development of an EIS.

The development of an EIS to assess the environmental aspects and impacts of both the projects is being advanced by the project proponent, QWI. Strategies to manage any potential impacts will be developed as part of the EIS and incorporated into an Environmental Management Plan for the construction and operational life of the project.

In accordance with the *State Development and Public Works Organisation Act 1971* (Qld), the Coordinator-General has prepared draft Terms of Reference (ToR) for the EIS for the Traveston Crossing Dam project, which were circulated to key stakeholders and the general public for comment.

Submissions have been received in response to the exhibition of the draft ToR for the EIS, including submissions from government agencies, local councils, community groups and individuals. The Coordinator-General is currently considering all submissions in finalising the ToR, which are anticipated to be released in late April 2007.

QWI has commenced community consultation as part of the development of the EIS as required by Queensland and Australian legislation and the draft ToR. Community members have attended information days staged for the project to inform the public about the Environment Impact Assessment process and the opportunities for public involvement in the process.

Both EISs are currently under preparation by QWI, and is scheduled to be released for public comment by October 2007. The Coordinator-General will consider all submissions on the EIS, and may require the preparation of a supplementary report to the EIS to address issues arising from the public review.

On completion of each EIS and any supplement to the EIS (if required), the Coordinator-General will prepare an assessment reports for projects, including decisions on whether the project are able to proceed under Queensland legislation, and if so, under what conditions of approval. The project assessment reports, EIS and any supplementary information are considered by the

Federal Minister for the Environment and Water Resources, to inform the Minister's *Environment Protection and Biodiversity Conservation Act 1999* assessment decisions.

Management of Social and Economic impacts

The reality is that the construction of any dam will have direct social and economic impacts on the people living in the area of the dam, and most particularly those people whose properties are directly affected by the dam's inundation boundaries. The Queensland Government recognises that for these affected people, the decision to progress the dam can have a significant emotional impact as well as the potential for financial impacts. As a result, the Queensland Government has put into place a range of measures which attempt to minimise the potential negative impacts of the dam on local residents individually, and local communities more broadly.

The Queensland Government has made a firm commitment to treat all affected landowners fairly and with respect. QWI has developed a land purchasing policy to ensure that negotiations are fair and transparent and landowners are paid fair market value for their land, including provision for reasonable costs incurred as a result of selling their property to QWI.

The purchase price to be paid for will be negotiated based on valuation advice given to QWI. If they wish, landowners may also obtain an independent valuation. To ensure that landowners are not financially disadvantaged, QWI will also meet reasonable costs incurred by landowners in agreeing a sale. To provide certainty and minimise disruption for landowners, QWI aims to conclude purchases within approximately four months of commencement of negotiations.

In the event that QWI and landholders cannot agree on a fair and reasonable purchase price, as a matter of last resort, QWI would request the CG to initiate procedures for compulsory acquisition of the relevant land and a water storage and access easement (if required) under the provisions of the *State Development and Public Works Organisation Act 1971* (Qld). The process of compulsory acquisition entitles the affected landowner to an independent assessment of compensation by the Land Court. Compulsory acquisitions of properties will not commence until the required approval of the project has been obtained under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

For the Traveston Crossing Dam, in response to community feedback, the Queensland Government has agreed to purchase the land of any landowners potentially affected by Stage 2, even though Stage 2 will not impact until 2035 at the earliest. This provides a higher degree of certainty to those potentially affected landowners.

QWI has undertaken an extensive program of community consultations and is committed to continue with its consultation program as milestones in the project are reached. The elements of the consultations undertaken to date include:

- stakeholders briefings to community groups, elected representatives, indigenous groups and media;
- one on one consultations with residents;
- community information days;
- publication of fact sheets; and
- agency consultations (Commonwealth, State and Local).

The Queensland Government has established the Community Futures Task Force to address the significant social and planning issues linked to the need for land acquisition and the resulting population changes associated with the project. It is chaired by Major-General Peter Arnison, former Governor of Queensland. The Task Force's key responsibilities are to:

- address the immediate effects on individuals and communities arising from the proposals to build the dams;
- develop strategies to maximise the longer term opportunities presented by the proposed dams;
- undertake community engagement and provide regular information to the communities; and
- develop community and government linkages to address issues and impacts.

The Task Force has developed strategies to respond to the immediate and ongoing community needs in terms of:

- emotional support, information provision and access to government agencies for individuals and community groups;
- assistance to address the immediate needs of those businesses and workers affected by the proposal, and to identify opportunities for medium and long-term economic and business development;
- ongoing consultation with community members to develop sustainable land use and infrastructure planning options; and
- assistance for communities to document their cultural heritage and promote the area as a tourist destination.

A suite of projects are underway to address and offset impacts of the proposed dams on individuals and communities. Key projects include:

- community support strategies including one stop shops, provision of counselling services and community development activities;
- the Economic Futures Project for primary and non-primary industries;
- tourism development and marketing activities;
- the Land Use and Infrastructure Planning Study; and
- historical research projects for the Boonah and Cooloola communities.

Conclusion

The Queensland Government's water strategy prioritises the delivery of safe and reliable water supply for South East Queensland into the long-term. The provision of secure water supplies is fundamental to the needs of the existing and future population.

The planned Water Grid adopts a multi-faceted approach, including demand side management and the diversification of supply sources, comprising dams and weirs, desalination, recycling and ground water sources. The area covered by the construction of the major water infrastructure projects is vast. Whilst the projects will have an environmental and social impact, the need for a secure supply of reliable water is an essential requirement for the continuing prosperity and the economic growth and development of the State and South East Queensland.

1. INTRODUCTION

Summary

The SEQ region is experiencing the compound effects of drought and a booming population together with the prospect of continuing irregular rainfall due to natural climate variability and long-term climate change.

The current drought is the worst drought in more than 100 years with the inflows to the Wivenhoe, Somerset and North Pine Dam system in 2006 being the lowest on record. The extended drought has exposed the current high risks associated with existing water supplies in SEQ. This is in contrast to the outcomes of recent previous studies, most notably the *SEQ Regional Water Supply Strategy – Stage 1 Report* which had indicated that the existing supplies would be adequate to at least around 2018.

Without additional water supplies, the future economic growth and quality of life in SEQ will be severely affected.

1.1 Senate Committee Inquiry and Terms of Reference

The Senate Standing Committee on Rural and Regional Affairs and Transport (***the Committee***) has invited submissions to its inquiry into "Additional Water Supplies for SEQ – Traveston Crossing Dam" (***the Inquiry***). The Inquiry's Terms of Reference are to conduct:

"…an examination of all reasonable options, including increased dam capacity, for additional water supplies for SEQ, including:

(a) the merits of all options, including the Queensland Government's proposed Traveston Crossing Dam as well as raising the Borumba Dam; and

(b) the social, environmental, economic and engineering impacts of the various proposals."

This document is the Submission by the Queensland Government to the Inquiry. It incorporates input from all relevant Queensland Government agencies. In particular, this Submission incorporates the position of both the Queensland Water Commission (***QWC***) and Queensland Water Infrastructure Pty Ltd (***QWI***).

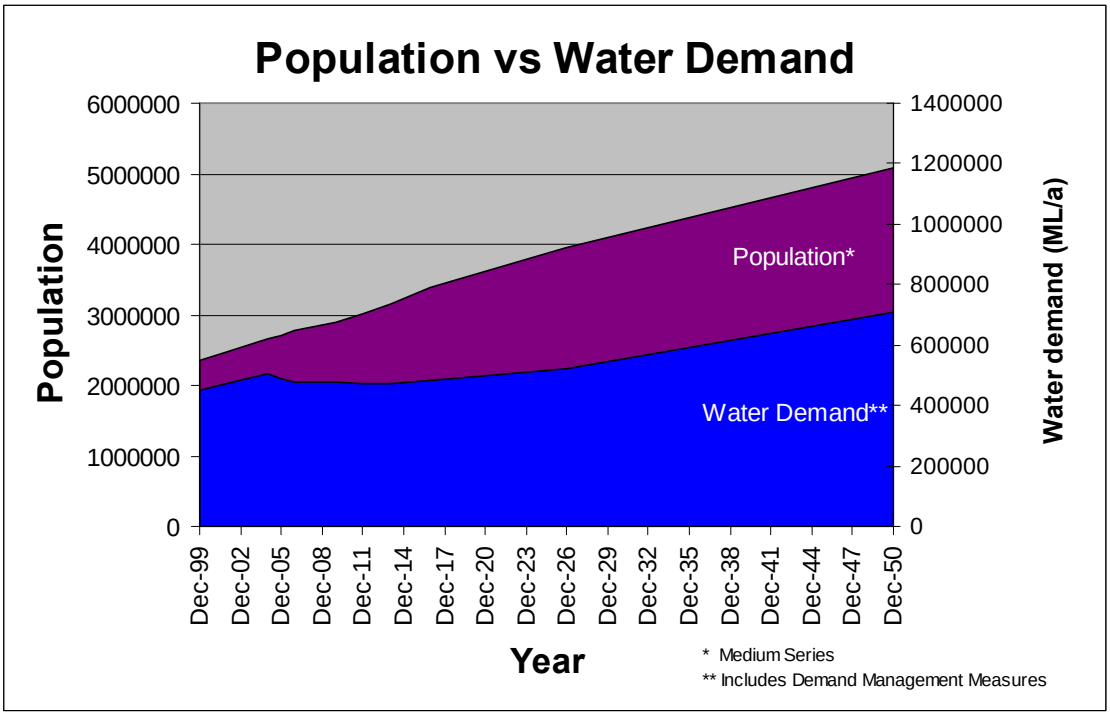
The terms of reference are broadly drawn and cover a wide range of issues concerning water resource policy and planning undertaken by the Queensland Government and its agencies to provide a secure long-term water supply to service the population of SEQ. In particular the Inquiry's terms of reference identify the Traveston Crossing Dam project proposed by QWI (and the associated raising of Borumba Dam) as a matter of specific importance to the Inquiry's review.

The Queensland Government would like the opportunity to provide a supplementary submission/s to the Committee to respond to matters raised by other parties appearing before the Committee or by Committee Senators in the course of the Inquiry, if required.

1.2 Overview

The SEQ region is experiencing the compound effects of drought and a booming population together with the prospect of continuing irregular rainfall due to natural climate variability and long-term climate change. SEQ has a vibrant regional economy which is driving an annual population increase of 50,000 to 60,000 people and an increasing demand for water.

Figure 1.1: Population versus Water Demand



Source: Data from "Water for South East Queensland: A Long Term Solution"

The current drought is the worst drought in more than 100 years with the inflows to the Wivenhoe, Somerset and North Pine Dam system in 2006 being the lowest on record. The extended drought has exposed the current high risks associated with existing water supplies in SEQ. This is in contrast to the outcomes of recent previous studies, most notably the *SEQ Regional Water Supply Strategy – Stage 1 Report* which had indicated that the existing supplies would be adequate to at least around 2018.

This drought has exposed the vulnerability of the region's water supplies previously thought to be secure and able to support long-term growth. Some dam levels are currently or have recently been at record lows.

It is now evident that existing policies on the security of supply need to be updated and a much more precautionary approach adopted. For large communities like those in SEQ, the social and economic consequences of supply failure are too devastating to contemplate.

The Queensland Government is committed to providing assured supplies of water to meet the needs of the existing population and that of growth and development in SEQ. The Queensland Government is endeavouring to promote the principles of best practice including strategies for reducing the demand for water and delivering water supplies in an economical and sustainable way that best meets the long-term water needs of the State.

Developing the final regional water supply strategy for SEQ is a significant task. The area covers 22,420 square kilometres and incorporates 18 local government areas. It stretches 240 km from Noosa in the north, to the New South Wales border in the south, and 140 km west to Toowoomba.

Any strategy for meeting the short, medium and long-term water supply needs of the region must be achievable and practical and must not expose the community to risk of a failed water supply and the associated unacceptable social and economic consequences.

While there is exposure to a high risk situation at the present point in time, strategies must be implemented for the timely and orderly introduction of new water supplies and management of demand with restrictions such that social and economic consequences are tolerable. The current levels of restrictions with dam levels approaching 20% of available supply are beginning to impact harshly on the urban, industrial and rural sectors.

The Queensland Government has put in place such a series of strategies aimed at minimising the likelihood of these circumstances occurring in the future. To achieve this

outcome, the Queensland Government has committed to a long process of regional planning, water planning and institutional reform to deliver coordinated, safe and secure water supplies. It is also delivering a substantial infrastructure program over the next 5 years, as well as addressing demand management.

In the development of these strategies, there has been extensive collaboration with local government. The best available processes and technologies have been used. This applies to land management, population and demand projections used in the region, and assessments of supply availability and processes to balance supply and demand.

Population projections and distribution underpinning the SEQ Regional Plan and projections and distributions updated more recently have been used in estimating demands.

Competitive processes were used to identify the best methodology available at the time for predicting demands. The methodology offered by the consulting engineers engaged was clearly the most advanced. Agreement has subsequently been reached with local government on the projected demands. The Queensland Government is aggressively implementing a range of least cost, demand side initiatives to help secure SEQ's water supplies both in the short and long term.

Comprehensive daily time step hydrological modelling have underpinned the water resource planning which is being undertaken in Queensland in response to requirements under the NWI. Without doubt, the water resource planning that is being undertaken in Queensland is as advanced as anywhere in Australia and the methodologies have been peer reviewed. The plans that have been produced are reflective of local circumstances and requirements. There has been extensive consultation in the development of such plans and the best available science has been used to guide decision making. Ultimately, the WRPs reflect the decision of the Queensland Government about the best balance between social, economic and environment needs. The WRPs influence where we can develop our water supplies.

Surface water resources in the southern areas of SEQ are already heavily developed and few new sound water development opportunities exist. Most of those that do exist have small catchments and therefore supplies obtained from them are inherently less reliable than can be achieved in dams commanding a larger catchment area. The comprehensive planning that has been undertaken by the Queensland Government to develop the WRPs has highlighted the limits on surface water availability that exist in SEQ and how few opportunities there are to build dams in the future.

Because of the rapid development in SEQ and the difficulty in establishing any new major water source whether it is surface water, ground water, desalinated water or recycled water, an imperative now is to identify and preserve the region's best long-term sources of supply and prevent them from being made unsuitable or uneconomic by continued development.

In respect of the security of our water supplies, the methodologies applied have been consistent with the recently developed LOS approach recommended by the WSAA.

Local impacts are important and must be addressed. That is why the CFTF, led by Major General Peter Arnison, has been established.

The QWC has been established to coordinate the use of available water supplies. The QWC has proposed a range of measures including the establishment of the Water Grid Manager to make best use of SEQ water supplies.

Previous processes requiring the coordination of the efforts of councils and several water service providers were not appropriate in the context of the current drought requiring responsive decision making. Increasing difficulty was being experienced with processes to identify, develop and pay for increasingly more expensive new water supplies.

New arrangements were needed and in the interim the Queensland Government has taken the lead and made significant strategic decisions about the management of future water demands and the provision of new water supplies where an impending unprecedented crisis was looming.

All the measures currently being implemented are needed if SEQ is to be assured of recovering from the current severe water restrictions within the short to medium term. On the basis of the Federation drought (1898-1912) and the potential impact of climate change, the current drought is only 6 years into a drought that could extend for much longer. The Queensland Government must plan for this outcome.

The depletion of existing supplies and consequential short to medium term reduction in available secure supplies requires the early development of additional future supplies to reduce the likelihood of extended severe water restrictions. It needs to be recognised that it could take many years before dam levels recover and the yields previously taken from SEQ dams can again be extracted.

1.3 Potential Impact of Water Shortages

Without additional water supplies, the future economic growth and quality of life in SEQ will be severely affected. SEQ is of major economic and social importance to Queensland and Australia. The gross regional product of SEQ is currently around $100 billion (ACIL Tasman 2006). This is around 60% of the State's gross state product or 11% of Australia's gross domestic product (OESR 2005; ABS 1999). The region also accounts for approximately 36% of the State's exports (OESR 2004). The region generates 70% of all of the state's employment in the services sector, and 67% of the state's employment in the manufacturing sector.

If Queensland is to continue to grow, SEQ will require significant quantities of additional highly reliable water supplies. It has been estimated that if SEQ has sufficient water to meet expected growth, its gross regional product could double by 2020 (ACIL Tasman 2006). The bulk of this growth will be driven by the services and manufacturing sectors. Without the provision of extra water for SEQ, this growth will not be possible.

The cumulative impact for the period from 2010 to 2020 of not providing extra water has been estimated, depending on assumptions, as a loss of between $55 billion and $110 billion to the regional economy (ACIL Tasman 2006). This loss would be accompanied by lost employment opportunities in the region and the State. A failure to provide adequate water into the future would have serious impacts on industry, families and young new job seekers.

Without additional supplies of water the region will be forced to endure long-term restrictions on supply. Such long-term restrictions would impact on the benefits supplied by public parks, sporting activities, and residential gardens. They may also have severe impacts on the way water is used indoors. This means that without additional water supplies there are likely to be numerous adverse social impacts, even with the adoption of new water efficient technologies and substitute sources.

1.4 Structure of Document

In very broad terms, this Submission can be regarded as a three part document.

Chapters 2-5 provide a clear outline of the current circumstances facing water supply and demand in SEQ, and importantly provide detail as to the methodologies adopted by the relevant Queensland Government agencies in undertaking the detailed analysis that has led to the decisions the Queensland Government has made in response to the worsening water supply situation.

Chapter 6 provides an overview of the Queensland Government's response. This chapter demonstrates that the response of the Queensland Government is multi-faceted across the demand and supply sides of the equation.

Chapters 7-12 discuss in detail the Traveston Crossing Dam proposal. Chapter 7 provides the basis for the selection of the Traveston Crossing site. Chapter 7 also examines some of the most prominently identified alternative surface water options, and establishes why these sites are demonstrably inferior to Traveston Crossing as a long-term source of secure water supply for SEQ. Chapter 8 describes in detail the key characteristics of the proposed Traveston Crossing Dam. Chapter 9 describes the key characteristics of the Wyaralong Dam. Chapter 10 addresses the regulatory and approvals processes that must be complied with prior to any final approval of the Traveston Crossing Dam and explains the distinct roles of different agencies within the approvals processes. Chapter 11 focuses on the environmental approvals and assessment process. Chapter 12 addresses the Queensland Government's approach to managing the community and social impacts which by its very nature any proposal like the Traveston Crossing Dam will generate.

In summary, this Submission concludes that:

- SEQ is facing unprecedented circumstances with the worst drought in 100 years and significant population growth. These circumstances, particularly rainfall in bulk storage catchments, have deteriorated recently and rapidly.
- In response, the Queensland Government has developed a multi-faceted strategy, underpinned by significant analytical work. This response also incorporates demand management strategies and a major infrastructure program, which includes as well as new surface water sources, includes a major desalination plant, introduction of purified recycled water, and the development of the SEQ Water Grid, a network of water transmission pipes that will allow water to be delivered from different sources to the point of most need.
- A single solution to the long-term water needs of SEQ does not exist. While desalination, recycling and demand management will constitute important components of the response to current water supply circumstances and future needs, there is a clear need to secure and develop high yield surface water storages.
- Traveston Crossing Dam's location was selected as a preferred site through a broad ranging regional assessment process. It is clearly the highest yield surface

water supply option available in SEQ. Since its selection, technical analysis has confirmed the appropriateness of this location from an engineering perspective.

- All major water projects will undergo stringent environmental review. In the case of the proposed Traveston Crossing Dam, this requires that an EIS be prepared. The EIS process is under way, and will be subject to rigorous review, in conjunction with the Commonwealth.
- The decision to investigate construction of a dam at Traveston Crossing has created a range of social and economic issues that cause difficulty and anxiety for the affected community, individuals and businesses. The Queensland Government is cognisant of this and, through a range of mechanisms, is making every effort to comprehensively and sensitively address these matters.

2. WATER SUPPLY CHALLENGES

Summary

SEQ dams were close to 100% capacity in 2001. However, SEQ is now experiencing the worst drought in more than 100 years and the Wivenhoe, Somerset and North Pine dams that supply more than 70% of regional demand south of Caloundra are at 20.5% of capacity in April 2007. Dams servicing Toowoomba and surrounding areas are at less than 15.5% of capacity. Strict water restrictions are in place across much of the SEQ region.

SEQ is the fastest-growing region in Australia with more than 1,000 people moving into the region every week. This level of growth is placing high demand on the region's natural resources, urban systems, infrastructure and services.

Planning for water supply involves consideration of a number of factors which are inherently uncertain, notably, population projections, demand projections, rainfall and climate variability.

2.1 Drought

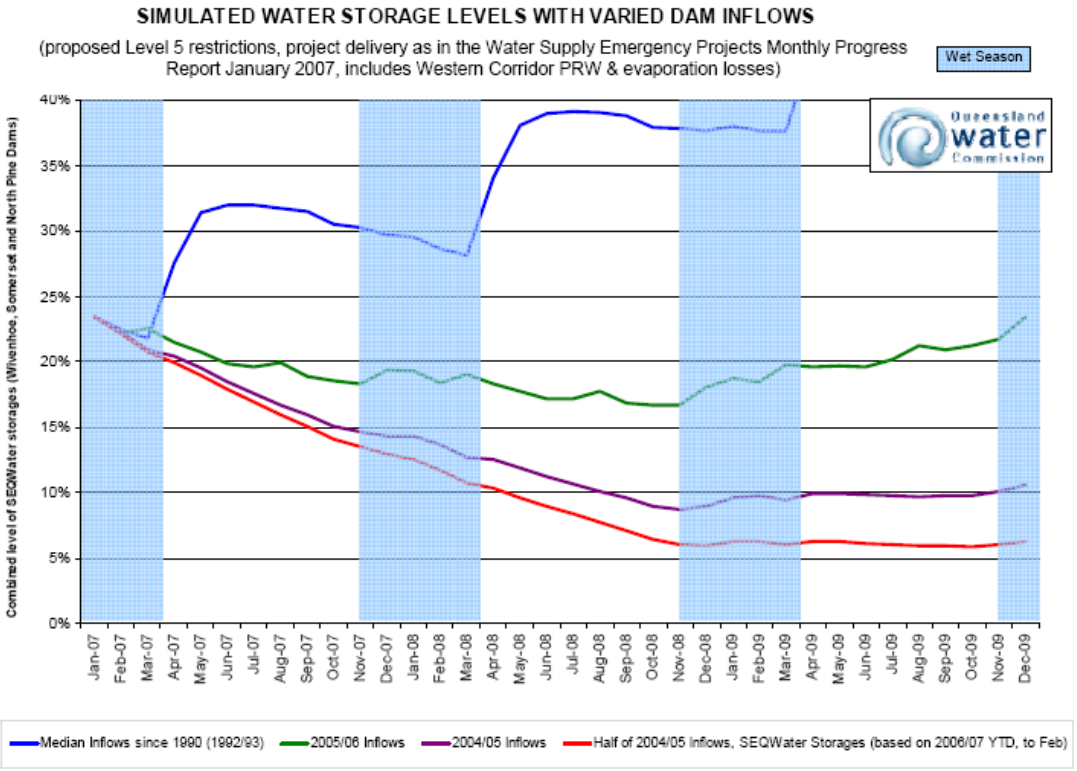
SEQ dams were close to 100% capacity in 2001. However, SEQ is now experiencing the worst drought in more than 100 years. The Wivenhoe, Somerset and North Pine dams that supply more than 70% of regional demand south of Caloundra are at 20.5% of capacity in April 2007. Dams servicing Toowoomba and surrounding areas are at less than 15.5% of capacity. Strict water restrictions are in place across much of the SEQ region.

The Queensland Government is undertaking a diverse range of projects that will ensure that adequate supplies are maintained even if the drought continues indefinitely, including construction of a desalination plant at Tugun on the Gold Coast and the Western Corridor Recycled Water Project.

Figure 2.1 illustrates forecast dam levels with continued low inflows including the drought regulation projects. Dam inflows from April 2004 to March 2005 were the worst full year on record and about 11% of the long-term trend in medium historical inflows at the Wivenhoe, Somerset and North Pine Dams as indicated in Figure 2.2. Figure 2.2 also indicates that the 2006-2007 inflows into the Wivenhoe/Somerset system is likely to be the worst on record. If this eventuates, the two worst years on record will have occurred during this current drought.

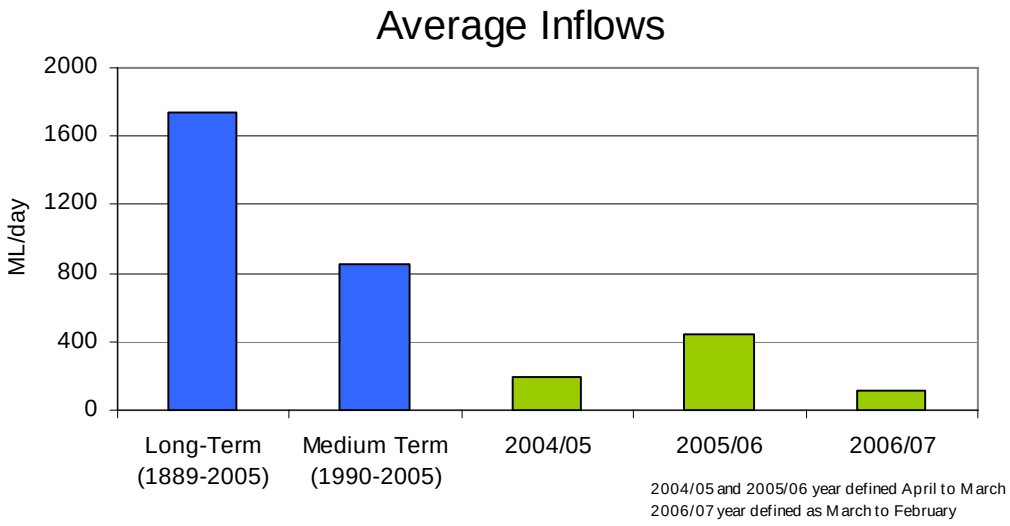
However, the eleven month period from April 2006 to February 2007 has seen inflows into the major dams of Wivenhoe, Somerset and North Pine decline further. At the end of February the year to date inflows recorded into these storages were 56% of those recorded for the 2004/05 year. These reduced inflows are being used as the basis for contingency planning.

Figure 2.1: Water Storage Levels



The above chart indicates that had rainfall in the Wivenhoe, Somerset and North Pine catchments remained similar to recent history, dam levels, rather than diminishing to risky levels, would actually have increased. This clearly demonstrates that the impact of the drought on SEQ water supplies is dramatic and recent. Dam inflows from April 2004 to March 2005 were the worst full year on record and about 11% of the long-term trend in median historical inflows. However, the eleven month period from April 2006 to February 2007, has seen inflows into the major dams of Wivenhoe, Somerset and North Pine decline further. At the end of February the year to date inflows recorded into these storages were 56% of those recorded for the 2004/05 year.

Figure 2.2: Average Inflows to Wivenhoe, Somerset and North Pine Dams (QWC, 2007)



The above graph demonstrates clearly the extreme reductions in inflows to the key SEQ surface water supply system, over the last 3 years, as compared with even recent historical averages.

2.2 Population growth

SEQ is the fastest growing region in Australia with more than 1,000 people moving into the region every week. This level of growth is placing high demand on the region's natural resources, urban systems, infrastructure and services.

Under the medium series projection, the population is forecast to increase from 2.7 million people in 2006, to 4.0 million people in 2026, and 5.1 million people in 2056. Under the high series projection, the population is forecast to increase to 4.3 million people in 2026 and 6.2 million people in 2056.

Table 2.1: Current population projections for SEQ region (PIFU and Department of Local Government, Planning, Sport and Recreation; derived from ABS data)

Year	Medium series projections	High series projections
2006	2,780,000	2,780,000
2016	3,025,000	3,519,000
2026	3,960,000	4,322,000
2051	5,080,000	6,243,000

2.3 Uncertainties in water supply planning

Planning for water supply involves consideration of a number of factors which are inherently uncertain, notably:

- population projections, which are dependent on births and deaths and population shifts. Population forecasts are inherently uncertain and in recent years have been the subject of constant upward revisions;
- demand projections, which are based on residential, commercial and industrial water usage, cannot be predicted with a high degree of certainty. This is particularly so where the projections include assumptions about the rate at which demand reduction measures will be adopted by water users; and
- rainfall and climate variability, while one can predict what may occur in what will happen in the short-term with a fair degree of certainty, the degree of certainty reduces as the period of time the subject of the prediction is extended.

Water supply planning must be able to deal with these uncertainties, and in particular, the potential for there to be higher population, higher water usage and less rainfall than projected.

3. PLANNING FOR GROWTH IN SEQ

Summary

Because of rapid growth and development in SEQ and constraints to establishing any new major water source, whether it is surface water, ground water, desalinated water or recycled water, it is critical that the Queensland Government identifies and preserves the region's best long-term sources of supply and prevents those sources from being made unsuitable or uneconomic through inappropriate development.

No recent studies predicted the prospect of the current water crisis.

The Queensland Government has driven a comprehensive planning framework, comprising the SEQ Regional Plan, the SEQRWSS, the SEQLTS and WRPs.

3.1 Past Planning Studies

The development of a SEQ Regional Water Supply Strategy in one form or another has been ongoing since the early 1990s. Three milestone documents produced over the last 15 years still have a significant bearing on planning directions in SEQ. These are:

- the 1991 *SEQ Sources Study*, which identified the Wyaralong and Glendower dam sites and the possibility of raising Borumba Dam (Queensland Water Resources Commission 1991);
- the 1999 *SEQ Water and Wastewater Management and Infrastructure Study*, which analysed infrastructure augmentation requirements based on the then existing demands and existing yield assessments (GHD/Kinhill 1999). The study identified that there was a potential short-term need for infrastructure to be augmented in the Gold Coast to the Logan corridor. However, overall regional water availability was considered to be adequate over the medium to long-term and further work was delayed until 2003; and
- The 2004 Stage 1 *SEQ Regional Water Supply Strategy Report* (SEQ Regional Organisation of Councils and Department of Natural Resources and Mines 2004), which confirmed the need for new infrastructure in the southern areas, but more importantly highlighted there would be significant reductions in the historically determined yields of dams on the basis of hydrologic modelling undertaken to

develop WRPs. This underscored the need for additional water supplies to support growth across SEQ.

Using data available at the time, all of these studies indicated that there were ample existing regional supplies well into the future. None of the studies predicted an impending water crisis, although there was an indication that Gold Coast would need to upgrade its water supplies by 2003 and progressively over the next twenty years there would need to be augmentation of water supplies for Toowoomba, Sunshine Coast, Beaudesert and the Brisbane metropolitan area. Significant surplus capacity was thought to exist in the Wivenhoe, Somerset and North Pine Dam system.

SEQ is currently experiencing the worst drought in more than 100 years. The Wivenhoe, Somerset and North Pine dams that supply more than 70% of regional demand south of Caloundra were at 20.5% of capacity in April 2007. Dams servicing Toowoomba and surrounding areas were at less than 15.5% of capacity. Strict water restrictions are in place across much of the SEQ region, with Level 5 restrictions applying from 10 April 2007.

3.2 SEQ Regional Plan

Released in 2005, the SEQ Regional Plan provides a framework for managing the challenges associated with rapid population growth.

To achieve the vision and the desired outcomes for SEQ, the SEQ Regional Plan proposes to manage growth and change through appropriate policies and the timely provision of infrastructure and employment. Water and energy use is a key focus of attention.

In particular, the SEQ Regional Plan sets the following targets for residential water use:

- 270 litres per person per day by 2010;
- 250 litres per person per day by 2015; and
- 230 litres per person per day by 2020.

250 litres per person and 230 litres per person per day represent approximately the medium savings and high savings scenarios in the demand projections undertaken as part of the preparation of the SEQ Water Strategy (refer section 4).

The Infrastructure Plan outlines the Queensland Government's infrastructure priorities to support the SEQ Regional Plan. It establishes priorities for regionally significant

infrastructure over the next ten years, but also considers the longer-term planning horizon of the SEQ Regional Plan.

The 2006 edition of the Infrastructure Plan envisions approximately $66 billion of infrastructure over the period to 2026 to provide the necessary infrastructure to sustainably manage growth and enhance access to services and facilities. It states that the total estimated cost of water infrastructure required over the next 5 years is expected to be up to $7 – 8 billion.

The Infrastructure Plan gives direction and momentum to Queensland Government infrastructure and services investment in the SEQ region up until 2026. In developing the Infrastructure Plan, the Queensland Government ensures that:

- the SEQ Regional Plan priorities are reflected in the Queensland Government budget process;
- the SEQ Regional Plan priorities are included in the infrastructure and services planning of key state agencies;
- the annual investment cycle is adequately informed by data on economic, demographic and development industry performance;
- there is effective coordination, planning and service provision by relevant State agencies and Government owned corporations; and
- there is effective coordination of planning and infrastructure investment with local governments across the region.

3.3 SEQ Regional Water Supply Strategy

The Queensland Government is committed to ensuring that water supplies in SEQ are sufficient to meet demand and are managed on a sustainable and integrated basis, consistent with the SEQ Regional Plan.

This integration is being achieved through the development and implementation of the SEQ Water Strategy in partnership with the SEQ Council of Mayors and the bulk water providers. Scheduled for release in mid-2007 for consultation, the SEQ Water Strategy will provide a framework for the development of the future water supply system.

The overriding intent of the Strategy is to ensure that the region has a world class water supply that is safe, secure, sustainable, and can meet anticipated needs for the next fifty years responsibly and efficiently.

The SEQ Water Strategy has been developed in two stages. The SEQRWSS *Stage 1 Report,* completed in 2004, provided important baseline information.

The SEQRWSS *Stage 2 Interim Report,* released in January 2006, outlines the approach needed to ensure water supplies meet our short and medium term water needs. It also provides details of short-term priority projects and contingency planning initiatives to be commenced in the period 2005 to 2009, and lists committed medium term (2010 to 2020) and possible long-term (2021 to 2051) initiatives.

While refining medium and long-term planning with the planning framework described above, responses to the short-term challenges presented by the region's current drought are well underway.

To ensure adequate supplies are maintained, the Queensland Government is working with QWC, SEQWater, SunWater and SEQ councils to develop and implement the large range of emergency projects and other drought contingency measures detailed in the *Water Amendment Regulation (No. 6) 2006*. These emergency projects and other measures (such as water restrictions) are collectively designed to ensure ongoing water supply in the event that the current drought continues.

The *Water Amendment Regulation (No.6) 2006* provides a coordinated set of actions to be undertaken by a number of State and local government entities and provides details on project measures, outcomes, timelines and target water volumes to be achieved.

Service providers develop monthly progress reports on their projects for publication on the QWC website.

3.4 Water for South East Queensland: A long-term solution

The SEQLTS was published by the Queensland Government in mid 2006 to outline the rationale behind a series of water infrastructure announcements and to provide background material on which decisions have been based.

SEQLTS drew on work undertaken for the SEQRWSS. This was in recognition of the scale of the work being undertaken and the fact that the timelines needed to complete the full development of the SEQRWSS were not congruent with the responses needed in the current drought.

SEQLTS presents a comprehensive range of measures designed to meet future demands for water in SEQ to about 2051. The document summarises the water sources

for SEQ, supply-side measures being or to be implemented, and a range of demand management initiatives.

While the document summarising the Government's position provides significant direction for the future, it is intended that service levels, demand management, future sourcing requirements, supply distribution and operating arrangements be finalised through the completion of the SEQRWSS under the direction of the QWC.

SEQLTS draws together material resulting from over a decade of research, as well as information gathered while preparing the SEQRWSS. The document also includes recent water resource planning and associated hydrologic data.

3.5 Water Resource Plans

WRPs have recently been finalised for catchments in the SEQ region. These plans define the balance between water available for consumption and water to be available for environmental purposes.

When assessing the viability of new surface and ground water supply sources, one of the key requirements is that they comply with the environmental flow and water allocation security objectives contained in the WRPs.

Hence it may be that a particular source may be favourable in terms of economic and financial sense, but cannot demonstrate compliance with the relevant WRP.

4. DEMAND

Summary

The SEQRWSS employed a comprehensive water demand and forecasting approach across all councils in SEQ. It was the first time that such an exercise has been undertaken in Australia at the regional scale.

Estimating urban water demands as part of the SEQRWSS has involved:

1. estimates of population growth both medium and high series;

2. estimates of 'Business as Usual' demand forecasts; and

3. estimates of savings that could be realised through active implementation of demand management initiatives. Three scenarios have been assessed as part of the development of the SEQRWSS, being low, medium and high savings scenarios.

There are numerous assumptions associated with the forecasts such as the accuracy of the population and employment projections, the assumed uptake or penetration rates of the non-mandatory water efficiency opportunities identified, and the achievement of predicted rain water tank yields.

There are a number of uncertainties associated with both the demand forecasting and supply-side estimates. Considering the risk associated with the uncertainty in the estimates and consequences to a large urban community of having insufficient water is important when embarking upon a program of source augmentation.

The demand projections incorporate consideration of the upward pressures on demand due to lifestyle and climate change as well as the expected demand reductions due to improved water use efficiency and customer side source substitution (eg recycling).

Unrestricted existing urban and industrial water demands are about 480,000 ML/a. The early implementation of water use efficiency and customer side source substitution measures is likely to reduce SEQ urban and industrial demand projections by about 30,000 ML/a. SEQ water demands are anticipated to be about 520,000 ML/a in 2026 and 710,000 ML/a in 2051. If high series population projections eventuate, the equivalent 2026 and 2051 demands are 590,000 and 1,100,000 ML/a.

It is clear that water use efficiency and management of water losses are cost effective strategies. In addition, the Queensland Government has legislated that every new house in SEQ must supply 70,000 litres from a rain water tank or other type of rain water harvesting or local water recycling. Rain water tank retrofits and recycled water applications will need to be considered on a case by case basis.

The provision of 40,000 to 60,000 ML/a additional medium priority water supplies would significantly enhance irrigated production, foster improved social and economic outcomes in small SEQ rural communities and potentially provide valuable environmental benefits.

4.1 Demand forecasting

Demand forecasting is a complex task that requires the use of best practice techniques to minimise uncertainties and reduce risks. Typically, a demand forecasting exercise will require the detailed analysis of:

- historical demands with a view to understanding the historical and future factors influencing demand; and
- the costs and benefits of different water conservation and source substitution options.

The SEQRWSS employed a comprehensive water demand and forecasting approach across all councils in SEQ. It was the first time that such an exercise has been undertaken in Australia at the regional scale.

The analysis and forecasting exercise involved:

- detailed assessment of the underlying (climate-corrected) trends in per capita bulk water production;
- detailed assessment of the underlying (climate-corrected) trends in a number of different types of customer (residential, commercial, industrial etc); and
- the development of “end-use” based forecasts that take account of changes in population, fixture and appliances stock, household size, dwelling type, employment trends as well as household incomes and lifestyle changes.

The assessment of trends in historical demand had to account for the impact of recent water restrictions and water pricing changes. The analysis also included an assessment of trends in water demand throughout Australia.

If demand management is to be relied upon to make a contribution to future water supply security, the estimates of that contribution must be reliable and based on realistic assumptions regarding the participation of customers and the volume of water saved.

4.2 SEQLTS urban demand forecasts

SEQLTS considered three saving scenarios based on preliminary analysis from the SEQRWSS. The key elements of these scenarios are summarised in Table 4.1. Together with the BAU forecast, this gives four potential courses of action (forecasts) for each local government area and for the SEQ region as a whole.

Table 4.1: Scenario Formulation Approach

Scenario	Water Use Efficiency Measures	Non Revenue Water Assump-tions	Rain Water Tanks		Recycled Water		
			New Development	Existing Dwellings	New Residential	New Non-Residential	Power Stations
Low Savings Scenario	Top 5 opportunities, ranked on annualised cost	50% of Regional Scoping Study savings estimate	Nil, except where a current policy exists	Nil, except where a current rebate exists. Tank used for outdoor. Assumed ultimate penetration of existing accounts varies with rebate level.	Nil except where projects are underway (i.e. Pimpama-Coomera)	Identified greenfield sites. Recycling of 5% of total demand.	Western Corridor Recycled Water Project
Medium Savings Scenario	Top 10 opportunities, ranked on annualised cost	75% of Regional Scoping Study savings estimate	Rain water tank on all new development, except in recycling areas. Tank used for outdoor, toilet and cold water laundry.	Rebate 25% of cost of tank. Tank used for outdoor only. Assumed ultimate penetration of 5% of existing accounts.	Identified greenfield areas, if over 1,000 ET* if in a 'high priority' river catchment or if over 10,000 ET.	Identified greenfield sites. Recycling of 10% of total demand.	Western Corridor Scheme
High Savings Scenario	Top 15 opportunities, ranked on annualised cost	100% of Regional Scoping Study savings estimate	Rain water tank on all new development outside recycling areas. Tank used for outdoor, toilet and cold water laundry. Rain water tank in recycling areas. Tank used for all laundry and bathroom.	Rebate 50% of cost of tank. Tank used for outdoor only. Assumed ultimate penetration of 10% of existing accounts.	Identified greenfield areas over 1,000 ET.	Identified greenfield sites. Recycling of 25% of total demand.	Western Corridor Scheme

Note: * ET is Equivalent Tenement
Recycled water does not include the use of purified recycled water to replenish drinking water supplies.

Source: SEQLTS, page 16

Based on these scenarios, SEQLTS concluded that 930,000 ML/a would be consumed by the year 2051 under a business as usual scenario and 750,000 ML/a under a moderate savings scenario.

Table 4.2 summarises the relative cost effectiveness of short-listed options. It is clear that water use efficiency and management of water losses are cost effective strategies. However, rain water tank retrofits and dual reticulation recycled water schemes need to be considered on a case by case basis.

Table 4.2: Annualised cost of water savings over forecast period (total costs to SEQ)

Scenario	Water use efficiency measures ($/kL/annum)	Non Revenue Water ($/kL/annum)	Rain water tanks ($/kL/annum)		Recycled water for non-potable uses ($/kL/annum)	
			Rebate on retrofit	Mandatory for new development	Residential	Business and industry
Medium Savings Scenario	$0.24	$0.52	$5.35	$3.18	$2.35	$2.60
High Savings Scenario	$0.49	$0.52	$5.43	$3.38	$2.35	$1.53

There are numerous risks associated with forecasting demand savings, including:

- the accuracy of the population and employment projections used, both in terms of the distribution of overall SEQ region projections between local government authorities and the overall regional projection;
- the projected ongoing shrinking of household size continues as forecast;
- the ability to remove current impediments to customer-side source substitution;
- the assumed uptake or penetration rates of the discretionary water efficiency opportunities;
- the achievement of predicted rain water tank yields, which is affected by issues such as roof area connected to tanks and also the ongoing affect of climate change on rainfall patterns;
- the extent to which the SEQ Regional Pressure and Leakage programme is successful in realising its water losses reduction;

- the ongoing rate of non-residential demand growth relative to population growth. Coupled with this is the ability to maximise opportunities for non-residential recycling of water; and
- the modelled understanding of market share of water efficient fixtures and fittings along with the end use breakdown of demand across different customer sectors.

The basis of the demand forecasts contained in SEQLTS is explained in more detail below.

(a) BAU demand forecast

BAU demand forecasts were estimated assuming that water use continues into the future without savings from any additional demand management initiatives other than those already in place. BAU forecasts incorporate changes in discretionary behaviour due to climate change, household income and lifestyle.

For instance, the Water Efficiency Labelling Scheme and part 29 of the Queensland Development Code were both included in the BAU forecast rather than identified as additional opportunities. Part 29 of the Queensland Development Code mandates the provision of water efficient appliances in new homes.

The first phase of analysis was to assess historical trends in water production and consumption. These assessments were undertaken for each local government service area and provide a starting point for forecasting water consumption trends.

A decision support system demand forecasting tool was used for this purpose. The decision support system was originally developed as part of a study into improving water use efficiency in Queensland urban communities in 2000.

The decision support system incorporates an end use model which utilises both ‘top down’ and ‘bottom up’ information to arrive at a current breakdown in water use. Unaccounted for water "non revenue water" is determined from the differential between water produced and metered consumption. Customer billing data provided the basis for a breakdown of water use between sectors including residential, commercial, industry, hospitality, public and other uses. Seasonal variation in billing data informed estimates of internal and external water use. Census, employment and other research data enabled estimation of per capita water use and penetration of new technology into the home and business.

For each customer sector, including all residential and non-residential sectors and non revenue water, a starting demand per account per day was selected after consideration of the historical trend tracking analysis. The historical trend tracking analysis incorporated climate correction of water production figures.

There are numerous assumptions and processes used within the end use model to provide an accurate model of water use. The key underlying processes can be divided into two groups: those which drive the overall demand per capita up, and those that drive the overall demand per capita down.

Evidence from around Australia indicated that while there was increasing consumer concern about the environment, this does not seem to be translating into lower energy use, water use or decreases in motor vehicle use. Since the early 1990s, there has been a propagation of more efficient using fixtures and appliances – most notably the dual flush toilet. Examination of data in Brisbane, Sydney, Melbourne, Adelaide and Canberra suggests that expected water savings are not translating into reductions in consumption per account. Data from Hobart, Darwin and Perth was not considered suitable for use due to the more recent impact of changes to water pricing.

Thus the BAU assessments incorporate the upward pressures on demand which counteract the expected demand reductions due to improved water use efficiency in fixtures and appliances. Increases in water use are occurring due to:

- losses in economies of scale in households resulting from falling household occupancy rates; and
- increases in direct and indirect discretionary uses associated with rising incomes and lifestyle aspirations and could be enhanced as a result of climate change impacts. Increased use can result from increased ownership of dishwashers, fixed irrigation systems, swimming pools and spa baths, and from the number of fixtures and appliances, which increase the likelihood of leakage. Indirect water use is occurring through more frequent eating at restaurants and the purchase of more goods and services.

For the purposes of preparing forecasts for SEQ, it has been assumed that a number of discretionary uses in the end use model will increase over the period of the model.

Uncertainty in BAU demand projections relates to the uncertainty in population projections and assumptions about per capita demand, especially the combined implications of existing policy frameworks affecting water use efficiency and discretionary water use over time.

(b) Identification of water savings measures

Many initiatives to ensure water is used more efficiently have already been implemented. Many other opportunities are being are being investigated by the Queensland Government and QWC as part of the drought response and longer-term supply.

For the purposes of analysis, water savings opportunities were grouped into either:

- water-use efficiency opportunities, which increase the efficiency of water-use after it has passed through a consumer's water meter; or
- side source substitution opportunities, which are alternative means of supplying water at a customer site level, such as rain water harvesting, greywater reuse and dual reticulation recycled water.

Water use efficiency opportunities

Over 100 potential water-use efficiency opportunities were identified across all customer sectors and implementation mechanisms, whether regulatory or voluntary and with or without financial incentives.

A screening process was undertaken using the following triple bottom line criteria:

Environmental

- Provides energy use reductions;
- Significance of water savings (from a SEQ regional perspective); and
- Sustainability of water savings (from a SEQ regional perspective).

Social Criteria

- Improves public awareness (that is, as a side benefit);
- Publicly acceptable;
- Equitable across customer base; and

- No political / regulatory obstacles.

Economic Criteria

- Low life cycle cost to customer; and
- Low life cycle cost to councils.

From this process, a short list of opportunities was selected from across all customer sectors. The opportunities that were selected include:

- **Residential**: Conservation pricing, permanent low level restrictions, landscaping efficiency, indoor retrofits (including compulsory retrofit on resale);
- **Commercial**: Toilet and urinals, cooling;
- **Public and Irrigation**: Irrigation education, building retrofits;
- **Large users**: Specific audit and follow up programme;
- **General**: Continue education efforts, school programmes; and
- **Pricing**: Wastewater volumetric pricing for non-residential applications, conservation focussed tariff structures for residential

The potential saving from each of the above initiatives was estimated based on a range of complex issues, such as:

- changing demographic patterns, in particular reduced occupancy rates and the aging of the population, which will tend to increase demand;
- estimation of the current stock of efficient appliances, which was generally based on ABS survey and product sales information but without any available checks of validity;
- real savings from possible business as usual activities, such as natural replacement of fixtures and fittings;
- interaction of different demand management measures, such as where savings from a showerhead retrofit program could overlap with savings

from another action, such as compulsory retrofit of showerheads on resale;

- limitations of effectiveness, such as the success of behavioural change programs and ongoing compliance with regulations;
- barriers to participation, such as health regulations and total cost to the community; and
- feasibility and effectiveness of implementation methods, such as the impact of increased regulation.

All of these issues involve risk to the water savings estimates and when compounded result in a high risk. Where very high participation and maximum savings for every demand management activity is assumed the risk of not achieving a demand target is increased further. The planning of major long-term infrastructure without assessment of these risks or their compounding nature is not realistic or prudent.

In addition, many of the commonly advocated demand management measures rely on changes to human behaviour to achieve full savings, either through agreement to participate and to continue participation in a measure or through relying on a long-term change of habits. Ongoing savings from these types of programs are highly uncertain.

Key factors in quantifying the water savings potential of water use efficiency opportunities are:

- the target customer sector for each measure and the number of accounts (both existing and new accounts for each year to 2051);
- the consumption per account in the target customer sector for each local government area;
- the target end-use within the customer sector and the percentage of overall account usage related to that end-use;
- the savings which may be achieved from the measure (as a percentage of the specified end uses, usually calibrated with a typical kilolitres/annum absolute figure based on available data); and
- the potential uptake of the measure across the account stock within each sector, both for existing and new accounts.

Source substitution opportunities

The source substitution opportunity evaluation process initially considered the options of stormwater reuse, greywater reuse, rain water tanks, recycled water through a centralised dual reticulation system and the decentralised process of water mining.

Screening of source substitution opportunities was undertaken based on a literature review of SEQ, Australian and international applications of these techniques. The criteria used in this screening exercise were:

Economic

- Potential Water Saving to SEQ Region; and
- Estimated Cost to SEQ Region.

Social

- Customer Acceptance; and
- Technology / Market Maturity.

Environmental

- Greenhouse Gas Reduction; and
- Environmental Enhancement.

The source substitution opportunities that were selected for more detailed evaluation were divided into four types:

- **Type 1**: Supplying recycled water to new and existing large, non residential uses;
- **Type 2**: Use of rain water tanks for new infill and greenfield development (toilet, outdoor and cold water laundry use as a stand alone measure or shower and laundry uses as a complement to recycled water in identified greenfield areas);
- **Type 3**: Use of rain water tanks for existing residential and rural-residential lots (outdoor use only); and
- **Type 4**: Use of recycled water dual reticulation in large new residential development areas (toilet and outdoor use).

Greywater reuse and stormwater reuse were considered as partial alternatives for outdoor use.

The customer-side source substitution opportunities are difficult to quantify because they are very dependant on actual patterns of development, as well as the specific end-uses able to be connected to the alternative water source. For this reason, it was necessary to identify end uses for each of the opportunity types and carry out some high level preliminary analysis to determine where opportunities might arise around the region.

4.3 Recent urban demand initiatives

A number of demand management measures have already been implemented across SEQ. Measures initiated by local and State governments have been embraced by the general community, industry and business, and governments and have helped to reduce water consumption and improve water efficiency. While these measures are typically focussed on addressing the short-term water balance, most will remain in force beyond the current drought and will assist in achieving sustainable water consumption habits and behaviours in the long-term.

Measures implemented since SEQLTS was released are outlined below. Further measures are currently being considered by the QWC, Queensland Government and councils, including:

- expanding the current requirement for water efficiency in new homes (water efficient showerheads and taps, dual flush toilets, rain water tanks) to new commercial and industrial buildings and existing homes upon sale or major renovation; and
- facilitating the provision of water consumption advice through the installation of sub-metering in new multi-unit residential and non-residential developments.

Business and industry

In consultation with stakeholders, the QWC has implemented a package of measures that will deliver long-term savings for businesses while minimising risks to economic production and employment.

Water intensive businesses are required to prepare Water Efficiency Management Plans to demonstrate the business is water efficient or how it plans to reduce its business water consumption by a minimum of 25% in the near future.

The Queensland Government has established a $40 million Business Water Efficiency Program to assist business implement water saving measures. By May 2007 this program yielded water savings of approximately 8.4 million litres per day. This is forecast to increase to savings of 20 million litres per day by May 2008.

Residents

In June 2006 the Queensland Government launched a series of rebate schemes to promote the take-up of water saving appliances. Rebates of up to $1000 are available for water tanks, $200 for four star water rated washing machines or better and $150 for dual flush toilets. In December 2006, a separate rebate scheme was introduced for defined garden products. The Government will provide a one off 50% rebate on the cost of approved plants and garden products up to $50.

The Government has committed over $50 million to the rebate programs. Rebates will be available statewide until June 2009 or when funding runs out.

In July 2006 the Queensland Government in partnership with the local governments across SEQ established the Home WaterWise Service. The service subsidises the cost of having a licensed plumber install a range of water efficient devices, such as showerheads and kitchen taps and advise home owners about water saving strategies. Over 75,000 homes will have been retrofitted with water efficient devices by May 2007, yielding water savings of more than 4 million litres of water per day.

More than 200,000 retrofits are anticipated by July 2008, saving up to 11.6 million litres per day.

From 1 January 2007 all building development applications lodged from the construction of new homes in SEQ must meet mandatory water saving targets. Detached houses must aim to achieve savings of 70000 litres per year, while terrace houses and townhouses must aim to achieve savings of 42,000 litres per year. Through these targets, most new homes will now use rainwater to supply toilet cisterns and washing machines, taking pressure off the SEQ Water Grid.

Options to achieve the target include rainwater tanks, dual reticulation recycled water systems, communal rainwater tanks or stormwater reuse. Councils may set higher water saving targets or may mandate additional water saving measures.

Pressure and leakage management

Significant water savings up to 60 million litres of water per day can be achieved by reducing water loss resulting from leaking and burst water mains and pipes. The Queensland Government has expanded its subsidies to local government to accelerate the implementation of the Pressure and Leakage Management Program by councils. The Queensland Government will contribute a subsidy of 40% of capital costs up to $32 million.

4.4 Rural water demands

The SEQ Regional Plan sought to achieve a sustainable balance between urban and rural development and includes principles that seek that ensure that:

- rural communities gain benefit from future growth;
- a viable rural production sector is maintained;
- rural water needs are met in an efficient and sustainable way; and
- alternative economic sources of water are identified.

These principles are being addressed as part of SEQRWSS. A Rural Water Task Group comprising key stakeholders from industry, water service provision, and Government has provided data on current water usage and projected future demands on both an area and commodity basis. The Task Group concentrated its efforts on four key sub-regions in SEQ where irrigated production is most intensive, namely:

- the Lockyer Valley;
- the Warrill and Fassifern Valleys;
- the Logan and Albert Valleys; and
- the Sunshine Coast.

The Sunshine Coast and Lockyer Valley areas have the greatest economic returns to water owing to the high value of irrigated fruit and vegetables (Hajkowicz et al, 2006). Work carried out under the Strategy to date has identified a number of measures that will enhance water supply security to the rural sector.

Overall, it is considered that the provision of 40,000 to 60,000 ML/a of additional medium priority rural water supplies would significantly enhance irrigated production, foster improved social and economic outcomes in small SEQ rural communities and potentially

provide valuable environmental benefits. Pending detailed investigation and clarification of capacity to pay, these opportunities have been taken into account in the water balance.

Lockyer Valley

The Western Corridor Recycled Water Project has the potential to supply recycled water from wastewater treatment plants in Brisbane and Ipswich to Lockyer Valley irrigators in times when it is not needed for other purposes. Although the initial focus of the project is to supply purified recycled water to power stations and industry and to replenish Wivenhoe Dam, there is scope for the addition of a distribution network to the Lockyer Valley if the capacity to pay exists within the industry and financial support from the Commonwealth Government is received.

Potentially significant benefits of water recycling into the Lockyer Valley include ground water recovery, restoration of flows, and re-establishment of vegetation in riparian zones along Lockyer Creek and its tributaries. It is anticipated that between 20,000 and 30,000 ML/a would be needed to deliver these outcomes and enhance agricultural production in the valley.

Warrill and Fassifern Valleys

Irrigators in the Warrill, Fassifern, Logan and Albert Valleys have experienced unreliable supplies in recent years due mainly to the ongoing drought.

Once the Western Corridor Recycled Water Project is constructed, there is the potential to improve the reliability of supply to the Warrill Valley by making the water currently allocated to the Swanbank Power Station available to upstream irrigators in the form of greater surety of supply. Further consideration of these arrangements, including pricing considerations, is needed. In order make a substantial difference to irrigated production by substantially improving the reliability of supply in the Warrill Valley, it would be necessary to deliver 5,000 to 10,000 ML/a of recycled water to the lower reaches.

Logan Valley

An offstream storage is being constructed in the Bromelton area. Water harvested by the BOS from the Logan River into the storage has the potential to support urban and industrial development and rural expansion in the area. It is anticipated that up to 5,000 ML/a would significantly benefit development in the valley.

Mary Valley

The Queensland Government has committed to make available 10,000 ML/a of medium priority water for irrigated production in the Mary Valley from the Traveston Crossing Dam.

4.5 Summary of Forecast Demands

Table 4.3 contains a summary of demand forecasts contained in SEQLTS and the updated current forecasts. These forecasts are all for the medium series population projections. Note that, following implementation of measures outlined above, the high saving scenario has been adopted as the basis for water supply planning.

Figure 4.3: Forecast urban water demand [a]

Scenario	2006 estimate (ML/a)	2026 forecast (ML/a)	% saving compared to 2026 BAU	2051 forecast (ML/a)	% saving compared to 2051 BAU
***SEQLTS* Figure 4** [b]					
BAU	—	670,000	—	950,000	—
Adopted Demand	—	570,000	15%	750,000	19%
High savings scenario	—	530,000	21%	710,000	25%
Current forecasts [c]					
BAU	480,000	670,000	—	920,000	—
High savings scenario	—	520,000	22%	710,000	23%

a Does not include existing or potential rural water allocations for SEQ storages.

b Includes estimates of 28,000 ML for power station demands; now known that power station demand is 36,500 ML/a

c Current forecasts include parts of Cooloola Shire Council that are likely to be supplied from Traveston Crossing Dam. This demand is currently about 2,430 ML/a and is forecast to increase to about 4,200 ML/a by 2051.

In summary, without implementing further demand management measures, unrestricted BAU urban and industrial demand for water is forecast to increase from about 480,000 ML/a to about 670,000 ML/a in 2026 and 920,000 ML/a in 2051, based on medium series population projections, the best available demographic forecasts and a slight increase in underlying per capita demand for water. With the high series population projection, BAU demand increases to 1,100,000 ML/a in 2051.

Once likely high savings demand management measures are taken into account, regional demand will increase to 520,000 ML/a in 2026 and 710,000 ML/a in 2051 with medium series population growth. With high series population growth, high savings demand is forecast to increase to 870,000 ML/a in 2051.

While any additional allowance is subject to detailed consideration and dependent on capacity to pay, an allowance has been included in regional demand forecasts for the rural sector.

In addition, provision of 40,000 ML/a to 60,000 ML/a of additional medium priority supplies to rural users would significantly enhance irrigated production, foster improved social and economic outcomes in small SEQ rural communities and potentially provide valuable environmental benefits.

The water use efficiency and supply side measures discussed will achieve the target in the SEQ Regional Plan of reducing average residential water consumption from around 300 litres per person per day in 2006 to 230 litres per person per day by the end of 2020. However, there is a significant level of risk involved in achieving savings that rely upon voluntary participation or ongoing behavioural change.

In addition, as described earlier in this submission, there are a number of uncertainties associated with both the demand forecasting and supply-side estimates. Considering the risk associated with the uncertainty in the estimates and consequences to a large urban community of having insufficient water is important when embarking upon a program of source augmentation.

5. SUPPLY

Summary

The great majority of urban, industrial and rural demand in SEQ is met by surface water supplies.

A single solution to the long-term water needs of SEQ does not exist. A multi-faceted and diversified response is required.

On the basis of the water resource planning undertaken in SEQ, it is possible subject to the identification of suitable dam and weir sites to develop additional supplies of about 150,000 ML/a in the Mary Basin, 50,000 ML/a in the Logan Basin, 25,000 ML/a in the Moreton WRP area and 30,000 ML/a in the Gold Coast WRP area. Much of the reserves identified in the Logan, Moreton and Gold Coast WRP areas is already earmarked for small projects.

Traveston Crossing Dam is the last remaining large dam site in SEQ and has the capability of providing a larger and more secure water supply than any other dam or combination of new dams in SEQ.

The ability of a significant portion of the medium to long-term requirements of SEQ to be supplied from ground water sources is limited.

Desalination and purified recycled water can also to provide additional supplies.

There are limited available desalination sites in SEQ, and desalination also involves significant establishment and operating costs.

The Queensland Government announced that purified recycled water would be part of SEQ's drinking supplies in response to the continuing drought and the need to diversify supply sources.

5.1 Existing Water Supplies

SEQ urban communities rely on water from 19 surface water storages (dams and weirs) with limited use of ground water. (See Figure 5.1 below).

Figure 5.1: South East Queensland Dams and Weirs

The 19 major urban surface water storages are operated by 12 separate owners. These are SEQ Water, SunWater, local governments and a local government cooperative. The region's major water sources are detailed in Figure 5.1.

While the total supply in Table 5.1 (a mixture of historical no failure yields and high priority allocations) totals 636,000 ML/a, not all of this supply is actually available for consumption in SEQ.

Current entitlements held by SEQWater for the Wivenhoe/Somerset system only permit 286,000 ML/a to be extracted from the system above Mt Crosby Weir. The Moreton WRP precludes any water take above this amount. About 7,250 ML/a of the SEQWater's entitlement is set aside for irrigation purposes. Thus only 279,000 ML/a is available for urban purposes. Notably, the historical no failure yield of the Wivenhoe/Somerset system based on calculations to the end of February 2007 has been revised down to 325,000 ML/a. If the current drought continues, the historical no failure yield will be less than the current SEQ Water entitlement by around the end of 2007/early 2008.

Similar downgrades of historical no failure yield can be expected for North Pine, Cressbrook, Perseverence and Cooby Dams.

Moogerah Dam, for long periods, contributes much less than 9,400 ML/a high priority water with water having to be supplied from the Wivenhoe/Somerset system. Likewise, the Maroon Dam system has been unable to consistently deliver 9,900 ML/a of high priority water. Thus both Moogerah and Maroon Dams have a considerably lower historical no failure yield capability.

During the current drought, only 8,200 ML/a has been able to be extracted from North Stradbroke Island.

The total available supply (incorporating historical no failure yield plus high priority entitlements from Table 5.1) in the region is only 528,259 ML/a. This will be somewhat higher than the historical no failure yield capability of the region.

Table 5.1: Major Urban Water Sources in SEQ

Source	Storage Yield / water allocations # (ML/annum)[1]	Owner/Operator	Council Area currently Serviced from Source
Surface Water			
Caboolture Weir	3,600 HP[2]	Caboolture City	Caboolture
Cressbrook Dam /Perseverance Dam	10,000	Toowoomba City	Toowoomba, Crows Nest, Jondaryan, Rosalie
Cooby Dam	2,610	Toowoomba City	Toowoomba, Crows Nest, Jondaryan, Rosalie
Lake Kurwongbah	4,100[3]	Pine Rivers Shire	Pine Rivers
Moogerah Dam	9,400 HP 20,700 MP	SunWater	Boonah
North Pine Dam	58,500 (59,000 HP)	SEQ Water	Brisbane, Redcliffe, Pine Rivers, Caboolture
Wivenhoe Dam/ Somerset Dam	373,000[4]	SEQ Water	Kilcoy, Gatton, Laidley, Esk, Nanango, Ipswich, Brisbane, Logan, Gold Coast, Redcliffe, Pine Rivers, Caboolture
Baroon Pocket Dam	34,750 (36,500 HP)	AquaGen	Caloundra, Maroochy
Borumba Dam[7]	11,689 HP 50,125 MP	SunWater	Noosa, Cooloola, Maryborough
Lake MacDonald	4,210 (5,000 HP)	Noosa Shire	Noosa
South Maroochy (Wappa Dam, Poona Dam and Cooloolabin Dam)	9,100 (16,500 HP)	Maroochy Shire	Maroochy
Ewen Maddock	3,800	AquaGen	*Currently not in use*
Hinze/Little Nerang Dam	69,800[5]	Gold Coast City	Gold Coast
Leslie Harrison Dam	7,600	Redland Shire	Redland
Maroon Dam	9,900 HP 13,600 MP	SunWater	Beaudesert
Ground water			
Bribie Island	2,000	Caboolture Shire	Caboolture
North Stradbroke Island	37,900[6] (21,900 HP)	Redland Shire	Redland
Total (HNFY plus HP Entitlements)	636,000		
Total Available Supply (HNFY plus HP Entitlements)	528,259		

- Figures in table are yields unless a HP or MP allocation is shown.
  - HP = High Priority water allocations (usually urban water supply))
  - MP = Medium Priority water allocations (usually rural water supply)
- Water availability is always subject to review through water planning processes.
- Yield is the volume that can be extracted on an annual basis at a particular reliability. The yields shown in the table are where possible historical no failure yields (HNFY).

[1] ML/annum = Megalitres per year
[2] Council expects to be able to access up to 3,000 ML/annum following augmentation.
[3] Council expects at times to be able to extract up to 7,000 ML/annum.
[4] The HNFY of the Wivenhoe Somerset Dam will reduce as the current drought is the worst on record. Current entitlements held by SEQWater only permit 286,000 ML/a to be extracted from the system above Mt Crosby Weir. Some of this entitlement is set aside for irrigation purposes.
[5] This figure incorporates a buffer capacity which Gold Coast City Council has adopted for hydrologic and supply security reasons. Exclusive of the buffer, the HNFY of Hinze Dam is estimated to be 76,000 ML/annum.
[6] Amount above 21,900 is undeveloped and unallocated.
[7] Includes all supply from the Mary Valley Water Supply Scheme which includes run of the Mary River extractions in addition to supply from Borumba Dam

5.2 Future Supply Options

Given the significant ramifications of running out of water in SEQ, it is essential strategies are put in place to ensure that the managers of water supplies can demonstrate that they are always in control and able to manage water supply risks. This includes the ability to deal with any unforseen climate variability and climate change circumstances.

It is clear that significant upgrades to supply are necessary across the region.

The main bulk supply options to meet the projected demands in SEQ are:

- additional ground water supplies;
- desalination;
- recycling; and
- new dams and weirs.

A single solution to the long-term water needs of SEQ does not exist. A multi-faceted and diversified response is required.

In considering possible future supply options, it has become apparent that the best surface and ground water supplies available in the region have already been developed and that the cost of new supplies will be much more than the community has become accustomed to paying for water. However to ensure the most appropriate supply options are chosen all reasonable options should be considered.

Ultimately, an effective suite of supply sources includes various options that are diverse in terms of their risk. This principle has been considered in making the decision on the forward program of infrastructure in SEQ. This section provides a summary of the options considered for supply of water to SEQ and that have been considered in recent water supply planning assessments.

Ground Water Sources

Under the SEQRWSS, an investigation was undertaken to assess island and mainland ground water development opportunities both as a permanent supply arrangement and as a means to respond to the current drought.

Two reports have been prepared, namely:

- the February 2006 *Draft Progress Report South East Queensland Potential Ground Water Resources Sandmass Aquifers* summarising the work of EHA and assessments undertaken by NRMW (NRMW 2006b);
- the May 2006 *Ground water Review of South East Queensland On-shore Aquifer Systems* by EHA (EHA 2006).

Sources of potential ground water reserves with water of suitable quality for urban use in SEQ include:

- the offshore sand dune islands including North Stradbroke, Moreton, Bribie and Fraser Islands;
- localised, onshore sand dune deposits located adjacent to the coastline and extending intermittently from Rainbow Beach in the north to the Gold Coast in the south;
- extensive sedimentary deposits associated with the Nambour Basin extending from north of Maroochydore inland to Maleny and southwards to Caboolture;
- an extensive system of mostly fractured volcanic rocks associated with what is known geologically as the Gympie Province extending from just north of Nambour to Gympie;
- sedimentary deposits, mostly sandstones associated with the southern part of the Maryborough Basin and known locally as the Myrtle Creek Sandstone;
- limited outcrops of relatively young tertiary basalts in the Maleny, Buderim, Sunnybank, Redland Bay and Tamborine Mountain areas; and
- reasonably extensive tertiary sedimentary deposits outcropping in the Brisbane metropolitan area to the north and south of the city.

Limited ground water modelling has been undertaken to assess the potential for expanding use of the aquifers in the dune sands on North Stradbroke Island. Ground water makes a small but significant contribution in the delivery of efficient local supplies. Ground water irrigation is significant in the Lockyer Valley and Warrill Creek areas and occurs widely throughout SEQ.

Previous estimates for ground water availability on the main islands are:

- North Stradbroke Island—possible yields subject to further investigation of up to 38,000 ML/a (though it is increasingly appearing that this supply capacity will not be able to be developed);
- Moreton Island—possible yields subject to further investigation of between 9,100 ML/a to 14,000 ML/a.

The Queensland Government has indicated that it will not seek to extract water from Moreton Island because of the small quantities involved and the desire to maintain ecosystem health. Redland Shire Council currently has an entitlement to take up to 21,900 ML/a from North Stradbroke Island, but does not have the water extraction and delivery infrastructure in place to be able to take this amount. Potential expansion of the North Stradbroke Island ground water bore field is currently being investigated as a drought measure. Subject to environmental approvals, it may allow development of an additional 22 ML/day (8,000 ML/a). This would be in addition to the 22.5 ML/day (8,200 ML/a) currently extracted from the Island by Redland Shire Council. This would bring the total ground water extractions from North Stradbroke Island to 16,200 ML/a, which is less than Council's entitlement.

Preliminary investigations into the potential to supply relatively small amounts of water from ground water sources are being undertaken as part of activities to provide additional supply in the current drought. These projects are specified in the measures and outcomes in the *Water Amendment Regulation (No. 6) 2006*. Investigations into ground water sources in the Landsborough area north of Brisbane have not yielded any production quantities of water.

On Bribie Island, it is anticipated that an additional 4 ML/day (1,500 ML/a) will be provided.

Brisbane City Council only has the potential to develop about 20 ML/day (7,300 ML/a).

Toowoomba City Council is developing additional ground water supplies of about 5,000 ML/a from fractured rock aquifers and the Great Artesian Basin. The aim of these activities is to find sources that can be used as substitution supplies for urban water requirements to assist in addressing the immediate challenge of the current drought. Their suitability as long-term supplies will depend on performance. Through negotiations with the Toowoomba City Council it has been determined that a water licence for the Helidon Sandstone will be issued to the Council with attached conditions; which includes a base annual access of 500 ML/a and increments to 1,000, 1,500 and 2,000 ML/a

commensurate with the restriction levels 3, 4 and 5 respectively. The trigger levels in the Toowoomba dams which implement these restrictions are 50%, 30% and 20% respectively. Toowoomba dam levels are currently at 15.5% and hence all trigger levels have been reached.

The total developed additional ground water supply will be in the order of 30,000 ML/a, but not all will be available as a long-term supply.

Desalination

The Queensland Government is collaborating with Gold Coast City Council on the development of a 125 ML/day reverse osmosis desalination plant as a drought contingency measure and to meet the shorter term growth needs of SEQ. In the near future, it will be necessary to identify and preserve desalination sites for future generations.

Suitable locations for the siting of a desalination facility to supply SEQ are limited, especially to access deep water to obtain consistently good quality water and allow for brine dispersion. Studies are still in progress to identify sites that might be preserved for the future. Based on the work completed to date, aside from Tugun it appears that the only additional suitable future desalination sites are on the Sunshine Coast. In determining suitable sites for desalination facilities, factors such as proximity to the water requirements and release of the concentrated brine solution to an open water body need to be considered. The sensitive receiving waters of Moreton Bay limit options in SEQ.

Desalination is a potential future supply option; however, there are limited available sites in SEQ and there are significant establishment and operating costs.

Recycled Water

Recycled water refers to treated effluent from a wastewater treatment plant that has been treated to a standard appropriate for the type of use. When treated to a sufficiently high standard, recycled water is suitable for a wide range of uses including industrial processes, irrigation of agriculture and sporting/recreation facilities, or indirect potable reuse.

Approximately 6% to 7% of the total quantity of treated effluent in SEQ is currently recycled, mainly for irrigation of golf courses and sporting ovals, with a lesser amount being used by industry. Gold Coast City Council is requiring installation of dual

reticulation in some new development areas in readiness for the availability of suitably treated recycled water.

Additional use of recycled water in the region is currently being planned. The Western Corridor Recycled Water Project will make significant quantities of purified recycled water available to the Tarong, Tarong North and Swanbank power stations and more recently for discharge to Wivenhoe Dam to replenish drinking water supply. Recycled water will initially be sourced from Oxley, Wacol, Goodna and Bundamba treatment plants, with later extensions to include recycled water from Gibson Island and Luggage Point treatment plants.

It is also planned to have dual reticulation recycled water play a part in meeting the water requirements in major industrial development areas in SEQ as well as in some new residential development areas.

Recently, the Queensland Government announced that purified recycled water would be part of SEQ's drinking supplies in response to the continuing drought and the need to diversify supply sources.

A regulatory framework for recycled water is being developed by the Queensland Government and will be introduced in 2007.

Purified recycled water as a drinking water supply and as part of future dual reticulated systems will form part of the of the long-term water supply solution in SEQ. However, recycling of water, even used for replenishing drinking water supplies, will not meet all future water needs.

Surface Water Sources

As part of the SEQRWSS, consultants GHD were commissioned to prepare a desktop report on dam and weir sites that had previously been identified in the region. In this report, GHD were asked to:

- make recommendations regarding those sites that did not warrant further consideration; and
- identify any shortfalls in available information that had the potential to impact on the viability of a particular development.

The GHD report was a desktop review of existing reports and data and publicly available information regarding dam and weir sites that had previously been identified in the SEQ region. Sources of information used in this review include past planning studies such as

SEQ Water and Wastewater Management and Infrastructure Study, GHD/Kinhill 1999, and *An Appraisal Study of Water Supply Sources for the Sunshine Coast and the Mary River Valley*, DPI Queensland Water Resources 1994.

Eighty dam and weir site options were identified as having been studied in the past. Initial rankings were at a high level on the basis of their potential to supply significant quantities of water. Short-listed options were identified as worthy of further consideration as potential bulk supply sources of regional significance. These short-listed options were reviewed in more detail at desktop level. Potential combinations of dams and weirs were also considered.

GHD carried out approximate updates of the estimated costs to construct dams for a selected number of sites based on information in earlier reports and estimated indicative costs based on conceptual designs for a number of other sites or for alternative development levels. The costings for road and other infrastructure relocation were prepared on the basis of replacement to the existing standard to enable equitable comparisons of dam site options.

The report ranked potential development options in terms of:

- potential yield (i.e. the volume of water that could potentially be delivered)
- unit cost of the dam per megalitre of water delivered.

The main dam and weir site options identified were:

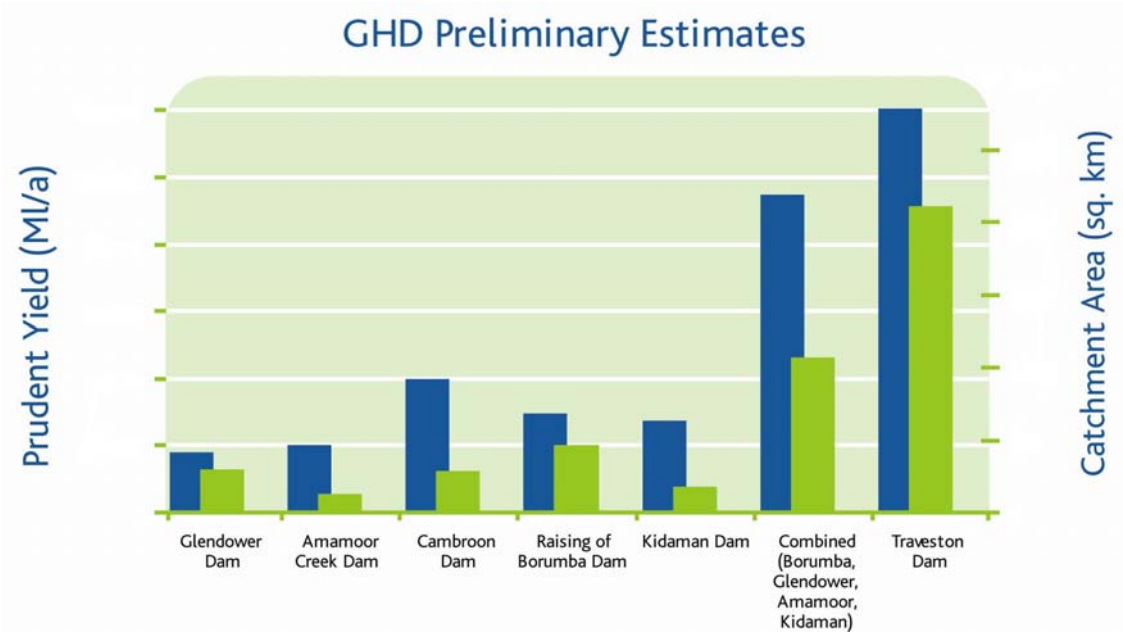
- Glendower Dam with a barrage on the Albert River;
- A dam on the Coomera River;
- A dam at Cedar Grove on the Logan River;
- Tilleys Bridge Dam with Cedar Grove Weir;
- Wyaralong Dam on the Teviot Brook with Cedar Grove Weir (Logan system);
- Raising of Hinze Dam to Stage 3;
- Water Harvesting from the Coomera River and Canungra and Mudgeeraba Creeks and other suitable locations to a raised Hinze Dam;
- A dam at Zillman's Crossing on the Caboolture River;
- Raising of Wappa Dam (South Maroochy);
- Amamoor Creek Dam (Mary River system);

- Cambroon Dam on the Mary River;
- Raising of Borumba Dam on Yabba Creek (Mary River system);
- Kidaman Dam on Obi Obi Creek (Mary River system);
- Traveston Crossing Dam (Mary River system);
- Raise Mt Crosby Weir on the Brisbane River; and
- Raise Wivenhoe Dam.

By far the largest yielding and most secure potential future dam site in SEQ is the Traveston Crossing Dam site. This derives from the much greater catchment commanded by the dam site in a comparatively wet area as compared to other areas of SEQ. Traveston Crossing Dam has an upstream catchment area of some 2,000 square kilometres.

Other potential combinations of smaller dams do not yield the same volume or reliability of supply. For example, the combined catchment area of the Glendower, Amamoor Creek, Cambroon and Borumba Dams is 1,400 square kilometres. Analysis also shows that combinations of these smaller dam alternatives would also result in dam levels being low for longer periods of time.

Figure 5.3: GHD preliminary estimates



5.3 Water available for new surface supplies

WRPs provide a blueprint for future sustainability by establishing a framework to provide a balance between water for human and environmental purposes. WRPs are developed through detailed technical and scientific assessment as well as extensive community consultation to determine the right balance between competing requirements for water.

When assessing the viability of supply sources, one of the key requirements is that they comply with the environmental flow and water allocation security objectives contained in the final WRPs. When comparing various supply sources, the restrictions imposed on supply sources by WRPs must be considered. Hence, it may be that a particular water source may be favourable in an economic and financial sense but cannot demonstrate compliance with the relevant WRP.

Since the SEQLTS report was developed, WRPs relevant to SEQ (Mary, Logan, Moreton and Gold Coast) have been finalised. These plans have slightly different provisions for future water requirements (strategic reserve) from that contained in the draft plans published at the time of the release of the SEQLTS report.

Provisions for unallocated water provided for future water requirements as strategic reserve[1] in the final WRPs are now:

- a strategic reserve of 150,000 ML of high priority entitlement for infrastructure identified in the SEQ Regional Plan or instruments that implement the plan or a regional water security program. It is also possible that an additional 10,000 ML for rural use from infrastructure in the Mary River catchment could be made available;
- a strategic reserve of unspecified volume that is subject to the type of development that may be proposed and compliance with the performance indicators in the WRP. Indicatively, the strategic reserve is likely to be able to accommodate additional development in the Logan Basin of approximately 50,000 ML/a[1]. This is less than the 55,000 ML indicated in the overview report for the draft WRP due to improvement in the representation of existing rural entitlements and consideration of more recent water supply planning activities;

[1] The volumes provided are indicative and not specified in the WRPs, except for the Mary Basin WRP. These volumes are subject to meeting the environmental and water allocation security objectives stated in the relevant WRP as well as the type and location of development.

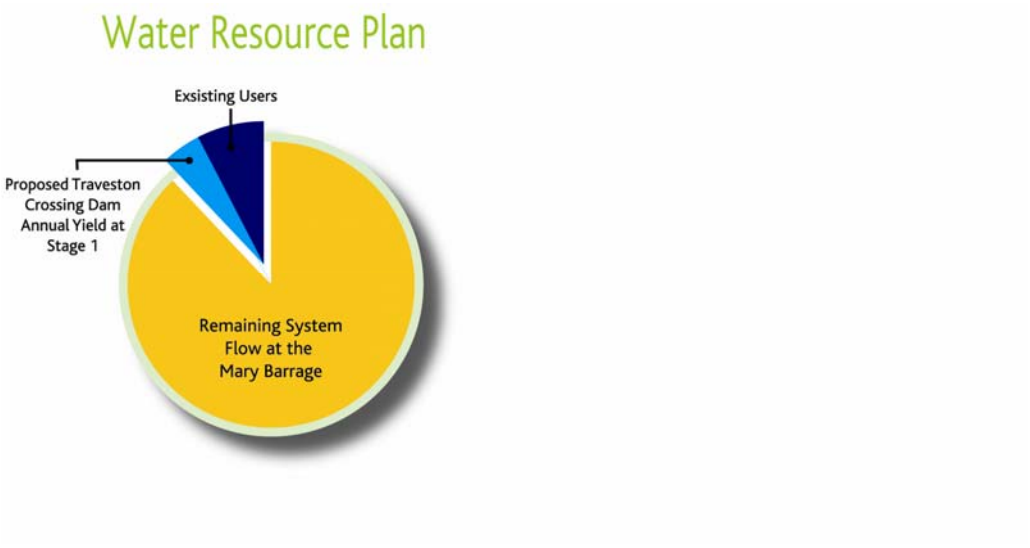
- a strategic reserve of approximately 30,000 ML/a[1] of high priority entitlement is available in the Gold Coast WRP area;
- a strategic reserve of approximately 25,000 ML/a[1] of high priority entitlement made available in the Moreton WRP;
- it is proposed to amend the *Water Resource (Logan Basin) Plan 2007* to include North Stradbroke Island. This amendment would be a full water resource planning process to determine the long-term sustainable extraction of ground water from the Island.

When considered in the context of the required volumes of supply for the requirements of SEQ, the Mary and Logan WRP areas are the remaining areas that allow a new large surface water storage. Consideration of future infrastructure options must be considered in light of the limitations set by water resource planning provisions with a view to maximising the opportunity to supply water.

The unallocated water provided for in the Mary Basin WRP underpins the development of the proposed Traveston Crossing Dam and the proposed raised Borumba Dam.

Investigations show that at Stage 1, more than 85% of the predevelopment flow will reach the estuary at the mouth of the Mary River annually.

Figure 5.4: Remaining System Flow at the Mary Barrage



Source: SunWater data

It is anticipated that the bulk of unallocated water provided for in the Logan Basin WRP would be associated with infrastructure in the plan area recently announced by the

Queensland Government. This infrastructure includes Wyaralong Dam, Cedar Grove Weir, BOS and water harvesting from Canungra Creek.

In the Gold Coast WRP area, it is envisaged that the limits of the plan and permitted unallocated water amounts could accommodate infrastructure such as a raised Hinze Dam and water harvesting into the dam from the Upper Coomera River, Tallebudgera Creek and Mudgeeraba Creek.

It is envisaged that infrastructure in the Moreton area within the limitations of the WRP could include proposed new or upgraded infrastructure in the Brisbane, North Pine and Caboolture River catchments. This includes the proposed raising of Mt Crosby Weir, water harvesting from South Pine River and a recommissioned and raised dam on Lake Manchester.

6. BALANCING DEMAND AND SUPPLY

Summary

For regions with very large urban populations, the consequences of an unreliable supply or a failure of supply are unacceptable.

Given the ramifications of running out of water in SEQ, it is essential that strategies be put in place to ensure that managers of water supplies can demonstrate that they are always in control and able to manage water supply risks. This will provide the ability to deal with any unforseen climate variability and climate change circumstances.

The Queensland Government is implementing a LOS approach advocated by the WSAA (Erlanger and Neal, 2005).

While the details of different approaches to managing supply risk will be outlined during finalisation of the SEQRWSS, it is clear that significant upgrades to supply are necessary across the region.

On the basis of the supply/demand gap analysis in section 6.3, 540,000-720,000 ML/a will need to be provided to satisfy projected 'business as usual' demand by around 2051 and between 150,000 and 200,000 ML/a of contingency will need to be identified and pre-planned.

Strategic approaches to address the supply/demand gap and contingency requirements include:

- water use efficiency / demand management measures;
- diversification of supply sources (rainfall and non-rainfall dependent options);
- provision of contingency supply to protect against severe drought; and
- interconnection of supplies to provide an integrated water supply system and full utilisation of available yields.

6.1 Introduction

A large community should be entitled to expect to never run out of water, especially essential supplies. The larger an urban community, the more reliable a water supply has

to be. For regions with very large urban populations the consequences of an unreliable supply or a failure of supply are unacceptable.

In order to achieve a water balance for SEQ, both demand and supply side measures need to be implemented, with a view to minimising costs to SEQ's water users and addressing current water supply constraints that are caused by the current prolonged drought.

Water supply planning has in the past occurred on the basis of historical no failure supply estimates of yield of surface water supplies. The current drought has caused a review of this philosophy, due to the risks associated with only considering historical climatic conditions.

This section discusses the HNFY approach and the Queensland Government's new planning strategy based on levels of service (LOS).

(a) HNFY

Traditionally, water planners have used the HNFY concept to assess the yields of storages. The HNFY of a dam is based on the existing historical records for its catchment. The HNFY is the yield of dam such that, for the period for which records exist, that dam would not have reached its dead storage level. In other words, HNFY is equivalent to the maximum yield that could have been supplied during the worst drought on record, by just emptying the dam.

Historical methods of yield assessment inherently assume that future climate patterns will be the same as the past record (ie climatic stationarity). It is possible and, given enough time, perhaps inevitable that more extreme droughts than those observed and captured in the record will occur. This is being evidenced at present in a number of SEQ catchments where the current drought is defining the critical period for HNFY which is continuing to fall as the drought continues. This effectively means that HNFY estimates will, given enough time, reduce as longer and more severe droughts are experienced.

A further limitation in using historical assessment methodologies is that they do not in themselves provide information about the seriousness or likelihood of future potential supply failures (ie the probability or "risk" of supply failure).

(b) LOS Approach

The WSAA advocates that water supply planners adopt a LOS approach (Erlanger and Neal, 2005). The LOS approach differs from the HNFY concept in a number of important ways.

Firstly, the LOS approach recognises that climate and stream flows are probabilistic in nature. This means that in regions where the climate is variable the recorded past may only be a general guide to the future. However, it is possible to apply statistical techniques to the historic record of a catchment to develop:

- a stochastic model of climatic and stream flow behaviour in a particular catchment; and
- an estimate of the probability that a dam will run out of water at differing yields.

Secondly, the yield of a dam is defined in terms of both the probability that the yield will not be met and the LOS objectives deemed acceptable. LOS objectives are defined in terms of the maximum frequency, duration and severity of restrictions that a community considers acceptable.

This means that the LOS yield of a dam or water supply system is the annual volume that can be supplied at the adopted level of service objective (which encompasses the frequency, duration and severity of restrictions). Unlike HNFY, the yield of a storage as defined through the LOS approach is always assigned a probability of occurrence, as defined by the level of service objective.

The LOS approach aims to be forward looking and communicate to the community how their water supply system will perform over time in terms of the frequency, duration and severity of restrictions. Under the LOS approach, restrictions are a major, but not the only, contingency measure available to water supply managers.

The LOS approach proceeds on the basis that in the future the climate will have the same probabilistic features as in the past. This in turn rests on two important assumptions:

- the existing historic record is long enough to capture all the probabilistic features of the climate and that the frequency, duration and severity of droughts can be robustly predicted; and
- climate change is not occurring and the frequency, duration and severity of droughts is not going to change adversely.

Consideration of these assumptions provides further rationale to adopt a prudent approach to the issue of water supply estimates. In formulating LOS and designing water balance solutions, provision also needs to be made for climate change.

In large urban regions with high populations, such as SEQ, underestimating the frequency, duration and severity of droughts could cause very significant social and economic disruptions. This would be unacceptable. If droughts significantly worse than those previously experienced occur, restrictions may not prevent a total failure of supply which, in large urban regions like SEQ would bring catastrophic consequences. Consequently, contingency planning for SEQ should not just rely on restriction regimes. Instead, the region's LOS objectives and contingency planning must focus on meeting the challenge of droughts worse than those previously experienced.

(c) LOS Criteria

The SEQLTS report noted that a set of LOS criteria for Level 2 restrictions has been discussed during the preparation of the SEQRWSS. These restrictions include:

- Frequency—Level 2 restrictions possibly no more than 1:50 to 1:100 ARI (average recurrence interval);
- Duration—mean duration of 12 months and maximum duration 36 months (controlled through the adoption of contingency planning measures); and
- Severity—Level 2 restrictions achieving a 15% reduction in demand and applying no more than 3% of the time on average.

Under the report, Level 2 restrictions apply when there is two years restricted demand available within the water supply system.

For preliminary planning purposes, these criteria were considered appropriate after review of yield tables for storages in SEQ.

The LOS criteria will be finalised through the SEQRWSS under the supervision of the QWC. Recent experience indicates that it may be appropriate to review the criteria for restrictions and levels of reserves of restricted supply to provide sufficient time to develop new supplies in the event of a severe drought. The current experience is demonstrating that more than two years of reserves may be appropriate. Sensitivity assessments have been run on LOS criteria, varying restriction periods and allowances for construction timelines and contingency reserves. These have resulted in marginal changes to prudent yield assessments in the SEQLTS. The concept of prudent yield is discussed later in this section.

Approaches to the Problem of Reliability of Supply

There are two fundamental approaches to the problem of reliability of supply. The first, a **low hydrological risk approach,** relies only on the yield selection and water restrictions to ensure reliability. The second, a **managed hydrological risk approach**, puts greater focus on a deliberate reliance on contingency supplies as the basis for water supply planning.

Both approaches have relevance.

The premise of the **low hydrological risk approach** is that there should be no need to rely on contingency supplies. On reaching low storage levels, the supply authority simply imposes increasingly severe restrictions in an endeavour to avoid running out of water. Under this approach, the chance of actually running out of water is extremely small, but is nevertheless a cause for concern. This type of approach is more relevant to situations where water supplies are highly dynamic such as the Baroon Pocket Dam and the Hinze Dam which, if operated at HNFY, have about two years of supply without inflow. In these circumstances, it would be difficult to set triggers which would not be activated frequently. Hence, additional supplies must either exist or be able to be activated almost immediately to ensure that the probability of failure is extremely small. The effect is to significantly de-rate the yield of the surface supply or to bring forward new infrastructure which effectively reduces the risk of failure.

The **managed hydrological risk approach** considers contingency planning as an important part of water supply planning. Deliberate reliance on contingency planning is built into water supply planning to achieve the lowest social, economic and environmental cost in the long-term.

For example, Level 2 restrictions would be imposed and supplies would start to be drawn from the contingency storage while previously planned contingency supplies are implemented. The chance of the storage itself actually running out of water is again extremely small but is not a cause for concern as the contingency supply will ensure the essential needs of the community are met, regardless of climatic conditions. Once implemented, the contingency supply may become part of permanent supply arrangements and would postpone the need to implement further supply sources.

The size of the contingency storage is determined by the time required to implement the contingency supplies, and may be significant. The need to assign some of the working storage to contingency storage means that dams must be significantly de-rated.

Given the ramifications of running out of water in SEQ, it is essential that strategies are put in place to ensure that managers of water supplies can demonstrate that they are always in control and able to manage water supply risks. Doing so will provide the ability to deal with any unforseen climate variations and climate change circumstances.

While details of the different approaches to managing supply risk will be developed during finalisation of the SEQRWSS, it is clear that significant upgrades to supply are necessary across the region.

The current ongoing drought illustrates that HNFYs exceed by far the prudent utilisation of our water supplies. From the analyses conducted to date and the behaviour of dams throughout the region over the last five years (with all major dams except for the Baroon Pocket Dam reaching critical supply levels), it is clear that the current capacity of supply in the region should be de-rated.

Recently, modelling incorporating sensitivity assessments to understand the impact of varying the frequency and severity of restrictions, and the provision for contingency storage to allow implementation of drought projects, has been undertaken as part of the development of the SEQRWSS. This modelling

indicates that the yield of the existing water supplies in SEQ should be de-rated to approximately 440,000 ML/a (Note: in the SEQLTS report the yield of existing supplies in SEQ were de-rated to 450,000 ML/a).

The de-rated yield or water take has been referred to as the 'prudent yield'.

The reality is that this reduction in yield estimation is a product of updating HNFY estimates and adopting a more contemporary LOS / prudent yield approach. These latter approaches do not reflect a change in the hydrological basis used in yield assessment, or the introduction of increased conservatism; rather they are an adoption of different and more relevant criteria.

HNFY by itself is an estimate of the yield which would, over the historical record, have resulted in imminent failure. In the context of major urban water supply systems, as discussed above, failure is unacceptable. Prudent yield provides inbuilt lead time to develop emergency supplies in the event of extreme unprecedented drought.

LOS criteria are applied to meet the community's expectations in terms of frequency, duration and severity of water restrictions. Designing and operating water supply infrastructure based on HNFY analysis, (which inherently ignores all of these aspects) can be seen as being a high risk approach. Operating a system at HNFY levels would result in lower and undefined levels of service and higher undefined risks of actual, unacceptable failure.

With the prudent yield of the region being about 440,000 ML/a and the available and accessible supply from of all existing water sources in the region being about 520,000 ML/a, this represents a de-rating of 15%.

6.2 Climate Change Impacts

(a) Preliminary Assessment of Climate Change Impacts on Inflows into SEQ Storages

CSIRO have prepared a report for the Queensland Government entitled "Climate Change in Queensland under Enhanced Greenhouse Conditions Report 2004-2005". This report describes the range of possible climate outcomes for 2030 and 2070. The general conclusion for Queensland is that the temperature may increase by 2 degrees celsius, and rainfall will tend to decrease over the State by up to -13% by 2030. A preliminary assessment of the impact of climate change on inflows into SEQ storages has been conducted using the outputs from a range

of general circulation models and an approximate method of down-scaling the climate information to the catchment scale. The results show average annual inflows tending to decrease by up to -16%. The impact on yields is similar but may further reduce yields if future down-scaling work reveals longer embedded dry periods.

The SEQLTS report caters for a climate change impact of ten percent on yields which is consistent with the preliminary estimates of reduction in flows and yields.

The Queensland Climate Change Centre of Excellence is currently formulating its science plan for the next five years. Developing improved downscaling techniques for SEQ will be one of its priorities.

6.3 The Supply/Demand Gap

On the basis of the LOS approach outlined in section 6.1(b), current dam levels would trigger the development of contingency plans to enhance the supplies to the Wivenhoe, Somerset and North Pine Dams supply area. Further, research data suggests that communities reliant on small coastal and inland dams are also at high risk of supply failure and contingency arrangements need to be put in place in the very near future.

The 2004 Stage 1 SEQRWSS Report identified on the basis of HNFYs and experience that:

- Gold Coast already has a security of supply risk;
- supplies for Caloundra and Maroochy would be fully utilised by around 2017;
- supplies for the Wivenhoe, Somerset, North Pine Dams service areas would need to be augmented by between 2018 and 2026;
- supplies to the Gympie and Noosa areas were threatened when Borumba Dam reached record lows in 2003, requiring an amendment to the IROL for the Mary Valley Water Supply Scheme;
- supplies to Beaudesert have been threatened for several years with the IROL for the Logan Water Supply Scheme being amended to protect urban supplies as a result of the ongoing low water levels in Maroon Dam; and
- supplies to Toowoomba would be fully utilised by around 2010. (Since 2004, the yield of all the Toowoomba dams has been revised downwards and supply capacity was exceeded in 1998).

It was reported in the SEQLTS that it will be necessary to provide by 2026 and 2051 additional supplies to satisfy supply / demand gaps as indicated in Table 6.1 below.

Table 6.1: Additional budget yield required at 2026 and 2051 under "Business as Usual" and "Medium Demand Savings" scenarios from SEQLTS

	2026		2051	
	'Business as Usual' Scenario	Medium Savings Scenario	'Business as Usual' Scenario	Medium Savings Scenario
Anticipated Demand ML/a	670,000	570,000	950,000	750,000
Existing Prudent Yield ML/a	450,000	450,000	450,000	450,000
Additional Prudent Yield required ML/a	220,000	120,000	500,000	300,000

Based on the more recent information summarised in Table 6.2, the Queensland Government is planning to meet the identified demands on the basis that the high savings scenario outcomes can be achieved. That is, the Queensland Government is advancing planning to address the identified additional demand assuming high savings demand measures that are implemented achieve targeted savings.

Table 6.2: Adopted demand and additional supply required by 2026 and 2051, medium series population projection

	2026				2051			
	'Business as Usual' Scenario, medium series population	High Savings Scenario, medium series population	'Business as Usual' Scenario, high series population	High Savings Scenario, high series population	'Business as Usual' Scenario, medium series population	High Savings Scenario, medium series population	'Business as Usual' Scenario, high series population	High Savings Scenario, high series population
Anticipated Demand ML/a	670,000	520,000	750,000	590,000	920,000	710,000	1,100,000	870,000
Existing Prudent Yield ML/a	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000
Additional Prudent Yield required ML/a	230,000	80,000	310,000	150,000	480,000	270,000	660,000	430,000
Approximate additional Prudent Yield required with 10%[a] allowance for climate change ML/a	270,000	120,000	350,000	190,000	520,000	310,000	700,000	470,000
Allowance for additional supply to the rural sector[b] ML/a	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Total additional prudent yield being planned for incorporating allowance for climate change and the rural sector ML/a	290,000	140,000	370,000	210,000	540,000	330,000	720,000	490,000

[a] 10% allowance for climate change applies only to climate affected sources. It has been assumed that the bulk of SEQ ground water sources will be climate affected.

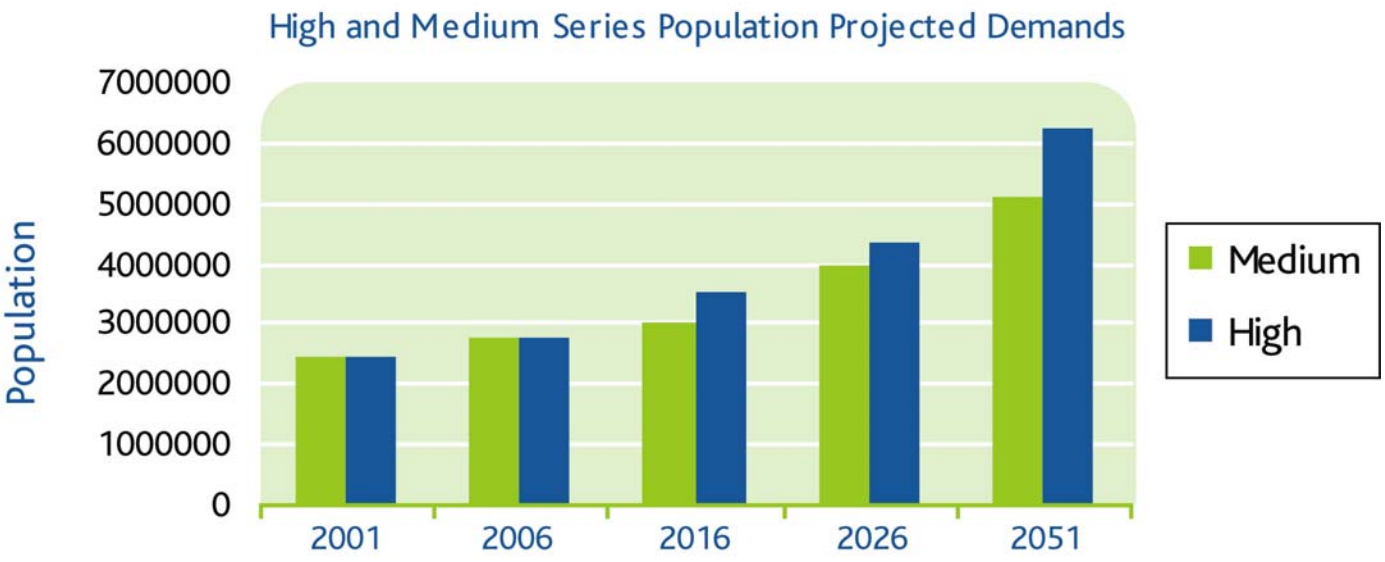
[b] It has been estimated that between 40,000 and 60,000 ML/a medium priority water would greatly assist the rural sector. As a medium priority type this converts to about 20,000 ML/a of prudent yield.

In addition to meeting the additional prudent yield requirements of urban and industrial demands, the QWC is investigating the possibility of providing 40,000 to 60,000 ML/a medium priority supplies for the rural sector in SEQ, which is equivalent to about 20,000 ML/a of prudent yield.

Finally, the Queensland Government will also ensure that it can meet the demands resulting from high series population projections, in order to accommodate the worst case scenario (ie the 'high series' population demand projections).

The demands to be met resulting from high series and medium series population projections are shown in Figure 6.1 below.

Figure 6.1: High and Medium Series Population Projections



Source: Queensland Government Projections 2006 and Queensland Department of Local Government, Planning, Sport and Recreation – Queensland's Future Population 2006

6.4 Strategy to Address the Supply/Demand Gap

Planning for future supplies must address the supply / demand gap and also identify non-climate dependent contingency supplies for severe drought conditions.

On the basis of the supply/demand gap analysis in section 6.3, 540,000-720,000 ML/a will need to be provided to satisfy projected 'business as usual' demand by around 2051

and between 150,000 and 200,000 ML/a of contingency will need to be identified and pre-planned.

Strategic approaches to address the supply/demand gap and contingency requirements include:

- water use efficiency / demand management measures;
- diversification of supply sources (rainfall and non-rainfall dependent options);
- provision of contingency supply to protect against severe drought; and
- interconnection of supplies to provide an integrated water supply system and full utilisation of available yields.

Through the development of the SEQRWSS, which commenced in 2003, the foundations for establishing a regional suite of supply and demand responses to the supply/demand imbalance had been established. The SEQRWSS was due to be finalised in late 2006, however, the current drought (which is the worst in 100 years) has forced the fast-tracking of the development of new water supply sources.

Water Use Efficiency

On the basis of the high savings scenario demand assessments and medium series population projections (summarised in Figure 6.1), it can reasonably be expected that about 210,000 ML/a savings can potentially be achieved by 2051. For the high series population projections, this saving rises to 230,000 ML/a.

Between 330,000 and 490,000 ML/a (as shown in Table 6.2) will need to be able to be developed as new supplies/augmentation works by 2051 to meet the projected supply / demand gap.

Diversification of supply sources

On the basis of the information contained in this Submission (at section 5 of this Submission), it is clear that additional supplies could be developed as follows:

- **Water Resource Planning:** which may permit up to 250,000 ML/a in additional surface water supply to be developed in SEQ, noting that the most reliable supply would occur through the development of the Traveston Crossing Dam site, at a capacity of 150,000 ML/a (prudent yield);

- **Ground water:** about 20,000 ML/a of additional sustainable ground water extraction;
- **Desalination facilities:** extensive supplies are available through the development of desalination facilities, though the number of suitable desalination sites in SEQ is limited, with the Tugun desalination site likely to be the only suitable desalination site south of Moreton Island;
- **Purified recycled water:** significant supplies of purified recycled water are also available for SEQ, noting that the major opportunity to recycle SEQ's water is currently being developed. Preliminary work by the QWC has estimated that the future additional purified recycled water capacity that might be developed in the future would be limited to about 60,000 ML/a.

Even if all possible surface water and ground water options were fully developed to supply SEQ's demands, other supply options will still be needed to supply the identified shortfall.

Contingency Supply

The calculation of contingency supply requirements is determined by subtracting from the restricted demands the non-climate dependent supply source capacity and net drought inflows into existing water storages.

The current drought has shown that at least 150,000 ML/a to 200,000 ML/a of drought contingency supply needs to be developed. Of this amount, about 120,000 ML/a is under development in the form of recycled and desalinated water supply. The remainder of the contingency supply during this current drought is to be obtained from ground water development, other recycling initiatives and transfers from areas with surplus supplies.

Whilst 120,000 ML/a of recycled and desalinated water supply is currently being developed as an emergency supply measure, these projects and sustainable ground water supplies will become part of the long-term diversified permanent supply for SEQ.

In consideration of the LOS requirements proposed for the future and the desire not to restrict supplies below 85% of normal consumption, even in the longer term, with the development of non-climate dependent sources, it can be expected that the ability to develop an additional 150,000 to 200,000 ML/a of emergency supplies above that currently under development will need to be retained.

Summary Supply / Demand Gap

It has been estimated that between 190,000 and 350,000 ML/a of pre-planned contingency supply capability and new water supply infrastructure will be required by 2051 over and above the current infrastructure program. This has been based on medium and high series population projections and high savings demand projections outlined in this Submission.

190,000 to 350,000 ML/a would require the identification/development of 500 to 950 ML/a of non-climate dependent sources by 2051 following completion of the water infrastructure program currently being implemented.

Because the strategic reserves available under WRPs will effectively be fully developed under the infrastructure program, all of these requirements will need to be supplied from desalination or purified recycled water. This could involve up to the equivalent of eight desalination facilities equal in size to the one currently under construction at the Gold Coast. This may exceed the total capacity of identified potential desalination sites in SEQ.

Considering the requirements to meet identified demand, allow for contingency supplies and recognising the constraints on developing desalination and recycled water supplies, the development of surface supplies cannot be dismissed.

The GHD report and subsequent investigations have established that by far the largest yielding and most secure potential future dam site in SEQ is the Traveston Crossing Dam site.

Given the significant size and yield advantages offered, it was recognised that securing this site for surface water development was a critical element of the water balance equation.

6.5 Government policy – Drought response and long-term planning

Following completion of the draft GHD Report, the Queensland Government was faced with deciding how many of the most highly ranked dam site opportunities should be investigated in more detail (including completion of drilling/geotechnical studies and a more detailed review of environmental and social factors).

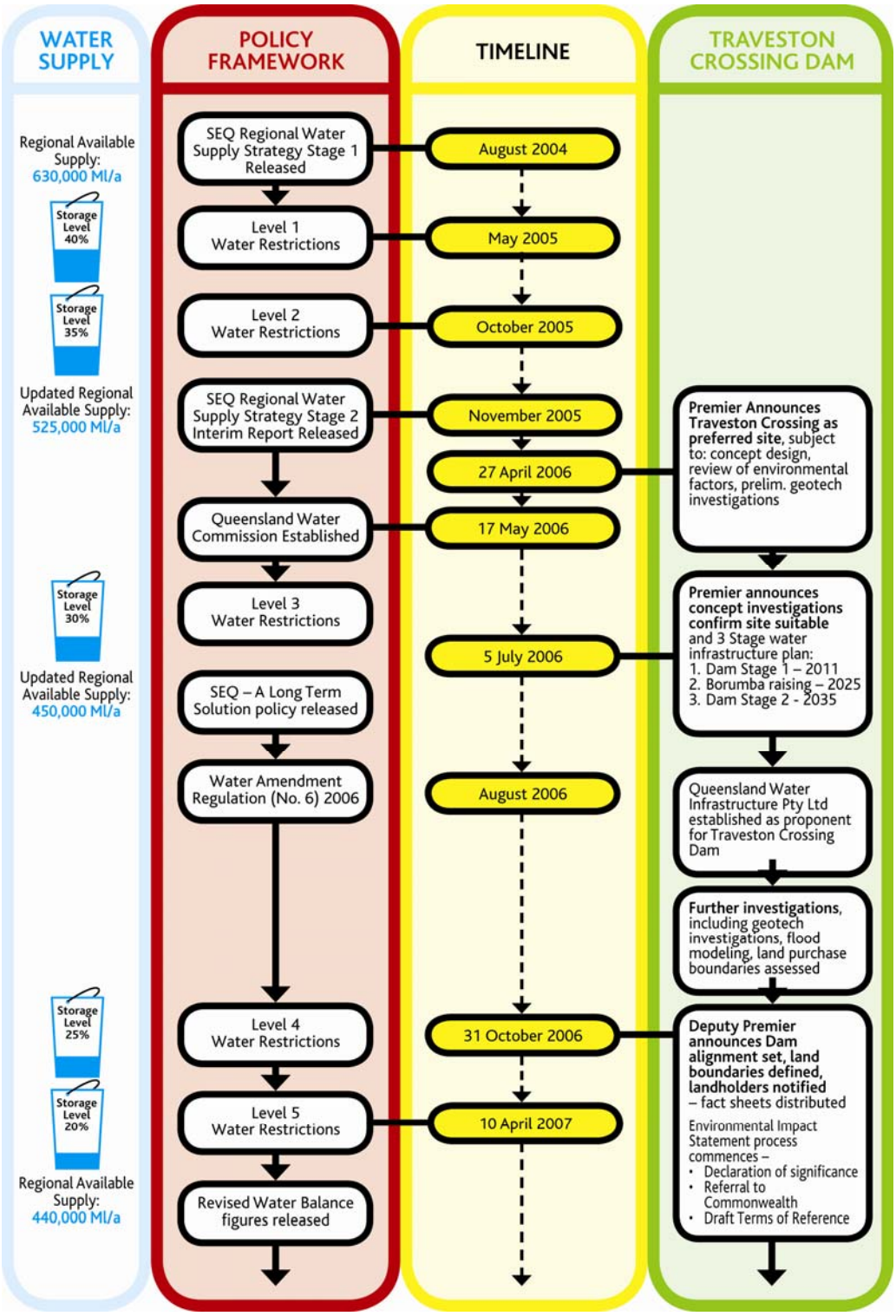
At about the same time, from November 2005 to April 2006, with dam levels at just above 30% and level 3 restrictions about to be applied in a drought that was now equal to the

worst on record, the Queensland Government also faced the problem of expediting drought and shorter term water supply solutions in an environment where organisational arrangements existing between the Queensland Governments, councils and several water service providers were not conducive to the responsive decision making necessary.

Consequently, the Queensland Government took the lead through a series of strategic initiatives and announcements as detailed below. In the context of the severe drought and the forthcoming regional water security risks, planning processes had to be expedited.

The following diagram illustrates the relationship between the diminishing availability of regional water supplies, Queensland Government policy decisions on water supply and demand and decisions relating to the proposed Traveston Crossing Dam.

Figure 6.2: Relationship between water supplies, Queensland Government policy decisions and the decision relating to the proposed Traveston Crossing Dam



(a) SEQ Regional Water Supply Strategy – Stage 2 Interim Report – November 2005

The SEQ Regional Water Supply Strategy – Stage 2 Interim Report was produced jointly with the Council of Mayors and explained how water needs would be met in the short and medium term and the list of initiatives and projects that were to be fast tracked at the time. These included:

- water restrictions, water conservation, pressure reduction and leakage management to reduce consumption and water losses;
- recycled water substitution to industry and power stations to reduce the demand from the Wivenhoe and Somerset Dams system;
- recommissioning a number of small dams not used since the construction of Wivenhoe Dam;
- development of minor aquifers;
- construction of Cedar Grove Weir on the Logan River and a weir on the Mary River;
- investigation of regional desalination facilities; and
- optimised distribution and management of existing water supplies.

(b) Announcement of Investigations into Dam Sites - Late April 2006

Following consideration of the draft GHD Report outcomes, the Queensland Government announced the investigation of the Traveston Dam site on the Mary River and the Tilleys Bridge Dam site on the Logan River with a view to completing drilling, concept designs and prefeasibility level environmental and cultural heritage assessments.

In respect of the Traveston Crossing Dam, the intention was to move to the feasibility stage of planning and detailed design of the dam if no critical issues were identified. In relation to the Tilleys Dam, a decision was to be made between the Tilleys Bridge and the Wyaralong Dam sites following completion of relevant investigations.

A principal reason for the selection of the Traveston site was its potential to provide significant quantities of water to meet the needs of the growing population of SEQ. No other single site in SEQ could be developed to provide water in comparable quantities. A dam at the Traveston site would also provide

attenuation of flood flows to the Mary Valley downstream including the town of Gympie and water security for downstream communities in a shire that is currently drought declared.

The site therefore had long-term strategic value and was considered to be able to deliver benefit to the SEQ and Wide Bay region more economically than other alternatives.

Having made the decision that the Traveston Crossing Dam was of long-term strategic value and that the site should be preserved, proceeding with construction of the dam subject to satisfactorily complying with all approval processes was an obvious and most cost-effective way forward.

The Tilleys Bridge site on the upper Logan River had been identified as a possible site for a dam in the Beaudesert region as an alternative to the previous proposal of Wyaralong Dam. Further investigations, including geotechnical works, were proposed to determine which site was preferred.

An initial phase of more detailed investigations of the three sites was to be completed within two months and was to confirm that dams could be constructed at these sites. This initial phase of more detailed investigations was also to provide information to enable a decision to made on which of the Tilleys Bridge or Wyaralong dams would be built.

(c) Establishment of the QWC - May 2006

The *Water Act (Qld) 2000* provides for the fair, orderly and efficient allocation of surface and ground water to meet community needs. Until recently, there were no provisions in that Act to enable best management of all water supplies including alternative supplies in situations such as that existing in the SEQ region.

On 17 May 2006, the *Water Amendment Act 2006 (Qld)* was assented to, establishing the QWC.

The QWC has five functions:

(1) Providing options: providing advice to government on achieving water security through supply and demand measures, including LOS objectives for each water service provider, infrastructure required, the likely cost and pricing implications, and preferred ways of sharing the cost.

(2) Implementing Queensland Government approved programs: based on advice on options provided by the QWC the Government approves a regional water security program incorporating infrastructure to be built and by whom, and demand measures to be adopted. QWC then monitors progress in the implementation of the program.

(3) Ensuring compliance with the program: QWC establishes a system operating plan for connected systems to ensure water service providers comply with the intent of the regional water security program.

(4) Setting water restrictions: QWC will, if necessary, impose and enforce restrictions if there is a significant threat to water supply security.

(5) Providing advice where requested by the Queensland Government.

The SEQRWSS now scheduled to be released for public comment in the middle of 2007, will be completed under the direction of the QWC.

The QWC is overseeing the development of institutional arrangements and identification of strategic infrastructure necessary to address:

- how water is shared at all times;
- service levels for all locations and at all times (including during drought);
- how to meet and fund future water needs;
- supply delivery and infrastructure operations; and
- environmental concerns.

(d) Announcement of Traveston Crossing and Wyaralong Dams - Early July 2006

Following completion of more detailed investigations, the Queensland Government announced that the Traveston Crossing Dam and Wyaralong Dam would be constructed by the end of 2011.

The detailed investigations undertaken to confirm site suitability included:

- geological investigations;
- concept designs for the dams;
- a Review of Environmental Factors;

- land acquisition assessments;
- transport infrastructure assessments; and
- cost estimates.

The full development of both the Traveston Crossing and Wyaralong Dams is subject to comprehensive engineering assessment and satisfactory outcomes with respect to environmental impact assessments and other approvals.

A number of potentially significant environmental impacts have been identified and consideration of these impacts is required in more detail. However, without pre-empting the outcomes of the detailed EIS process, it is anticipated that measures can be adopted to mitigate these impacts to an acceptable level.

Geotechnical investigations confirmed that dams could be built at either site. From a geotechnical perspective, the Wyaralong site was considered superior to the Tilleys Bridge site.

(e) Water for SEQ: a long-term solution - Early July 2006

SEQLTS presents a comprehensive range of measures designed to meet future demands for water in the region to about 2051. It explains the rationale behind the Queensland Government's water infrastructure announcements and background material on which decisions have been based. In particular, it explains the impact of the current unprecedented drought on planning strategies to ensure the future provision of secure water supplies.

A diversified supply strategy both spatially and in respect of source type, particularly including desalination and water recycling which are less impacted by drought, will reduce the region's susceptibility to drought. Prudence will be required in adopting appropriate yields of storages. At the time of preparation of the report purified recycled water for drinking water purposes was not a Queensland Government approved supply option.

It was proposed that in the short-term to 2016, the following water supply infrastructure would be built with a conservative allowance for yield to address urban and industrial needs:

- Wyaralong Dam and Cedar Grove Weir (21,000 ML/a);
- Tugun Desalination Plant (45,000 ML/a);

- Western Corridor Recycled Water Project (30,000 ML/a);
- Raising of Hinze Dam (6,000 ML/a);
- Traveston Dam Stage 1 (70,000 ML/a);
- BOS (5,000 ML/a);
- Water harvesting to Hinze Dam (10,000 ML/a); and
- other smaller projects including island and mainland ground water development, water harvesting proposals, raising of Mt Crosby Weir, recommissioning of small dams and other industrial recycling initiatives (38,000 ML/a).

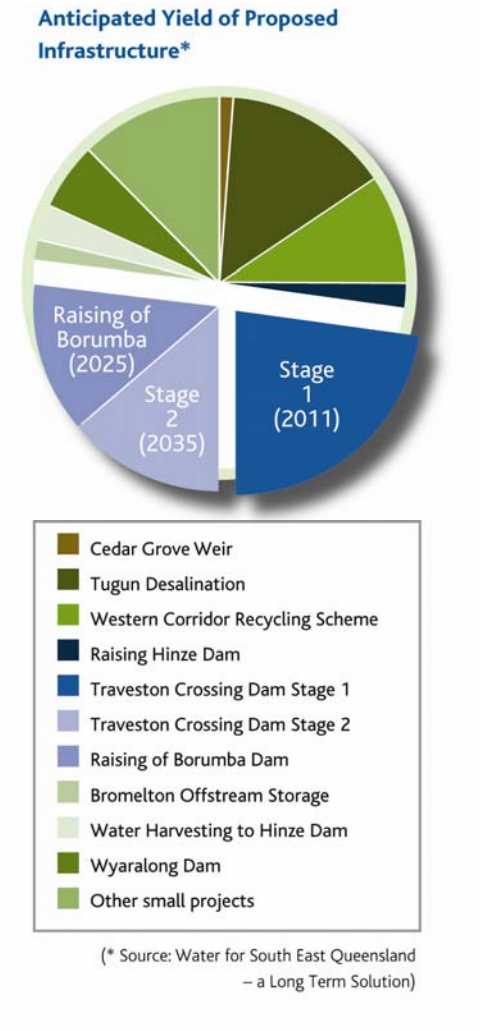
The above yields are sources from SEQLTS. Following the decision that purified recycled water will form part of the normal supply, the yield of the Western Corridor Recycled Water Project has increased to 76,000 ML/a.

In the longer term, beyond 2025, it is expected that a large raising (stage 3) of Borumba Dam would occur to supply in conjunction with Stage 1 of Traveston Dam an additional 40,000 ML/a followed more than a decade later by Stage 2 of Traveston Dam to deliver an extra 40,000 ML/a. Stage 2 of Traveston operating in conjunction with the raised (Stage 3) Borumba Dam will deliver 150,000 ML/a with provision for environmental flow releases.

Combined, all these sources will prudently deliver for urban and industrial usage about 305,000 ML/a and would meet the region's future water needs beyond 2051 depending on the success achieved in reducing demand.

Figure 6.3 demonstrates that the Traveston Crossing Dam (Stages 1 and 2), in conjunction with the raising of Borumba Dam, will deliver approximately half of the additional water supply needed to meet expected demand by 2051.

Figure 6.3: Anticipated Yield of Proposed Infrastructure



Major pipeline projects needed to form the Water Grid including the Southern Regional Water Pipeline and the Northern and Eastern Inter-connectors to transfer water from the proposed Gold Coast Regional Desalination Plant (Tugun), Traveston Crossing Dam and North Stradbroke Island were also discussed.

(f) Water Amendment Regulation (No. 6) 2006 (Qld) - August 2006

The Water Amendment Regulation was made as a response to the current worst drought on record and aimed to expedite the coordinated delivery of initiatives and projects, most of which had previously been identified in the SEQLTS report. As many projects required local government/water service provider cooperation,

lead agencies were identified to coordinate the delivery of outcomes and measures identified in the Regulation.

(g) Bulk Water Supply Infrastructure Suite for SEQ

Detailed consideration of potential water supply solutions has categorically demonstrated that a single solution to the long-term water needs of SEQ does not exist. The Queensland Government is committed to a diversified bulk water supply infrastructure strategy to ensure that water supplies in SEQ are sufficient to meet future demand and are managed on a sustainable and integrated basis.

The bulk water supply infrastructure program can be divided into projects to be implemented by 2012, and projects scheduled to be implemented beyond 2012.

A profile of each of the projects and their status of development is detailed in Tables 6.4 and 6.5.

The benefits of this suite of projects include:

- management of the risk of the current drought, recognising that previous droughts have lasted 10 years or longer;
- management of the uncertainty of urban, industrial and rural growth and future climate variability and change;
- preservation of the best dam sites in SEQ;
- taking advantage of the lowest energy options first;
- providing increased flood and water supply security for the Mary Valley townships; and
- leaving options for the next suite of projects for the next drought.

Table 6.4: Bulk Water Supply Infrastructure Program to 2012

Project Title	Project Description	Date Complete	Current Status
Cedar Grove Weir	Weir on the Logan River near Jimboomba. Will operate in conjunction with Wyaralong Dam and Bromelton Offstream Storage	31/12/2007	• Commonwealth approval not required. • State approvals progressing. • Design work completed. • Construction to start May 07.
SEQ (Gold Coast) Desalination Project	Facility based at Tugun will desalinate seawater to a potable water standard. It will have the capacity to produce up to 125 ML/day for distribution across SEQ.	30/11/2008	• Preparatory site work commenced in September 06. • Excavation of intake/outlet shafts substantially progressed. • Major site works to commence April 07.
Western Corridor Recycled Water Project	Bulk recycled water supply linking Luggage Point on Brisbane's east to Caboonbah in the north-west of SEQ. This water will be used by power stations and industrial users and to supplement the urban water supply via Wivenhoe Dam. Overall length of pipelines is approximately 200km with a combined capacity to supply 210 ML/day.	Stage 1A 31/7/2007 Stage 1B 30/4/2008 Stage 2 31/12/2008	• Bundamba to Swanbank pipeline under construction. • Bundamba 1A Advanced Water Treatment Plant under construction. • Western pipeline section to Wivenhoe – under construction. • Eastern pipeline section to Luggage Point – under construction. • Luggage Point & Gibson Island Treatment Plant – under construction.

Southern Regional Water Pipeline	A 100 km bulk treated water supply network between Brisbane and the Gold Coast with reverse flow capacity to distribute up to 130 ML/day.	30/11/2008	• Pipeline construction started October 06.
			• Main construction activities progressing include:
			  • pipelaying in the Bundamba/Swanbank area;
			  • Bremer and Brisbane River crossings;

			• construction of the North Beaudesert Balance Tank; and • major road crossings
Eastern Pipeline Interconnector	A total of 20 km of pipelines to connect Redland Shire bulk water sources (North Stradbroke Island aquifer and Leslie Harrison Dam) with the SEQ Water Grid at Logan City to distribute up to 22 ML/day	31/12/2008	• The project is currently in the preliminary planning phase, with a series of detailed site investigations progressing. • A pre-lodgement briefing with the Federal Department of the Environment, Heritage and Water Resources was undertaken on 12 February 2007. • Detailed assessment and project design yet to undertaken.
Northern Pipeline Interconnector	A 90 km pipeline to connect the Sunshine Coast bulk water storages (Mary River-Noosa, Baroon Pocket Dam, Wappa Dam and Ewen Maddock Dam) with the SEQ Water Grid at Morayfield/Narangba to distribute up to 65 ML/day.	31/12/2008	• A range of preliminary and interim preconstruction activities are progressing, including environmental assessments and approvals processes, community and stakeholder consultation, concept engineering development, corridor selection and land assessment activities.
Bromelton Offstream Storage	Construction of an 8,000 ML storage facility adjacent to the Logan River in the vicinity of Bromelton. This project will generate an extra 5,000 ML/a through water harvesting from the Logan River.	31/12/2009	• Necessary preliminary feasibility investigations, including preliminary geotechnical, environmental scans, and hydrological modelling are being advanced. • A preferred site has been selected. Further detailed investigation and acquisition work is progressing to confirm the site. • Detailed approvals yet to be sought.

Hinze Dam Stage 3 Project	Stage 3 proposes raising the Hinze Dam embankment from 93.5 metres to approximately 108.5 metres. The FSL will be raised by 12.3 metres, providing a water storage capacity in excess of 300,000 ML. The project aims to achieve a 50% reduction in the peak flood outflow from Hinze Dam for the 1 in 100 year flood event, thereby reducing flood levels in the lower Nerang River Catchment. The raising will also increase the dam's water supply yield by at least an additional 16 ML/day	31/12/2010	• The Federal Department of the Environment, Heritage and Water Resources decided, on 16 January 2007, that the project is a controlled action under section 18 of the EPBC Act. • The ToR for the EIS will be finalised during April 2007.
Traveston Crossing Dam Stage 1	The first stage of Traveston Crossing Dam, will involve the construction of a 153,000 megalitre storage on the Mary River, approximately 16km south of Gympie. Stage 1 of the dam will deliver up to 70,000 ML/a. (Full details at Section 8 of this Submission)	31/12/2011	• On 29 November 2006 the then Federal Minister of the Department of Environment and Heritage decided that the Project constitutes a 'controlled action' under the EPBC Act. • The ToR for the EIS will be finalised in April 2007. • Preconstruction project development advancing, including full EIS, water quality and land management, cultural heritage assessment and community consultation.
Wyaralong Dam	The project is to be located on Teviot Brook, approximately 14 kilometres north-west of Beaudesert in the Logan River catchment. It is estimated that the system will yield up to 21,000 ML/a, when operated in concert with Cedar Grove Weir on the Logan River.	31/12/2011	• On 13 December 2006 the Federal Minister of the Department of Environment and Heritage decided that the Project constitutes a 'controlled action' under the EPBC Act. • The ToR for the EIS will be finalised in April 2007. • Preconstruction project development advancing, including full EIS, water quality & land management, cultural heritage assessment, community consultation, and voluntary land acquisition.

Table 6.5: Bulk Water Supply Infrastructure Program beyond 2012

Project Title	Project Description	Year Complete (estimated)	Current Status
Northern Regional Water Pipeline	Pipeline to connect the Traveston Crossing Dam to the Northern Pipeline Inter-connector. Ultimate aim is to connect the proposed Traveston Crossing Dam near Gympie with storages supplying the Sunshine Coast, Caboolture and Brisbane. This will potentially allow water to be moved between six different dam systems, each with different catchment characteristics.	2011	• Only preliminary planning has commenced for this Project at this time.
Additional recycling to industry and other minor sources –ground water developments	Identification of options to increase potential recycling to industry across the region and Identification of potential sources of ground water for use in SEQ	2020	• Local Governments pursing potential localised recycling options. • Investigations of potential ground water sources by DNRW ongoing
Borumba Dam Stage 3	Raise Borumba Dam to a FSL of around 163.7 metres, with a capacity of some 350,000 ML. It is anticipated that a raised Borumba Dam will be capable of generating an additional 40,000 ML/yr, when operated in concert with Traveston Stage 1.	2025	• A community - led proposal to raise Borumba Dam as an alternative to the proposed Traveston Crossing Dam Stage 1 is currently being assessed by the QWC.
Water harvesting into Hinze Dam Stage 3	Increase the yield of Hinze Dam Stage 3 by water harvesting from adjacent creeks such as the Coomera River, Canungra and Mudgeeraba creeks.	2016	• Preliminary investigations have commenced.
Traveston Crossing Dam Stage 2	The second stage of Traveston Crossing Dam involves all necessary dam and other infrastructure modifications to increase the storage capacity to 570,000 ML. Traveston Crossing Dam, when finalised at stage 2, will deliver 150,000 ML, operating in concert with a raised Borumba Dam.	2035	• Voluntary land purchases for those landholders potentially affected by Stage 2 commenced. • Preliminary project planning to inform optimisation of infrastructure relocation.

(h) Regional Water Balance – most recent considerations

Benefits of this suite of projects includes:

- managing the risk of the current drought, remembering we have had droughts that have lasted 10 plus years in the past;
- managing the risk of urban population and industry and rural growth and future climate change;
- utilising the lowest levelised cost options first;
- preserving the best two SEQ dam sites;
- taking advantage of the lowest energy options first;
- giving increased flood security for the Mary River townships;
- increasing water security for Gympie and Mary Valley townships; and
- leaving options for the next suite of projects for the next drought.

7. THE PROCESS OF SELECTING THE TRAVESTON CROSSING DAM SITE AS THE PREFERRED OPTION

Summary

Traveston Crossing was selected as a site for further examination as a result of a detailed desk top study undertaken by independent expert advisers, GHD. This study examined some 80 potential surface water sites throughout SEQ and conclusively determined that the proposed Traveston Crossing Dam provides by far the largest yield and most secure potential future dam site in SEQ. This derives from the much greater catchment commanded by the dam site in a comparatively wet area as compared to other areas of SEQ and the development permitted by the WRPs in SEQ.

Traveston Crossing Dam's location was selected as a preferred site through a broad ranging regional assessment. Since this selection, technical analysis has confirmed the appropriateness of this location. The investigations completed to date have confirmed the initial assessment that foundations along the dam alignment are suitable for the proposed dam structure.

7.1 Introduction

In order to promote sustainable management and best use of water, the Queensland Government has adopted a three pronged planning hierarchy that provides a robust basis for meeting future water requirements. It is one which:

(a) facilitates the move toward high value and best use of water through improved specification and security of existing water entitlements and providing for water trading;

(b) encourages efficient use of water (reduce, reuse, recycle); and

(c) if supplies cannot be met through (a) and (b) above; then

(d) promotes development of additional water supply sources through new cost effective water infrastructure.

When the various supply options are considered in concert it is clear that each category of source plays an important part in meeting the water requirements of SEQ. A diverse

suite of options that rely on both climate dependant and non-climate dependant factors is required to ensure a robust water supply system to meet the ongoing needs of SEQ.

While ground water, recycled water and desalination will play an important part in meeting water supply requirements, these alone can not provide the amounts of water that are required to meet SEQs requirements in the medium to longer term.

There is clearly a need for a sufficiently sized source that can provide a significant amount of water to meet the requirements of SEQ.

On the basis that the supply/demand balance in SEQ necessitates examination of new options for surface water storage, it is important to understand why and how the site at Traveston Crossing was chosen as the preferred site for a major new dam to supply water to SEQ.

7.2 Historic consideration of Mary River flood mitigation

The concept of a dam on the Mary River is not new. In July 1973 and January 1974, the Gympie commercial district and low-lying residential areas were flooded. As a result, the Gympie City Council requested the Irrigation and Water Supply Commission Queensland (IWSC) to investigate the possibility of a dam in the upper reaches of the Mary River, to mitigate future flooding in Gympie.

In June 1974 after investigating the proposed Kenilworth Dam Site (Mary River at AMTD 270 km), the IWSC indicated to the Council that a dam at this site, because of its small catchment area, would have no significant flood mitigation benefit to Gympie.

Options

At the further request of the Council, the IWSC carried out an assessment of three possibilities for flood mitigation benefits to Gympie as follows:

- a major flood mitigation storage on the Mary River just South of Gympie;
- construction of levee banks in parts around Gympie; and
- alleviation of a constriction in the Mary River downstream of Gympie at Fisherman's Pocket.

The IWSC concluded that the levee system and the flood mitigation dam were both feasible options but costs for both projects were expensive. However the report also concluded, that the flood mitigation cost component of a major dam could be reduced

considerably if a major source of water supply were required in the future for "irrigation, coastal town water supply schemes, Brisbane water supply, or power station requirements".

Report - January 1980

In 1980, at the request of the Council, a summary report Mary River Gympie Flood Mitigation was prepared by the Queensland Water Resources Commission and forwarded to Council for consideration. Council took no further action on any of the proposed options to reduce flooding.

Gympie Flooding – 1989

Following flooding in April 1989 and after some community discussion, the District Engineer for the Queensland Water Resources Commission reiterated the main aspects of both the 1977 and 1980 Reports, suggesting the levee bank proposal would be more economic than the flood mitigation storage, but only marginally effective. A major flood mitigation dam was also mentioned.

7.3 GHD Desktop Review

As part of the SEQRWSS, consultants GHD were commissioned to prepare a report on dam and weir sites that had previously been identified in the region. In this report GHD were asked to:

- make recommendations regarding those sites that did not warrant further consideration; and
- identify any shortfalls in available information that have the potential to impact on the viability of a particular development.

GHD undertook a desktop review of existing reports and data and publicly available information regarding dam and weir sites that had previously been identified in the SEQ region. Sources of information used in this review include past planning studies such as SEQ Water and Wastewater Management and Infrastructure Study (GHD/Kinhill, 1999) and An Appraisal Study of Water Supply Sources for the Sunshine Coast and the Mary River Valley (DPI Queensland Water Resources, 1994).

Eighty dam and weir site options were identified as having been studied in the past. Initial rankings were at a high level on the basis of their potential to supply significant quantities of water. A short list of these eighty options were considered as worthy of further

consideration as potential bulk supply sources of regional significance. These short-listed options were reviewed in more detail. Potential combinations of dams and weirs were also considered.

The main dam and weir site options examined were:

- Glendower Dam with a barrage on the Albert River;
- a dam on the Coomera River;
- a dam at Cedar Grove on the Logan River;
- Tilleys Bridge Dam with Cedar Grove Weir;
- Wyaralong Dam on the Teviot Brook with Cedar Grove Weir (Logan system);
- raising of Hinze Dam to Stage 3;
- water harvesting from the Coomera River and Canungra and Mudgeeraba Creeks and other suitable locations to a raised Hinze Dam;
- a dam at Zillman's Crossing on the Caboolture River;
- raising of Wappa Dam (South Maroochy);
- Amamoor Creek Dam (Mary system);
- Cambroon Dam on the Mary River;
- raising of Borumba Dam on Yabba Creek (Mary system);
- Kidaman Dam on Obi Obi Creek (Mary system);
- Traveston Crossing Dam (Mary system);
- raising Mt Crosby Weir on the Brisbane River; and
- raisinge Wivenhoe Dam.

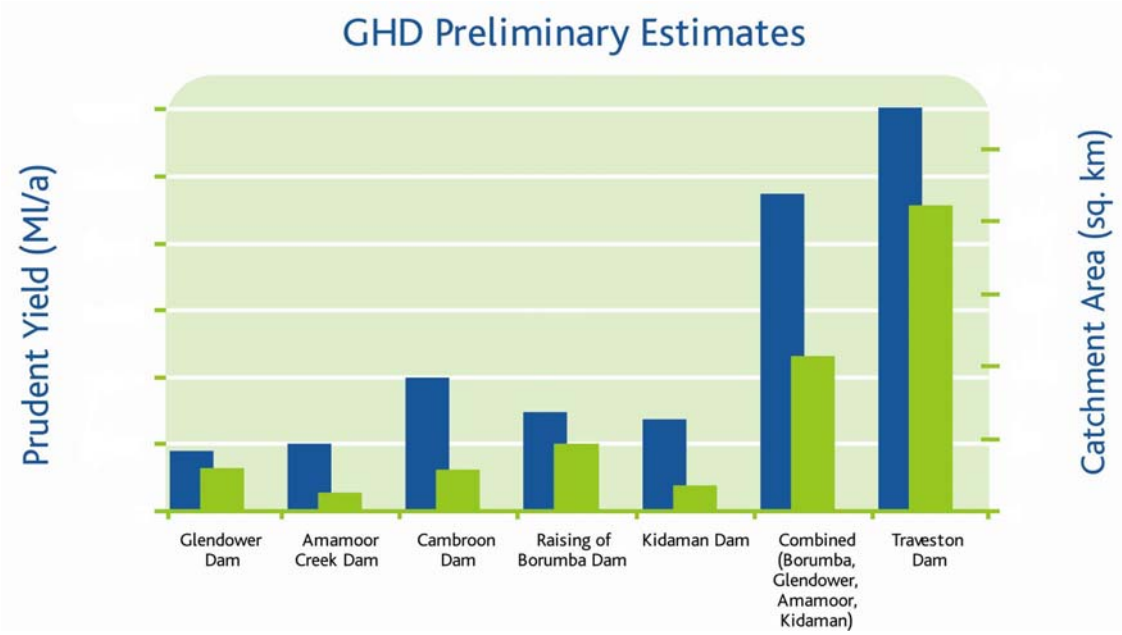
The report ranked potential development options in terms of:

- potential yield (ie. the volume of water that could potentially be delivered); and
- unit cost of the dam per megalitre of water delivered.

Significantly, the Traveston Crossing Dam ranked first in terms of potential yield (and storage capacity) being more than 2.5 times greater than the second rating dam. The Traveston Crossing Dam ranked fourth in relation to the unit cost per megalitre of delivered water.

The Traveston Crossing Dam provides by far the largest yielding and most secure potential future dam site in SEQ. This derives from the much greater catchment commanded by the dam site in a comparatively wet area as compared to other areas of SEQ. Traveston Crossing Dam has an upstream catchment area of some 2,000 square kilometres. The combined catchment area of any prospective alternative combination of dams that might be built in SEQ to deliver a similar capacity to Traveston Crossing Dam will be much smaller and produce much smaller inflows. As an example, the combined catchment area of the potential Glendower, Amamoor Creek, Cambroon and Borumba Dams is 1,400 square kilometres. QWC analysis indicates that combinations of the smaller dams alternatives would also result in dam levels being low for longer periods of time, resulting in longer periods of restrictions.

Figure 7.1: GHD preliminary estimates

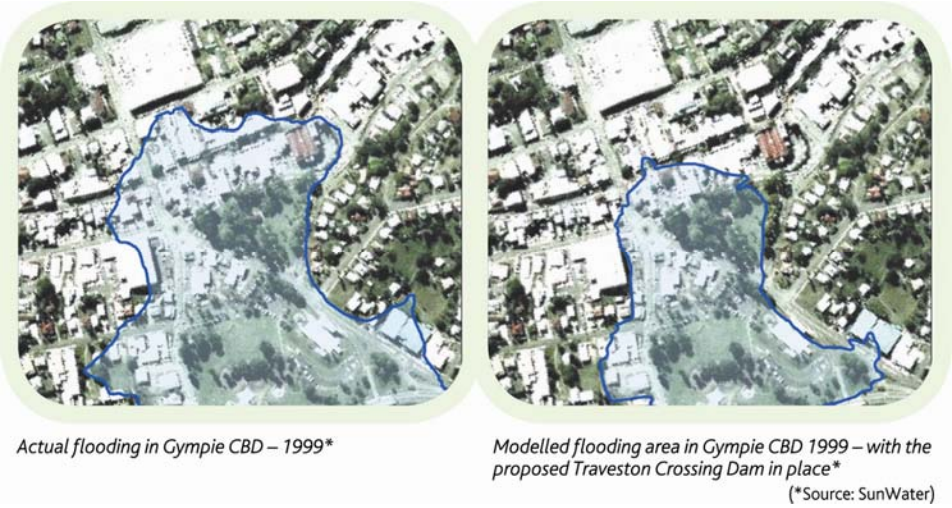


It is acknowledged that potential yield is not the only factor which must be taken into consideration in making a final decision on dam location. However, the assessment of dam options undertaken by GHD showed that there were no other significantly sized storages other than Traveston Crossing Dam that could meet the identified requirements. As such Traveston Crossing Dam was identified as a logical single source to supply the amounts of water required once the other measures such as demand management initiatives and alternative sources were considered.

7.4 Announcement to Further Assess Traveston Crossing Dam

The principal reason for the selection of the Traveston Crossing site was its potential to provide significant quantities of water to meet the needs of the growing population of SEQ. No other single site in SEQ could be developed to provide water in comparable quantities. A dam at the Traveston Crossing site would also provide attenuation of flood flows to the Mary Valley downstream including the town of Gympie as indicated in Figure 7.2.

Figure 7.2: Flooding in Gympie CBD



*Actual flooding in Gympie CBD – 1999**

*Modelled flooding area in Gympie CBD 1999 – with the proposed Traveston Crossing Dam in place**

(*Source: SunWater)

Considering the assessments undertaken and the fact that Traveston Crossing was a reasonable and logical option to supply the large additional volumes of water required to meet SEQ demand, it was announced by the Queensland Government on 27 April 2006 that the Traveston Crossing was chosen as a site for further investigation.

7.5 Detailed Assessment

After this announcement an initial phase of more detailed investigations of the Traveston Crossing Dam site and three potential sites in the Logan River catchment (Glendower, Wyaralong and Tilleys Bridge) was to be completed within two months and was to confirm that dams could be constructed at these sites and that there were no insurmountable technical issues. These investigations included:

- geological investigations;
- a concept design for the Traveston Crossing dam site;
- Review of Environmental Factors;

- environmental comparison; and
- transport infrastructure assessment.

Geotechnical Assessment and Conceptual Design

Geotechnical investigations including drilling and seismic refraction surveys were carried out at the Traveston Crossing site and SunWater has developed concept designs for a dam at this site. Initial geotechnical investigations confirmed that the dam could be built at this site (refer to Section 8.4 for the current geotechnical investigations). The main objective of the concept design was to establish a possible arrangement for a dam at the Traveston Crossing site.

Review of Environmental Factors

Golder Associates Pty Ltd were engaged to undertake a desktop review of five environmental aspects associated with the construction of the dam. The study found that the construction of the dam is likely to result in a number of potentially significant environmental impacts. The key findings are summarised as follows:

- native title claimants would likely be interested in the proposal and indigenous cultural heritage items have been recorded in the area;
- there is some vegetation classified as endangered regional ecosystems listed unde the *Vegetation Management Act 1999* in the area of inundation;
- there are threatened flora and fauna species under the *Nature Conservation Act 1992* and the EPBC Act in the inundation zone and area immediately adjoining the inundation area including the Mary River Cod and Mary River Turtle;
- potential impact of Great Sandy Straits resulting from the changes to flow regime and sediment supply; and
- 16 lots listed as contaminated sites on the EPA Environmental Management Register.

It was concluded that further studies are required to fully assess and determine the level of impacts associated with the proposal. A full EIS has been triggered by the CG under the SDPWO Act.

Environmental Comparison

Independent technical assessments of possible combinations of infrastructure for the Mary and Logan Rivers were undertaken by Sandra Brizga and Associates in their report, Environmental Assessment of Logan / Albert and Mary Catchment Development Scenarios (Brizga et al 2006). Any infrastructure that is built would be subject to the completion of additional studies and the granting of necessary Commonwealth and State approvals.

DNRW commissioned an independent technical panel of eminent scientists to investigate the potential environmental impacts and possible mitigation strategies for particular infrastructure proposals in the two basins.

For this reason, the panel was asked to comment on two scenarios for new storages in the Mary Basin:

1. A large dam on the Mary River at Traveston Crossing; and

2. A combination of four smaller dams on tributaries of the Mary River and a weir on the Mary River.

The panel was also asked to recommend possible mitigation strategies for any potential impacts arising from the construction of any of the storages.

While acknowledging that the construction of any dam or weir will cause ecological impacts, a comparison of the relative ecological impacts of the different scenarios for each basin is summarised below.

On some assessment criteria, both options were found to have similar impacts. For instance, both options would affect animal species listed in the EPBC Act and would inundate remnants of “endangered” and “of concern” regional ecosystems. Although Traveston Crossing Dam would inundate a greater land area, the two options would inundate similar distances along the Mary River and its tributaries, while the four dams/weir option would result in altered flow regimes over a greater length of river reaches.

There is minimal difference between the two options with respect to inflows (particularly flood flows) to the Mary River estuary and Great Sandy Straits. Because both options would result in high end of system flows of around 85 – 88% of the natural mean annual flow (Mary Basin WRP Information Report), neither option is expected to significantly

affect the ecological values of the estuary, Great Sandy Strait or Fraser Island, beyond the impacts that have already occurred as a result of tidal barrages and land use factors.

The assessment concluded that the Traveston Crossing Dam option would have less overall environmental impacts than the four dams/weir option, particularly if the turbidity of water in storage could be managed. When compared with the Traveston Crossing Dam option, the four dam/weir option would:

- cause more river and creek sections to be affected by major flow regime change;
- cause more river and creek sections to be affected by downstream impacts from the storages;
- inundate a larger number of regional ecosystems classified as "of concern";
- affect a greater number of plant and animal species of conservation significance; and
- by way of comparison, no endangered plant species would be affected by Traveston Crossing Dam.

Traveston Crossing Dam would have a greater impact on fish passage, particularly those that require both marine and freshwater habitats through their life cycle, as it commands a larger catchment area and is closer to the estuarine reaches of the Mary River. It does however need to be noted that the fact that the dam commands a larger catchment area is the very reason why the dam would also provide a more reliable water supply. It also needs to be noted that this is an issue that will be addressed in comprehensive detail through the EIS process.

7.6 Mitigation

A number of potentially significant environmental impacts have been identified and consideration of these impacts will be undertaken in more detail in the EIS process. It is anticipated that measures can be adopted to mitigate these impacts to an acceptable level. Some impacts can only be successfully mitigated through a combination of different strategies which are well known and already being implemented for storages in other parts of Queensland, Australia and the world, and include:

- use of destratifiers to reduce the layering of water in dam pondages;
- use of multi-level offtakes to prevent water from the cooler, non-circulating, lower parts of the storage from being released into the stream;

- various options to control excessive aquatic plant or weed growth;
- installation of a fish lock, fish lift, fish way or other mechanism to provide for fish passage;
- control of feral animal species, exotic fish and exotic plants;
- use of hatcheries, artificial spawning and rearing to artificially breed and release juvenile fish;
- implementation of weed management and vegetation restoration programs; and
- provision of environmental flow releases.

Particular mitigation strategies will be developed as part of the EIS process. Ongoing monitoring and research will be crucial to further reducing potential environmental impacts. Monitoring and research activities are already underway and will continue long after construction as part of an overall EMP.

7.7 Announcement to Construct Traveston Crossing Dam

In view of the water balance issues outlined above, it was apparent the Traveston Crossing Dam was required and was in fact the reasonable and logical solution to part of the water supply/demand imbalance. Furthermore it was considered that any potential negative impacts associated with the proposal had the scope to be mitigated appropriately, and further investigation of the proposal should proceed.

As at the time of the announcement in April 2006, to further investigate the Traveston Crossing Dam Site, the desk top studies being conducted as part of the development of the SEQRWSS had reached a point where a choice had to be made as to which major water supply options were to progress to the detailed on-site investigation stage. Further desk-top studies were not going to substantially add to the knowledge about the various supply options, and given the emerging regional water supply shortfalls, a choice had to be made.

In light of the extent of the short, medium and long-term demand/supply imbalances being confirmed by the strategy-related work, it was clear that new water storage proposals needed to form a substantial part of the of the next stage of planning involving costly detailed site investigations and EIS processes.

In relation to the available water storage options, all possibilities involved challenging issues relating to social and environmental impacts. The Traveston Crossing Dam

proposal stood out as being vastly superior to all other options in terms of hydrological performance and ability to generate additional water supplies.

Consequently, the Queensland Government announced on 5 July 2006 that Traveston Crossing Dam was the preferred site for construction of a dam in the Mary Valley.

The publication of the desk-top assessments into various options made it clear that the Traveston Crossing Dam was the superior option in terms of the key area of hydrological performance. This superiority was further emphasised by the maturing water resource planning processes for rivers throughout the region. These processes demonstrated that only the Mary River had substantial amounts of available unallocated water that was not essential for sustaining ecological processes. Typically and logically, the only way to efficiently exploit potentially available unallocated water within the high-summer, low-winter flowing Queensland rivers is through a major dam on the lower reaches of a trunk stream within a catchment.

The Queensland Government decided openly and transparently to commit to conducting detailed investigations into the proposal while agreeing to buy affected land from any landholders who wished to enter into voluntary sales of their properties at market values.

The alternative decisions would have necessarily meant ongoing speculation that the Traveston Crossing site would eventually have to be developed after smaller less-effective dams had been developed with greater disruption to landholders and the environment but no substantial contribution to the water supply security of SEQ.

7.8 Other options

It is important to understand that the GHD desktop review considered all known options for dam/weir construction in the SEQ Region. Of the 80 options reviewed, the Traveston Crossing site was regarded as significantly superior to be identified as the sole option for further examination.

This section briefly examines alternatives that have been proposed and demonstrates why these options are inferior to the Traveston Crossing site.

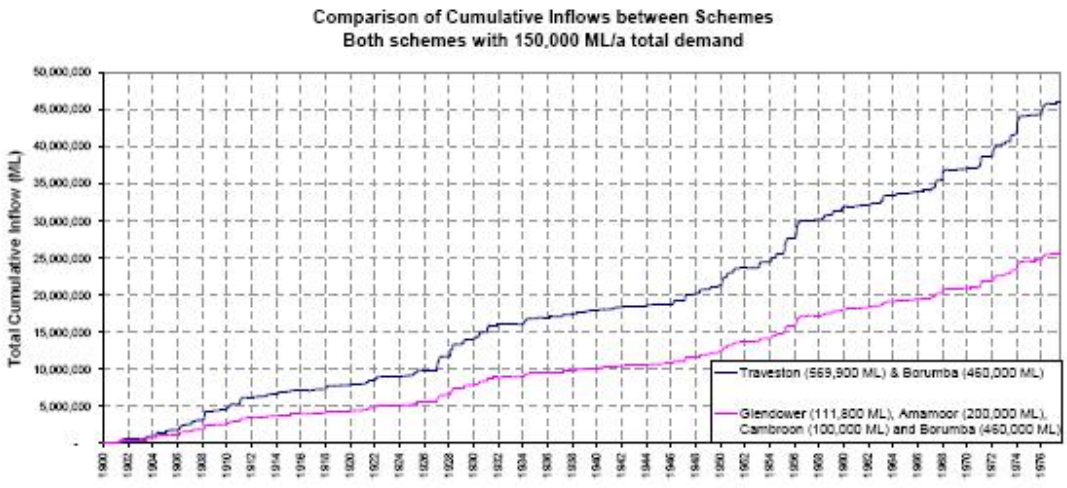
(a) Valley Option Comparison

Through the process of considering the supply options there was an alternative raised to the construction of Traveston Crossing Dam that consisted of the construction of a series of smaller-sized storages and a weir. An environmental assessment has been undertaken to determine the comparative advantageous and disadvantages of the two

options (Brizga et al, 2006). More recently there has been a hydrologic comparison on a variation to the original two options considered in the environmental assessment detailed below.

This recent comparison between the Traveston Crossing Dam and raising Borumba Dam option with four dams in the SEQ area (Glendower, Amamoor, Cambroon and Borumba) shows a potential difference in supply security. The level of inflow captured by each of these options is significantly different. The inflows captured by Traveston Crossing Dam are far in excess of the inflows captured by the alternative option encompassing four smaller dams.

Figure 7.3: Comparative Cumulative Inflows



Source: Gilbert & Associates

(b) Raising of Borumba Dam and Mary River Water Harvesting

As an alternative to constructing Traveston Crossing Dam a proposal was put forward that involved harvesting flood flows from the Mary River and storing in a raised Borumba Dam. It was proposed that as an upper limit Borumba Dam could be raised from its current size of 46,000 ML to 2,000,000 ML. A preliminary hydrological assessment has been undertaken to determine the feasibility of delivering similar yields to that of Traveston Crossing Dam.

In terms of being able to deliver yields similar to that produced by Traveston Crossing Dam Stage 1, it was found there was the need to have a very large pumping capacity to take water from the Mary River to make the most of the flood flow in the Mary River. It was also found that there would be the need to raise of

Borumba Dam to a level larger than that contemplated in Stage 3 raising of Borumba Dam. In addition to the very large pumping capacity it was found that Borumba Dam would need to be raised to a size larger than 1,500,000 ML to deliver yields similar to that from Stage 2 Traveston Dam.

Further hydrologic-based statistical analysis found that the water harvesting proposal would be significantly more vulnerable in the short to medium term due to:

- much greater dependency on large flows needed to sustain significant pumped transfers to Borumba Dam; and
- failure during protracted periods when such high flow conditions did not occur.

It was found that when compared with water harvesting and storage proposals an on-stream proposal such as Traveston Crossing Dam would have:

- greater likelihood of capturing sufficient water over a relatively short period post-construction (<3 years) for commencement of full supply than a system based on harvesting; and
- greater likelihood of maintaining sufficient storage on an ongoing basis for continued supply over the medium term.

8. TRAVESTON CROSSING DAM

Summary

The Queensland Government proposes to develop water infrastructure in the Mary River catchment in three phases to provide 150,000 ML/a by 2035. The three phases are:

- construction of Stage 1 of the Traveston Crossing Dam by the end of 2011;
- raising the existing Borumba Dam by approximately 30 metres by 2025; and
- construction of Stage 2 of the Traveston Crossing Dam by 2035, as required by demand.

The Traveston Crossing Dam site is the last undeveloped high-yield dam site available in SEQ.

The Traveston Crossing Dam site is located on the Mary River in SEQ at approximately Adopted Middle Thread Distance 207.6 kilometres which is approximately 27 kilometres upstream of Gympie.

8.1 Project Description

(a) Overview

The Queensland Government proposes to develop water infrastructure in the Mary River catchment in three phases to provide 150,000 ML/a by 2035. The three phases are:

- construction of Stage 1 of the Traveston Crossing Dam by the end of 2011;
- raising the existing Borumba Dam by a maximum of 30 metres by 2025; and
- construction of Stage 2 of the Traveston Crossing Dam by 2035, as required by demand.

The Traveston Crossing Dam site is the last undeveloped high-yield dam site available in SEQ. Traveston Crossing Dam Stage 1 comprises between 14% and 21% of the additional supplies required at 2051, including the high savings scenario, an allowance for climate change and a provision for additional rural supplies. This increases to between 31% and 45% once the dam is completed.

Accordingly the Traveston Crossing Dam is a critical component of the strategy to secure a safe and reliable water supply for SEQ. Table 8.1 outlines the key statistics of Traveston Crossing Dam.

Table 8.1 – Traveston Crossing Dam Statistics: Stages 1 and 2

	Stage 1	Stage 2
Anticipated annual yield	**70,000 ML**	*110,000-150,000 ML (includes 70,000 from Stage 1)*
Elevation above sea level	**71 metres**	*79.5 metres*
Water depth at dam wall	**24 metres**	*32.5 metres*
Average depth (in river channel)	**12 metres**	*16.25 metres*
Average depth	**5 metres**	*8 metres*
Full supply area	**3,000 ha**	*7,135 ha (includes Stage 1 area)*
Total capacity	**153,000 ML**	*570,000 ML (includes Stage 1 capacity)*
Length of Mary River inundated	**36.5 km**	*50.7 km*
Properties affected	**332**	*597 (includes 332 from Stage 1)*
Houses required for dams and roads	**76**	*204 (includes 76 from Stage 1)*
Highway relocation	**11.94 km**	-
Road relocation	**37.29 km**	*69.63 km (includes 37.29 from Stage 1)*
Rail relocation	**-**	*3.99 km*
Scheduled completion	**2011**	*2035 (subject to SEQ demand)*

Based on extensive preliminary geotechnical investigations, the proposed site of the Traveston Crossing Dam is considered suitable for a design comprising a roller compacted concrete centre section, an earth embankment on the northern bank and concrete spillway on the southern bank (refer to Section 8.4 of this Submission). It is proposed that a fish passage device will also be incorporated into the dam design.

The detailed description of the project may change during the EIS process as detailed designs are further developed from the original concept, and an

assessment of environmental, social and economic impacts and mitigation measures are considered.

(b) Location

The Traveston Crossing Dam site is located on the Mary River in SEQ at approximately Adopted Middle Thread Distance 207.6 kilometres which is approximately 27 kilometres upstream of Gympie. The location of the proposed dam is shown in Annexure 11 to this Submission.

The proposed dam inundation area is situated within 3 local government areas – Noosa, Maroochy and Cooloola Shires. The majority of the inundation area (including the dam wall and the majority of the affected road and local government infrastructure) is situated in the Cooloola Shire. The most eastern extent of the proposed dam is in the Noosa Shire and the south-eastern corner of the proposed dam is in the Maroochy Shire.

The site is located within a coastal rainfall catchment, which provides advantageous climatic conditions compared to the Wivenhoe Catchment. The Upper Mary Valley is a hydrologically efficient catchment that receives 40%-55% more rain on average than the Wivenhoe Dam catchment (SunWater data, 2007).

Recent hydrological investigations indicate that the Traveston Crossing Dam will be full or near full (defined as to within two metres of the FSL) greater than 80% of the time (SunWater data, 2007).

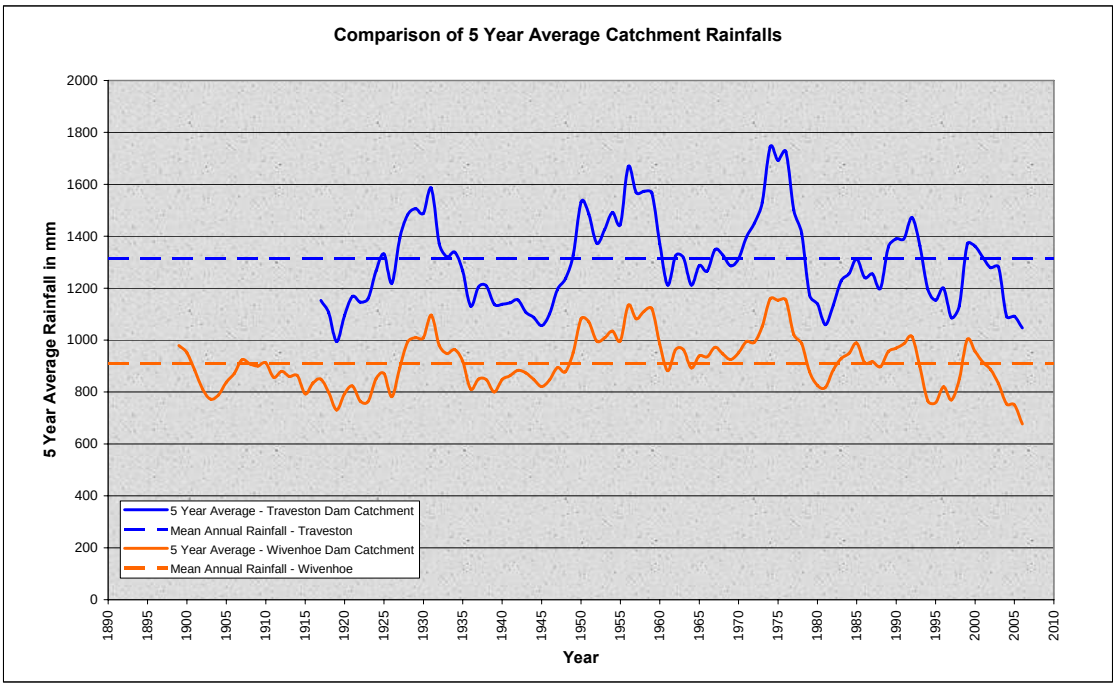


Figure 8.1 – Comparison of 5 year Average Catchment Rainfalls for Traveston Crossing Dam and Wivenhoe Dam (SunWater data, 2007)

(c) Potential Impacts

The following potential impacts identified are provided as a high level and preliminary summary only at this time. The EIS process will involve the undertaking of significant further assessments to fully determine the potential impacts of the construction and operation of the Traveston Crossing Dam. It is anticipated that the EIS process will interact with the development of dam design and routes for relocated roads and other infrastructure, thereby optimising either potential design or impact management solutions.

Property affected

Stage 1 inundation will affect about 3,000 hectares of land at FSL, including 76 houses on 332 properties. The townships of Imbil, Brooloo, Federal, Carter's Ridge and Amamoor will not be affected at FSL for Stage 1.

The modelling shows that a large proportion of the Kandanga township will not be affected by Stage 1 of the dam. Community facilities not affected include: the Kandanga Hall, Bowls Club, swimming pool, school, railway station and railway line, and the hotel. The cemetery will not be affected in Stage 1.

The road connecting to the east of Kandanga will be relocated and upgraded outside the inundation area for Stage 2 of the dam, which, if required, may be implemented by about 2035. Also, minor upgrade works will be conducted on the timber bridge across Kandanga Creek.

While the parts of the town that are in lower lying areas, below Main Street, will not be inundated by Stage 1, there is likely to be an increased susceptibility to flood events in this area.

Townships not directly affected by inundation at Stage 1 will be subject to variable indirect affects as a consequence of regional changes to population, local road networks, land use patterns and relocation of utilities.

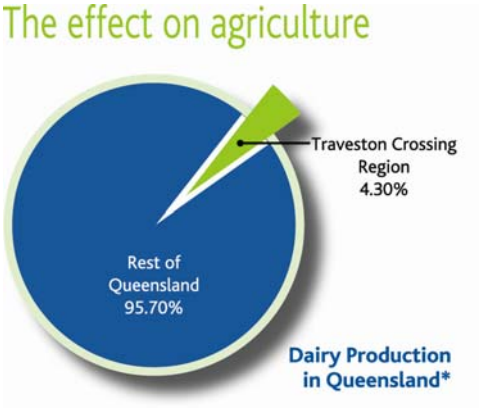
The Stage 1 inundation area includes 1.7% of productive agricultural land in the Mary River catchment and rural residential land. The State Government has established The CFTF to address the significant social and planning issues linked to the need to purchase affected land and the resulting population changes associated with the project. The CFTF is a separate program of the Queensland Government, and is described in section 12.3 of the submission. The economic assessment of the project is addressed above.

Agricultural Land Impacts

About 1.7% of productive agricultural land in the Mary River Basin will be affected by Stage 1 of the proposed Traveston Crossing Dam.*

The value of production, as a percentage of Queensland output, represents 4.3 percent of dairy production and 0.1% of beef, horticulture and other industries.*

Figure 8.2: Effect on Agriculture



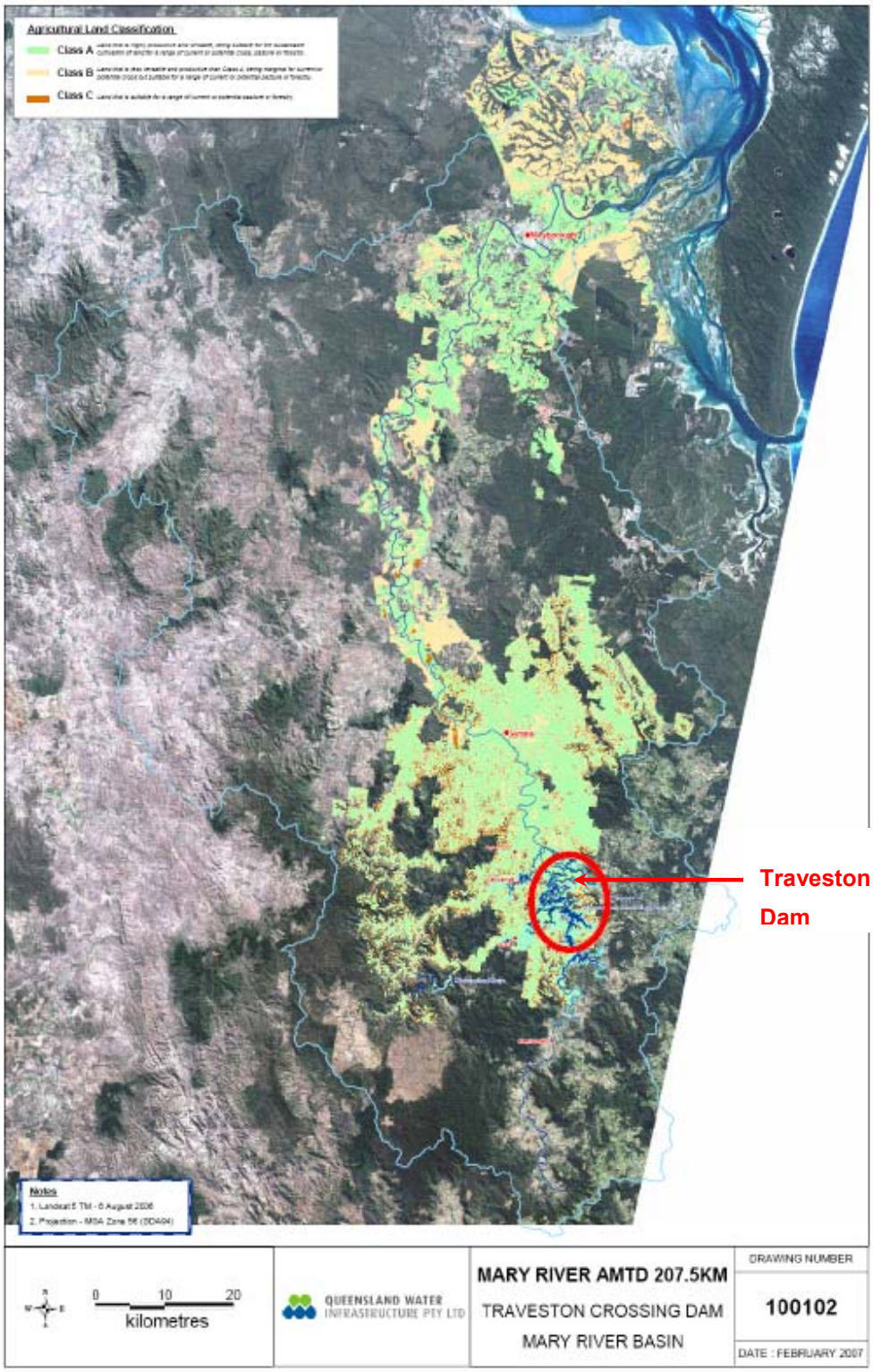
However, as the February 2007 ACIL Tasman report notes, the Traveston Crossing region will be able to use the business and entrepreneurial experience of those farmers and business people who have adopted lease-back arrangements to drive enhanced agricultural and business practices in the vicinity.

It also notes that the release of water to the area below the dam may open possibilities for more intensive agricultural uses.

Figure 8.3 highlights the area impacted by the Traveston Crossing Dam.

* Source: ACIL Tasman

Figure 8.3: Agricultural Land Impact



Environmental issues

While the land affected by the dam has been subject to significant alteration as a result of farming, timber clearing and other human interventions for more than a century, the construction of the dam and associated works still has the potential to impact on a range of terrestrial and aquatic flora and fauna that are listed under State or Commonwealth legislation as possessing conservation significance. These include several species listed as 'endangered' or 'vulnerable' and include the Mary River cod, Mary River turtle and the Australian lungfish. Two regional ecosystems classified as 'endangered' or 'of concern' would also be impacted.

As part of the EIS, an EMP will be developed to minimise the risk of environmental harm and manage the environmental impacts during the dam's construction and operations to comply with all statutory obligations.

Environmental impact assessment measures are detailed in Section 11 of this Submission.

Infrastructure

Roads

The project will provide an opportunity for new road construction in the Traveston Crossing region, through relocations and upgrades to the existing road network.

A new section of the Bruce Highway will be constructed, approximately 12 kilometres in length, to replace a 4.5 kilometre section that will be inundated at FSL for Stage 1. A number of other roads, including the Mary Valley, Gympie-Brooloo, Kenilworth-Skyring Creek Roads and the roads joining these in the project area will also be inundated in Stage 1. The relocation and upgrade of the road network will enable roads to be straightened and widened in places, improving travel times and road safety for local residents and through traffic.

The roads which will be impacted by one or both of the Stages are detailed in Table 9 of the IAS (refer to Annexure 13 to this Submission). It is possible that additional local roads may be impacted. As noted in the IAS, re-establishment of the local road network and re-routing of the Bruce Highway may require the acquisition of additional land. The opportunity exists to minimise the land

purchase requirements for the highway corridor by utilising land to be purchased for the Traveston Crossing Dam and its buffer area.

The EIS process will include consideration of proposed road closures and planning for a new road network to service the area, including realignment of the Bruce Highway.

Buildings

The Stage 1 inundation area will affect 76 houses on 332 properties, and the owners of those properties will be made offers for voluntary purchase by QWI in accordance with the land purchasing policy discussed at Section 12.4 of this Submission. A small area of Kandanga may be affected by raised flood levels at FSL in Stage 1, which will be the subject of detailed assessment in the EIS process.

Utilities

Local power and telecommunication networks will be affected by Stage 1 of the Project. Ths EIS process will identify the relevant utilities infrastructure that will require relocation during the construction phase and set out arrangement to ensure the services are maintained and disruptions are minimised.

The current intake for the Noosa Shire water pipeline will need to be modified for Stage 1.

Rail

No rail lines are affected by inundation on Stage 1. The 'Valley Rattler' is a World War II steam train that runs between Gympie and Imbil stopping at Kandanga 2 days per week. There is no impact on the Valley Rattler in Stage 1.

8.2 Project Timeframe

Estimated Project Timelines

- Concept design - final at August 2006
- Preliminary design - completed December 2006
- EIS - completed by October 2007
- State and Federal Assessment - completed by March 2008

- Detailed design - completed by March 2009
- Construction - completed by November 2011
- Project Completion - by 31 December 2011

8.3 Preliminary Design Phase

Geotechnical investigations of the proposed dam site consisting of some 76 boreholes have confirmed its suitability for the proposed dam and storage (a detailed discussion of engineering issues is provided at section 8.4 of this Submission). The proposed location of the dam wall has been realigned about 900 metres upstream of the original concept design location from AMTD 206.7 km to AMTD 207.6 km (refer to Annexure 12 to this Submission). Recent geotechnical investigations confirm that good foundations are present for construction of the dam wall at that location.

At this early stage of the preliminary design phase, the favoured design comprises a combination of roller compacted concrete wall for the terrace and central channel, with an earth and rock fill, non-overflow embankment for the left abutment and a concrete spillway with flood control gates provided at the right abutment. The respective component sections of the dam wall and associated spillway structure are undergoing continuing assessment and evaluation, with oversight by an expert peer review panel.

QWI has appointed 3 nationally recognised, eminent dam engineers to constitute an expert peer review panel for the dam design process. The panel will provide best practice oversight to the design of the dam. The panel members are:

- Robin Fell, Emeritus Professor of the School of Civil and Environmental Engineering, The University of New South Wales; and
- Graham Bell, specialist consultant civil engineer through New South Global Consulting (formerly Unisearch Limited), The University of New South Wales; and
- Richard Herweyen, Principal Consultant – Dam Engineering, Hydro Tasmania.

The panel members' curricula vitae are at Annexure 14 to this Submission.

The design of the dam will comply with the:

- Queensland Dam Safety Management (QDSM) Guidelines; and
- Australian National Committee on Large Dams (ANCOLD) Guidelines.

Copies of these guidelines are at Annexures 15 and 16 to this Submission respectively.

Embankment designs will be developed in the current preliminary design phase including consideration of:

- suitability of embankment type;
- availability of construction materials;
- foundation conditions and treatment;
- staged construction;
- stability analysis (including assessment of earthquake stability and deformation);
- liquefaction potential;
- freeboard analysis (including wave run bash run up and set up); and
- upstream wave protection.

Preliminary design of the roller compacted concrete section will include consideration of:

- stability analysis;
- stage construction;
- materials;
- crest profile; and
- downstream steps.

Preliminary design of the spillway will include consideration of:

- suitability of spillway type;
- discharge rating capability;
- foundation, conditions and treatment;
- staged construction;
- spillway profile and stability analysis (including assessment of earthquake stability);
- hydraulic analysis of energy dissipation method; and
- downstream erosion protection.

The design of the intake towers and outlet works will include consideration of:

- hydraulic capability to pass regulated released, environmental flows and diversion during construction;
- control devices;
- entrance and outlet channels;
- terminal structures and dissipating devices; and
- structural assessment of tunnel/conduit.

The design will include a range of measures to protect wildlife and habitat, including a fish passage device, designed to current national and international best practice and suitable for the local fish species, including the Mary River cod and the Australian lungfish. The fish passage device will allow upstream and downstream movement of fish, and will take into account the operating range of the water level downstream of the dam and the operating range for the storage upstream.

Current modelling of the dam shows that the structure will meet all necessary environmental flow objectives of the Mary Basin WRP, retaining a Mean Annual Flow in excess of 85% of the predevelopment flows at the river-mouth. The WRP is provided at Annexure 18 to this Submission.

QWI is currently progressing the preliminary design phase for the dam taking into account the following criteria:

- minimise cost of Stage 1 for FSL at EL 71m AHD;
- achieve prudent yield of approximately 70,000 ML/a for Stage 1, whilst meeting WRP requirements;
- ease of Stage 2 construction for FSL at EL 79.5m AHD including cost considerations;
- optimise system yield for Traveston Crossing Dam Stages 1, 2 and Borumba Dam raising;
- optimise mitigation of upstream effects on infrastructure, including cost consideration for the State;
- optimise downstream flood mitigation in Gympie, including cost consideration for the State;
- optimise mitigation of upstream effects on land, including cost consideration for the State; and

- consider environmental issues, especially sediment transport implications.

8.4 Engineering Assessment

(a) Geotechnical investigations

Geotechnical investigations are currently being undertaken to obtain sufficient geotechnical information to allow for the preliminary design of the Traveston Crossing Dam on the Mary River. A summary of the geotechnical investigations is provided at Annexure 26 to this Submission.

QWI has appointed an expert peer review panel of three eminent and respected dam engineers to provide best practice oversight in relation to the ongoing geotechnical investigations and preliminary dam design works. The membership of this panel is addressed at Section 8.3 of this submission.

The current geotechnical investigations incorporate:

- a desktop review of all historical data;
- aerial photographic interpretation;
- review of reservoir leakage potential;
- geological mapping at various scales;
- seismic refraction profiling;
- soil and rock core drilling;
- excavation and mapping of large test pits;
- hydrogeological assessment, including a pumping test within the site's alluvial strata; and
- reconnaissance for sources of construction materials.

The geotechnical investigations have reviewed and built upon the data obtained by the Queensland Irrigation and Water Supply Commission between June 1976 and March 1977. These historic investigations identified the most favourable ground conditions for the construction of a dam exist on an alignment at 207.6 km AMTD.

The advantages of a dam at this location, endorsed by the expert peer review panel, include:

- higher foundations;

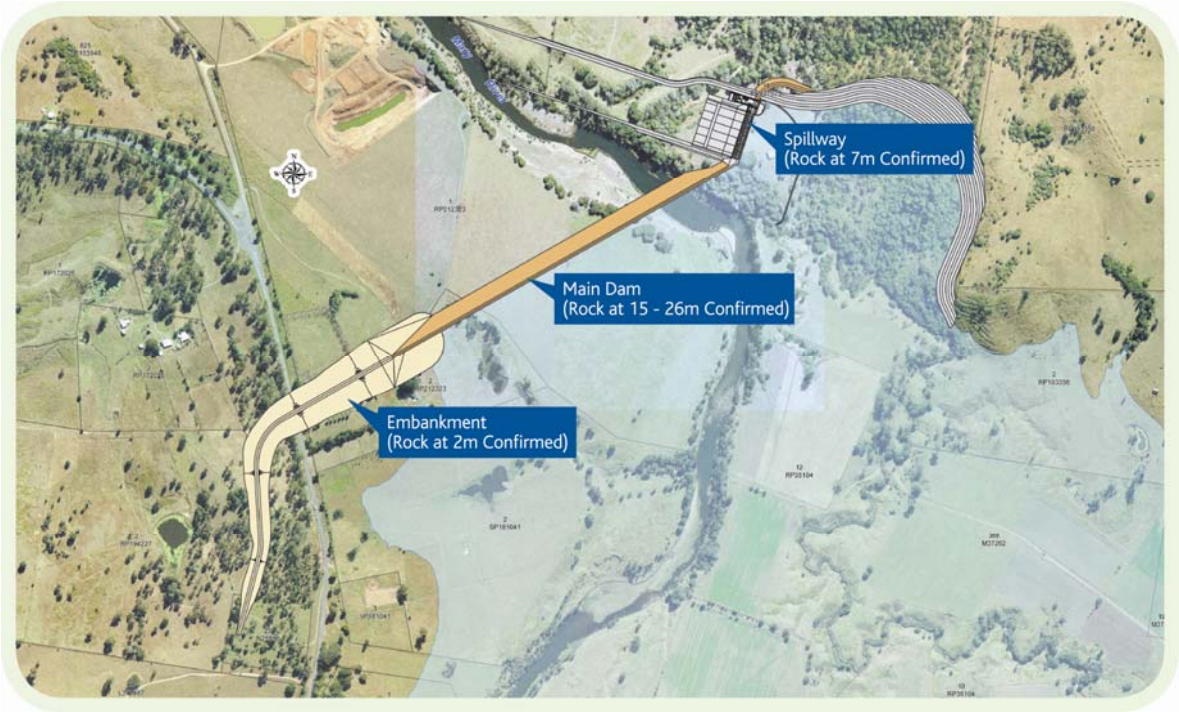
- the ability to divert floods during construction relatively easily; and
- cost reductions in comparison to dams located elsewhere in the vicinity.

To date a total of 76 geotechnical bore holes have been drilled across the sites. This includes 46 bore holes across the AMTD 207.6 km alignment and 19 bore holes across the AMTD 206.7 km alignment. 11 bore holes have been drilled to investigate the AMTD 207.6 km ground water hydrology. All drilling data is being incorporated with all available data to construct a comprehensive dam site geological model.

The investigations completed to date have confirmed the initial assessment that foundations along the dam alignment are suitable for the proposed dam structure and that there are good foundations as follows:

- The right abutment is underlain mostly by medium to high strength rock at a depth of 7m and is suitable for the proposed concrete spillway structure. It is proposed to excavate to an elevation of EL 50m AHD at this location as it would be suitable to divert water through the spillway channel during construction of the dam. The right abutment is also a potential source of hard rock material for use in the construction of the dam.
- The terrace and central channel area is directly underlain by alluvial materials (sands, gravels and clays). A roller compacted concrete structure is proposed for this section of the dam and the depth to suitable foundation ranges between 15m and 26m.
- The left abutment is underlain by rock from a depth of 2m which is suitable for the foundation for an earth fill embankment.

Figure 8.4: Traveston Crossing Dam Site



Source: SunWater

The results of the geological investigation have confirmed that a single grout curtain will be adequate to provide an effective cut-off and limit seepage beneath the dam without the need for upstream and downstream rows of consolidation grouting.

(b) Ongoing Geological Investigation Program

The ongoing geological investigation program will include the following:

- Further geotechnical drilling across the site will enable refinement of the existing damsite geological model and investigation of potential areas from which construction materials may be sourced;
- More detailed investigations of foundation properties are being performed, including downhole geophysical logging which is aimed at determining detailed properties of the foundation rock mass for the purpose of detailed design;
- Further large test pitting or trenching to examine the left abutment formation; and
- Further laboratory testing of potential construction materials.

(c) Seismic Hazard Assessment

A seismic hazard (earthquake) assessment of the dam site has been carried out. This is a probabilistic assessment which employs a seismotectonic model that considers the seismology (earthquake activity) and geology of the area in order to estimate seismic activity and frequency. The seismotectonic model allows for calculations of expected ground motion recurrence at the site, including peak ground acceleration and response spectra. These parameters allow the stability of the dam to be checked under earthquake loading.

The peak ground acceleration for the site has been calculated as being slightly above 0.05g for a return period of 500 years when considering earthquakes of Richter magnitude ML4 and above. This value is below average by Australian Standards.

With these peak ground accelerations earthquake loading should not be a concern to the dam.

(d) Evaporation

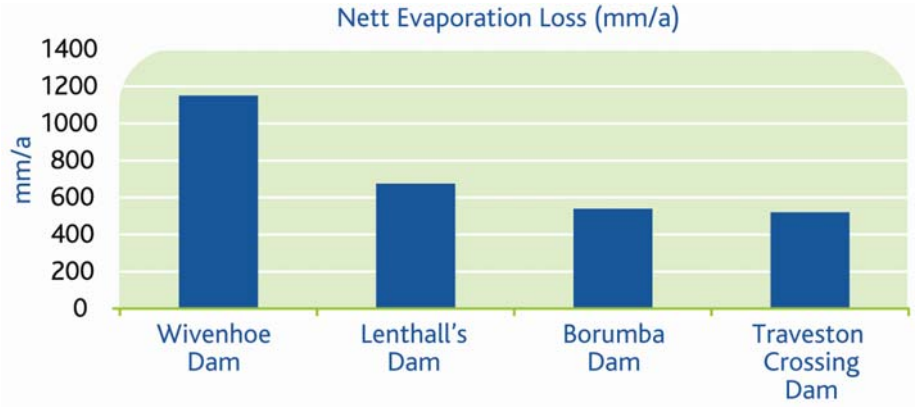
The nett annual evaporation loss from storages, the lake evaporation, is calculated using the following formula:

Nett Evap = Pan Evap Lake Factor + Seepage – Rainfall on Storage

The equation is based on the Water Budget Determination Method, as described in Linsley,J.R., Kohler,M.A., Paulus,J.L.H., “Hydrology for Engineers”, (Third edition) and is standard industry practice.

The table below summarises the nett evaporation loss from three existing storages in the region and the proposed Traveston Crossing Dam.

Figure 8.5: Nett Evaporation Loss

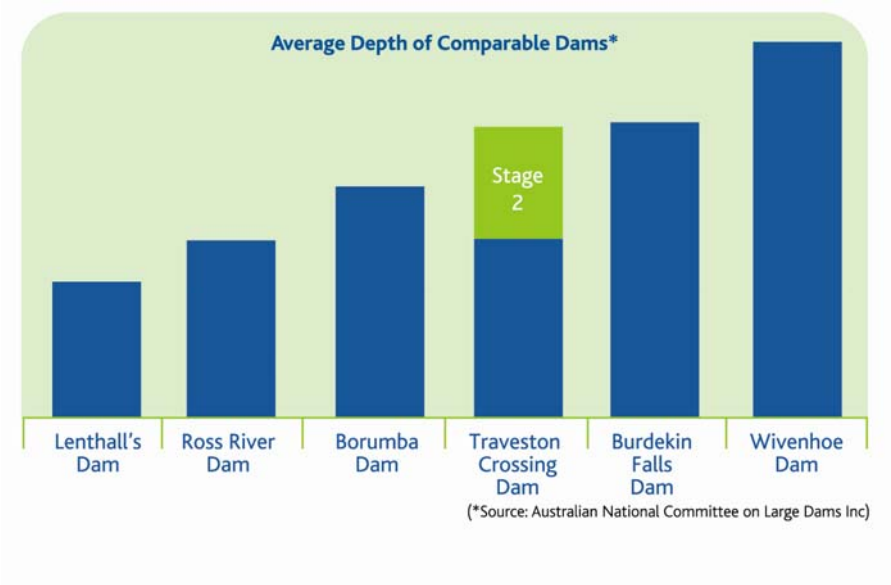


Storage	Nett Evaporation Loss (mm/a)	Period of Record
Wivenhoe Dam	1150	1993 - 2005
Lenthall's Dam	674	1976 - 2005
Borumba Dam	539	1976 - 2005
Traveston Crossing Dam	520	1975 - 2005

Source: SunWater

The overall average depth of the Traveston Crossing Dam is 5 metres at Stage 1 and 8 metres at Stage 2 and is comparable to other major dams in Queensland as shown in the accompanying table. The depth of the dam wall is 24 metres and the average depth in the river channel is 12 metres at Stage 1.

Figure 8.6: Average Depth of Comparable Dams

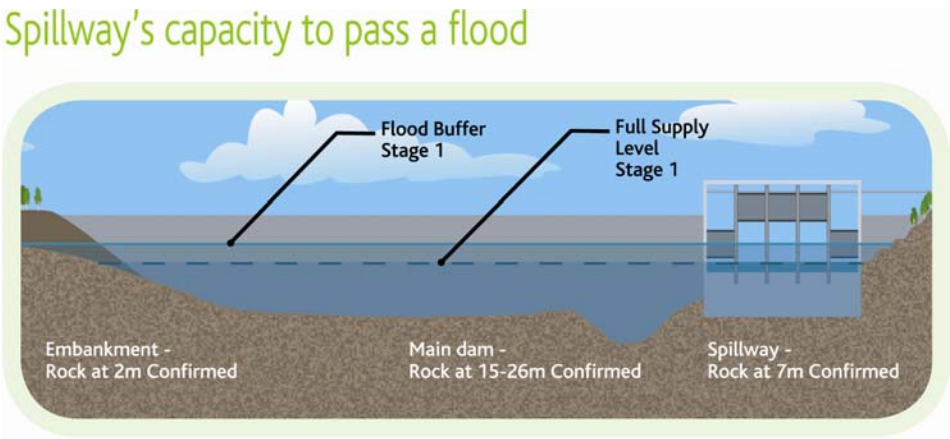


(e) Spillway Engineering and Operation

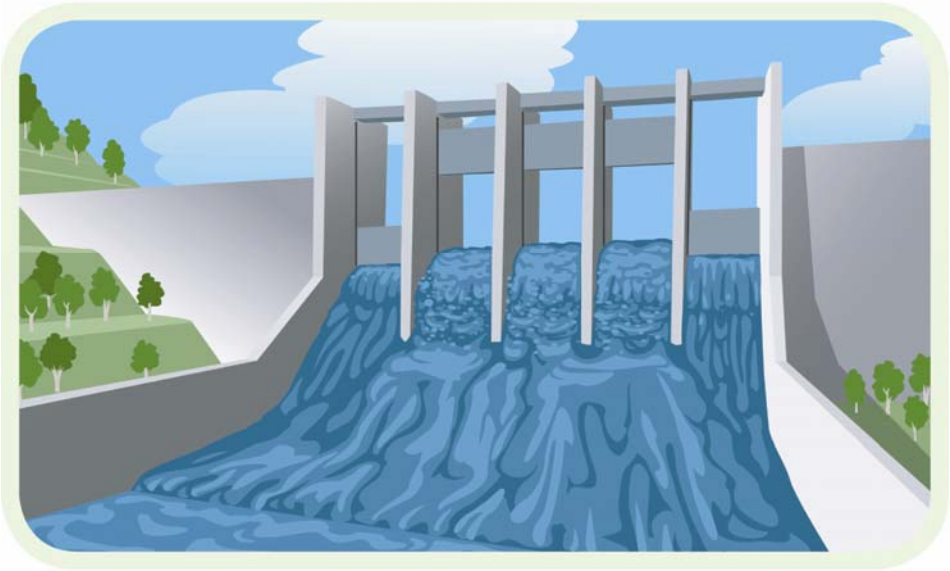
In order to mitigate downstream flooding, a gated spillway will be included, designed in accordance with the QDSM Guidelines.

The proposed spillway is to be designed to pass a Probable Maximum Flood (***PMF***) in accordance with the ANCOLD Guidelines and QDSM Guidelines. The PMF has a probability of occurring in any one year of less than 1 in 500,000.

Figure 8.7: Spillway Capacity



The dam in operation at full supply level with the flood buffer. This clearly demonstrates the dam's capacity to handle major floods that occur on average once every 100 years.



The reverse side of the spillway as pictured above. The dam spillway gates have been designed for the height of Stage 1. At Stage 2, (around 2035) the spillway gates will be replaced to manage the increased volume.

Source: QWI

The land that would be inundated in the event of a 1% AEP flood event is included within the land purchase boundary for Stage 1 of the project.

The spillway to be built in Stage 1 cannot operate at the Stage 2 level under the current proposal for the following reasons:

- There will only be environmental approval for Stage 1 and operating the dam storage in excess of the Stage 1 approved operating range will be a breach of the approval and expose the dam operator to prosecution, and injunction proceedings.
- The dam spillway gates are only designed to accommodate the Stage 1 operation of the dam. New gates would need to be installed to allow the dam to operate at the Stage 2 FSL. It is physically impossible to operate the dam at the Stage 2 height with the Stage 1 gates.
- QWI has entered into long-term leaseback arrangements with affected property owners until 2035. The lease conditions are set out in the land purchasing policy (refer to Annexure 29 to this Submission). The cost of terminating these leases, to enable operation at Stage 2 FSL, would be prohibitive (in comparison with the value of the freehold interest already paid by QWI).

The reason the main dam wall is constructed to the Stage 2 height is the efficiency of construction, given the plant, equipment, materials, workforce and batching plant that will be established. The volume of the material for the height difference between the Stage 1 and Stage 2 dam wall height is not significant in comparison to the balance of the wall's volume. Furthermore, there is the capacity to build the access road, fencing, concrete protection walling and necessary safety barriers, which would otherwise need to be removed and reinstalled at a later date.

(f) Road Network Design

QWI has appointed a second expert peer review panel to assist with the traffic engineering and design of the road network required to be relocated from the affected land area. As with the panel appointed in relation to geotechnical and dam design issues, this panel is constituted to provide best practice oversight and specialist advice to QWI and government agencies concerning the planning and construction of the relocated road network. This expert peer review panel consists of:

- Stephen Golding AM, RFD, Consultant;
- Leslie James Louis, Consultant; and

- John Gralton, Consultant.

These panel members' curricula vitae are at Annexure 27 to this Submission.

(g) Flooding Mitigation

The Traveston Crossing Dam will have a significant beneficial impact on downstream lands in the Mary River Valley through the mitigation of adverse flood peaks and flood levels. A numeric hydraulic model has been formulated for the Mary River catchment which enables the simulation of resultant flood flows and changes in water surface levels downstream of the Traveston Crossing Dam.

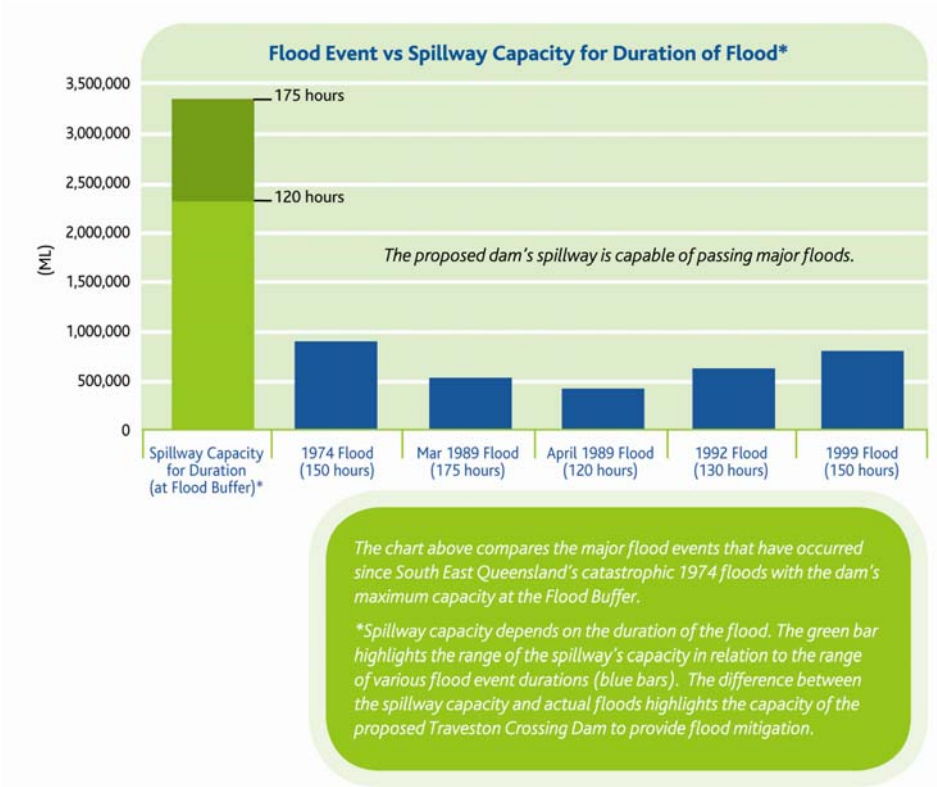
The numeric model has been calibrated with recorded stream flow records and the flood hydrographs for the 1974, 1989, 1992 and 1999 flood events using recorded rainfall data for those events. The calibration of the flood model ensures a good correlation between measured historical data and simulated modelled behaviour with regards to peak flow, peak water levels, total volume and flood timings.

Figure 8.8 highlights the impact of flooding on Gympie in 1999.

Figure 8.8: 1999 Floods in Gympie

Source: SunWater

Figure 8.9: Spillway Capacity for Flood



Source: SunWater

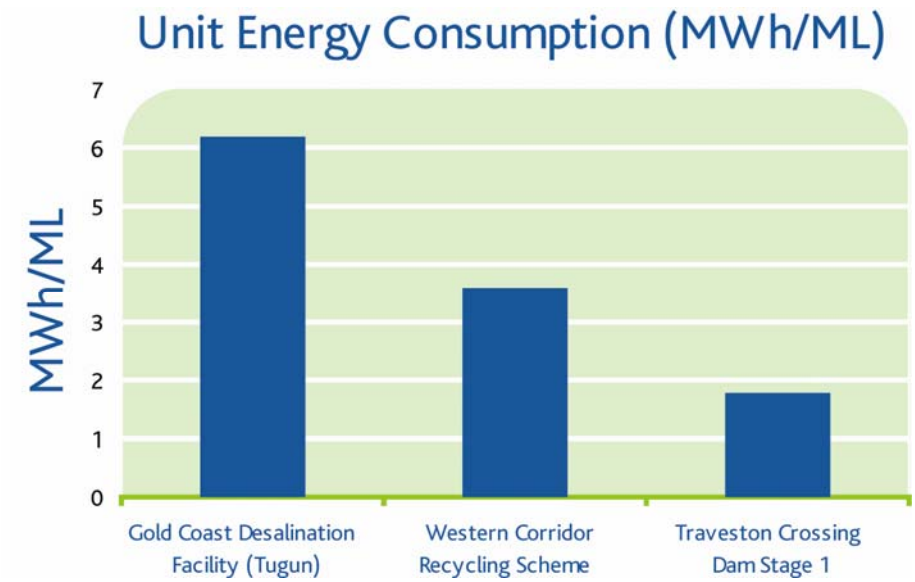
When the model including the Traveston Crossing Dam is applied to the recorded data from the 1999 flood event at Gympie, the reduced outflow hydrograph demonstrates that had the dam been in existence of the 1999 flood, it would have reduced peak water levels through Gympie by approximately 4 metres. This reduction in peak water surface levels can be seen on the plan at Annexure 28 to this Submission, which depicts the different levels of the 1999 flood modelling with the dam in place, and as occurred without the dam.

On the basis of the numeric hydraulic modelling prepared for the Mary River, a flood mitigation strategy is under preparation to optimise the benefit to Gympie by limiting flood discharges from the dam using the flood control gates on the spillway. A preliminary gate opening strategy is under preparation to optimise the flood mitigation benefit that can be achieved downstream, while limiting upstream storage levels to the buffer zone that will be acquired as part of Stage 1 of the project.

(h) Energy Consumption

A preliminary comparison of estimated energy consumption (including pumping) of the Traveston Crossing Dam, the Tugun desalination plan and the Western Corridor Recycled Water Project undertaken by QWC appears on the following graph. The graph indicates the relative energy consumption associated with the three projects.

Figure 8.10: Energy Consumption



8.5 Associated Projects

(a) Northern Regional Water Pipeline

The Northern Regional Water Pipeline is the connection between Traveston Crossing Dam and the Northern Pipeline Interconnector. The ultimate aim is to connect the proposed Traveston Crossing Dam with current storages supplying the Sunshine Coast, Caboolture and Brisbane. This will potentially allow water to be moved between six different dam systems, each with different catchment characteristics.

The Northern Regional Water Pipeline Project is currently in the preliminary planning phase with the QWC. Detailed planning is yet to commence and the project delivery structure is currently undefined. Once the project delivery structure is defined and detailed project planning is commenced, the project will be subject to a rigorous and transparent assessment process in accordance with Queensland Government and Australian Government legislative requirements, including an assessment of cumulative impacts on the receiving environment.

(b) Gympie Bypass Project

The need for the Bruce Highway (Cooroy to Curra) Strategic Planning Study and the upgrade of the Bruce Highway

The Bruce Highway is part of the AusLink National Network and is therefore eligible for funding from the Commonwealth Government. The Commonwealth Government has provided funding to Main Roads for a study to determine future needs for the 65 km section of the Bruce Highway between Cooroy and Curra (to the north of Gympie) and to develop a strategy to meet these needs for the next 30 years.

The existing highway between Cooroy and Gympie has one of the highest motor vehicle accident rates on the Bruce Highway. The proposed upgrade to the highway has been designed to create a safer road that separates local and long distance traffic, restricts driveway access, maintains adequate spacing between the intersections and interchanges and divides the highway carriageway.

The upgraded highway is planned to be a high-standard, four-lane alignment (ultimately with provision for six lanes) allowing safe high-speed travel for heavy traffic volumes with improved flood immunity. There is no definite timing for construction and this will depend on funding from the Commonwealth Government.

The Bruce Highway (Cooroy to Curra) Strategic Planning Study

The Bruce Highway (Cooroy to Curra) Strategic Planning Study (***Stud***y) is being undertaken by DMR, in conjunction with the Commonwealth Government and has taken into account community feedback provided through a number of information forums. DMR has also worked closely with the Cooroy Curra Community Committee (***CCCC***) and a number of Community Focus Groups (***CFG***) during the Study.

The Study will identify the best corridor for the highway to provide a safe and efficient route in the longer term while minimising impact on existing communities and the environment.

The Study has been underway since 2004. Various corridor options have been considered throughout this process. On 14 March 2007, in a joint statement (the Honourable Mark Vaile MP and the Honourable Paul Lucas MP), the

Commonwealth Government and the Queensland Government announced the proposed corridor which takes into account the impact of the proposed Traveston Crossing dam. The proposed Traveston Crossing dam affects the part of the Bruce Highway between the localities of Federal and Kybong, south of Gympie.

Traveston Crossing Dam

On 5 July 2006, the Queensland Government announced proposed plans to stage the construction of the Traveston Crossing dam. At the full storage level (Stage 2 of the proposed dam) approximately ten kilometres of the 65 kilometres of existing Bruce Highway under investigation will be affected. The study team is consulting with QWI and DNRW to progress the highway upgrade around the proposed dam.

The Study process

The Study is being undertaken in four stages. At present, the Study is in the final part of Stage C, involving the public display of the proposed corridor.

Stage A of the Study involved the preparation of a constraints and deficiencies report. This report identified highway objectives, deficiencies of the existing highway, physical, environmental and other features within the study area and non-physical issues such as cost, access and social issues.

During Stage B of the Study, a number of "corridor options" were developed, taking into account the constraints identified during Stage A.

Stage C of the study involved examining and assessing the shortlisted corridor options at a higher level against environmental, social, cultural heritage, transport and engineering assessment criteria to develop the proposed corridor option. During Stage C, a refined study area was announced within which a proposed corridor was to be determined.

The refined study area was released in October 2006, followed by the release of the proposed corridor in March 2007. Both the refined study area and the proposed corridor take into account the impact of the proposed Traveston Crossing dam.

Stage D is the final stage of the study and will involve the review of public comments received during Stage C. An implementation strategy will then be developed and the project report finalised.

The route selection process has involved developing route options, including the existing road corridor, and analysing those options against predetermined route selection criteria. The selection criteria included:

- directness of the corridor;
- indicative cost;
- ability to construct in stages;
- impacts on the natural environment and on cultural heritage; and
- the need to acquire land and residences and impacts on current residential amenity.

Other work undertaken to assist in the selection of the proposed corridor includes environmental fieldwork, visual assessment of the local area, preliminary reviews of indigenous cultural heritage and European historical heritage issues, noise modelling and planning and land use work.

The proposed corridor

The Study is now at the end of Stage C and the proposed corridor has been displayed for community consideration and comment. This feedback will be considered in any final refinements of the proposed corridor before developing a strategy for how the works could progressively be carried out and a recommendation is made to government. The Proposed Gympie Bypass Corridor Locality Map is provided in Annexure 44 to this Submission.

The proposed corridor as presently announced takes into account the impact of the proposed Traveston Crossing Dam. The proposed corridor will mostly be in the buffer area for the proposed dam. However, if the dam does not proceed, the alignment may be relocated closer to the existing Bruce Highway corridor.

Community consultation during the Study

To ensure the community has the opportunity to be involved in the Study, information has been distributed regularly through newsletters, fact sheets, public displays and the study website. Advertisements have been placed in local and

regional newspapers to inform the community about key study activities such as public displays.

In Stage C, the Study team used feedback received from the public display options at the end of Stage B. The Study team worked closely with the CCCC that was formed in November 2005 to re-look at the existing options and consider new corridor options to develop a refined study area. The local councils have also provided vital local input.

Having established the refined study area, DMR's consultation process focused on smaller localised CFGs in and close to the refined study area. Representatives from each of the CFGs presented DMR with a summary of important issues identified in their communities. The information provided has influenced the proposed corridor which has just been displayed.

Refer to Annexure 42 to this Submission for Bruce Highway (Cooroy to Curra) Strategic Planning Study Frequently Asked Questions

Environmental Impact Assessment

An environmental impact assessment study has yet to be completed for the Gympie bypass project. DMR will conduct an environmental impact assessment as part of the detailed planning phase of the project, when the final alignment has been determined.

Land Acquisition

Land acquisition for the Gympie bypass project will be in accordance with DMR's acquisition policies, including DMR's Property Acquisition Hardship Policy attached at Annexure 43 to this Submission.

9. WYARALONG DAM

Summary

The Wyaralong Dam on Teviot Brook, between Boonah and Beaudesert, is an integral element of the storage system comprising the Cedar Grove Weir and the Bromelton Offstream Storage, and will be operated in conjunction with those assets. The Wyaralong Dam (in conjunction with the Cedar Grove Weir) will contribute 21,000 ML/a of the projected additional need for SEQ region by 2051, and its construction is due for completion by 2011.

The Wyaralong Dam is located on Teviot Brook in Boonah/Beaudesert area of SEQ, about 14 kilometres north-west of Beaudesert within the Logan River basin.

The proposed Wyaralong Dam Project will be subject to a rigorous and transparent assessment process in accordance with the process outlined in section 11 of this Submission before a decision is made on whether the project is able to proceed, and if so, the conditions under which it will be approved.

9.1 Project Description

(a) Overview

In April 2006 the Queensland Government announced the Wyaralong Dam being a second major dam project as part of the suite of measures to ensure a safe and sustainable water supply for the SEQ region.

The Wyaralong Dam on Teviot Brook, between Boonah and Beaudesert, is an integral element of the storage system comprising the Cedar Grove Weir and the Bromelton Offstream Storage, and will be operated in conjunction with those assets. The Wyaralong Dam (in conjunction with the Cedar Grove Weir) will contribute 21,000 ML/a of the projected additional need for SEQ region by 2051, and its construction is due for completion by 2011 at a cost of $500 million.

QWI has been appointed by the Queensland Government to progress the design and construction of the Dam. The project is currently in its preliminary stages as QWI undertakes geotechnical investigations and assesses likely environmental social and economic opportunities and potential impacts of the project ahead of commencing the formal assessment and approval processes. These processes are addressed in section 9.5 of this Submission.

Table 9.1 outlines the key statistics of the Wyaralong Dam.

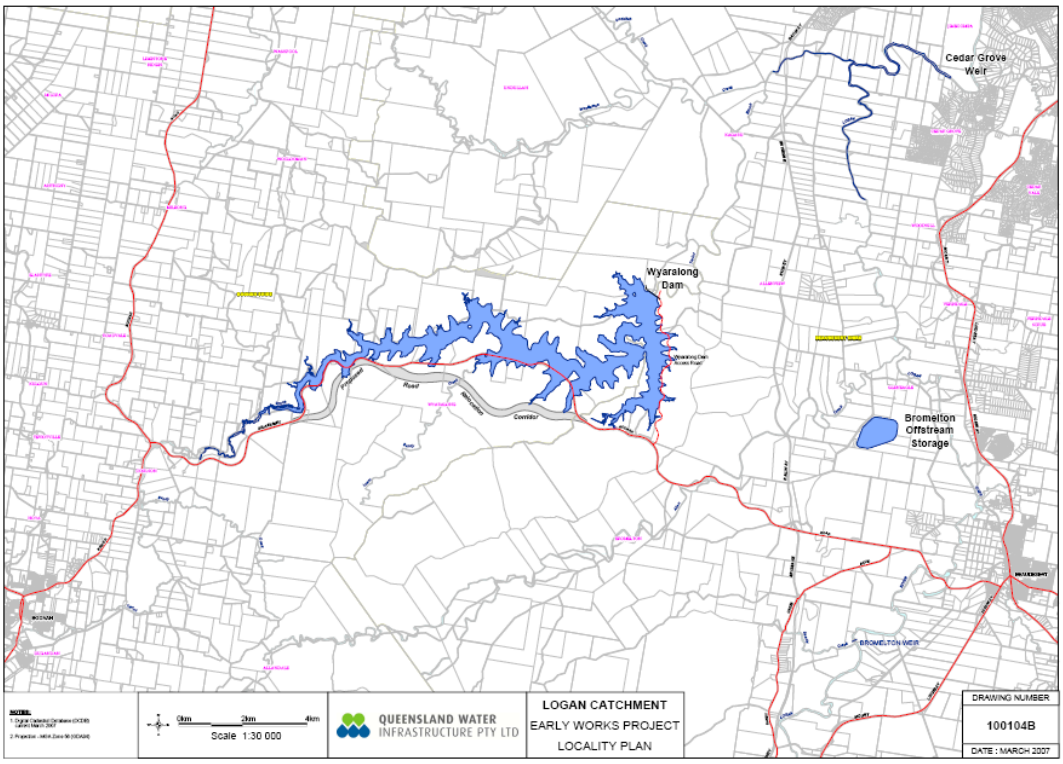
Table 9.1: Wyaralong Dam Statistics

	Completion
Anticipated annual yield:	21,000 ML in conjunction with Cedar Grove Weir
Elevation above sea level:	63.6 metres
Water depth at dam wall:	28 metres
Average depth: (in river channel)	14 metres
Average depth:	8.3 metres
FSL Area:	1,230 ha
Total capacity:	103,000 ML
Scheduled completion:	By Dec 2011
Total Project Cost:	$500 million
Properties affected:	18
Houses required:	Nil
Road relocation:	10.7km

(b) Location

The Wyaralong Dam is located on Teviot Brook in Boonah/Beaudesert area of SEQ, about 14 kilometres north-west of Beaudesert within the Logan River basin.

Figure 9.1: Locality Map



(c) Potential Opportunities and Impacts

The following potential opportunities and impacts identified are provided as a high level and preliminary summary only at this time. The EIS process will involve the undertaking of significant further assessments of the construction and operation of the Wyaralong Dam. As for Traveston Crossing Dam, it is anticipated that the EIS process will interact with the development of dam design and routes for relocated roads thereby optimising either potential design on impact management solutions.

(d) Property affected

The area affected by inundation from the Wyaralong Dam at FSL is 1,230 hectares, comprising 18 properties. No houses will be directly affected by the inundation area.

(e) Environmental issues

As for the Traveston Crossing Dam, the construction of the Wyaralong Dam and associated works has the potential to impact on a range of terrestrial and aquatic flora and fauna. Any potential ecological impacts will be assessed and mitigation

strategies prepared for the EIS in accordance with the assessment and approvals processes detailed at Section 9.5 of this Submission.

(f) Infrastructure - Roads

The proposed inundation area will require the relocation of 10.7 kilometres of road. This opportunity will enable the upgrade of part of the Beaudesert – Boonah Highway. Road design and planning is being carried out by QWI in close consultation with the DMR, local councils and affected residents.

9.2 Project Timeframe

Estimated Project Timelines

Approval Timeframe

•	October 2006	-	Preliminary environmental investigations
•	November 2006	-	Project of significance declared
•	November 2006	-	Project referred to Federal Government
•	January 2007	-	Draft Terms of Reference on public display
•	By October 2007	-	Draft EIS available on public display
		-	Supplementary EIS prepared (if required)
•	By early 2008	-	State and Commonwealth assessment

(subject to satisfactory outcome of State and Commonwealth approvals)

•	By late 2008	-	Appointment of construction company
•	By early 2009	-	Construction commences
•	By end 2011	-	Construction complete.

9.3 Preliminary Design Phase

Wyaralong Dam will be designed to withstand full flood and earthquake loading in accordance with the QDSM Guidelines and the ANCOLD Guidelines.

Concept design studies indicate that the following two dam arrangements are suitable for the site:

(a) a non-overflow concrete face rockfill embankment across the river channel with flood flows being passed through a concrete spillway constructed on the right abutment;

(b) a roller compacted concrete embankment across the river channel designed to pass flood flows over the embankment itself.

The current preferred option is for a non-overflow concrete faced rockfill embankment, however a roller compacted concrete embankment may be the final design. The final preferred concept will be refined during the detailed design phase of the project, following the results of materials investigations (eg. sources of rock, clay, sand).

QWI has recently completed a series of studies and modelling investigations in relation to the project. An assessment of the dam development at FSL at EL 63.6m (height above sea level) and EL 66m, concluded that the preferred FSL for the dam is EL 63.6m, reducing the amount of land required for the dam.

The dam will include a range of measures to protect local wildlife and habitat and current indications suggest the dam will meet all necessary environmental flow objectives, of the Logan Water Resource Plan. The Logan Water Resource Plan is available in Annexure 33 to this Submission.

9.4 Engineering Assessment

Geotechnical Investigations

Extensive geotechnical investigations have identified the existence of solid rock foundations on both abutments and in the river channel. These foundations are suitable for all types of dam construction.

9.5 Status of Environmental Assessment

The proposed Wyaralong Dam Project will be subject to a rigorous and transparent assessment process in accordance with the process outlined in section 11 before a decision is made on whether the project is able to proceed, and if so, the conditions under which it will be approved.

The assessment process for Wyaralong Dam is consistent with the process outlined for Traveston Crossing Dam in Section 10. The following points summarise the key milestones associated with the Wyaralong Dam assessment process:

- QWI lodged the IAS with the Coordinator-General for the Wyaralong Dam Project on 19 September 2006. An addendum to the Initial Advice Statement identifies further information as the design progressed. The IAS is at Annexure 34 to this Submission.
- By a gazette notice in the Queensland Government Gazette of 3 November 2006, the Coordinator-General declared the Wyaralong Dam Project to be a significant project for which an EIS is required, pursuant to section 26(1)(a) of the SDPWO Act.
- By a Referral dated 16 November 2006, QWI referred the construction and operation of the Wyaralong Dam and the construction or relocation of associated infrastructure to the Federal Minister for the Environment and Heritage for the Minister's decision on whether or not that action was a "controlled action" for the purposes of the EPBC Act, that is, one that would otherwise be prohibited under Part 3 without an approval under Part 9. The Referral is at Annexure 35 to this Submission.
- On 13 December 2006, a delegate of the Federal Minister for the Environment and Heritage decided (refer to Annexure 36 to this Submission) that the proposed action to construct and operate the Wyaralong Dam and to construct or relocate associated infrastructure as described in the Referral was a controlled action, with the following controlling provisions:
    - sections 16 and 17B (Ramsar Wetlands);
    - sections 18 and 18A (Listed Threatened Species and Communities); and
    - sections 20 and 20A (Listed Migratory Species).
- On 13 December 2006, a delegate of the Federal Minister for the Environment and Heritage decided that the Wyaralong Dam Project would be assessed by the SDPWO Act as the accredited process under the bilateral agreement between the Australian and Queensland Governments.
- In accordance with the SDPWO Act, the CG prepared draft ToR for the EIS for the Wyaralong Dam Project which were circulated to key stakeholders and the general public requesting submissions from 13 January 2007 to 26 February 2007. The draft ToR issued by the CG under the SDPWO Act includes specific reference to the matters of national environmental significance. Typically the CG allows 4 weeks for key stakeholder and general public submissions on Draft ToRs, however a total of 6 weeks was allowed for the Wyaralong Dam Project due to the high level of public interest in the Project and comment period taking

place over the New Year period. The draft ToR is at Annexure 37 to this Submission.

- 29 submissions were received in response to the exhibition of the draft ToR for the EIS, including submissions from government agencies, local councils, community groups and individuals. The CG is currently considering all submissions in finalising of the ToR, which is anticipated to be released in late April 2007.

10. ROLE OF QUEENSLAND GOVERNMENT AGENCIES

Summary

Through its agencies, the Queensland Government has a number of roles and responsibilities in regard to the progressing of any proposed water project, such as the proposed dam at Traveston Crossing. Indeed this is true of any significant project undertaken by the State Government, such as power stations and major roads. It needs to be noted that:

- the various approval processes all have clear statutory requirements that ensure a distinction between the State's role as owner of the proponent, QWI, and as assessor; and
- in regard to the critical environmental assessment process, the EIS, the assessment process is carried out in conjunction with the Federal Government.

It is important to clearly understand the distinct roles played by these different agencies in relation to the various stages of the development and implementation of a water resource development proposal.

10.1 Role of the Queensland Government

Through its agencies, the Queensland Government has a number of roles and responsibilities in regard to the progressing of any proposed water project, such as the proposed dam at Traveston Crossing. Indeed this is true of any significant project undertaken by the State Government, such as power stations and major roads. It needs to be noted that:

1. the various approval processes all have clear statutory requirements that ensure a distinction between the State's role as owner of the proponent, QWI, and as assessor; and
2. in regard to the critical environmental assessment process, the EIS, the assessment process is carried out in conjunction with the Federal Government.

It is important to clearly understand the distinct roles played by these different agencies in relation to the various stages of the development and implementation of a water resource development proposal.

These stages are outlined in the below table.

Table 10.1: Role of Government Agencies

Stages	Simplified illustration of Key consideration	Lead Responsible agency
Water Resource Planning and Management	Is there spare water after the needs of existing users and the environment are met?	DNRW
Future Needs - Project Identification and Preliminary Assessment	What are the future needs relating to growth and drought/climate change and how are these needs best addressed?	QWC
Detailed Assessment of Impacts	What are the impacts of a proposed project and can they be satisfactorily addressed?	CG and Commonwealth Department of Environment and Water – with assistance from all agencies with a statutory interest in the impacts
Development Permits and Other Authorities – Decisions and Compliance	What are the specific measures required to comply with legislation dealing with specific impacts?	All agencies with a statutory interest in the identified impacts

In each stage, the relevant agency has to make any required approval decisions based on the applicable legislative framework. That is, the statutory decision makers must take account of the factors set out in the relevant legislation and their discretion to respond to any inconsistent policy objectives is limited. Taken together, the many statutory assessment and decision-making processes provide a comprehensive and thorough system of checks and balances designed to ensure that water storage proposals only proceed if they are ecologically sustainable.

It is important to distinguish the roles and responsibilities of statutory decision makers and the Queensland Government in general. The Government may decide to commit the resources to facilitate a water storage proposal through the various stages outlined in the table above. However, it is statutory decision makers such as the CG and the Chief

Executive of DNRW who are obliged by law to ensure that there are sufficient plans, research and other information produced by the proponent, in consultation with the public, to demonstrate that the proposal can address the extensive and challenging requirements of the large range of applicable legislation protecting the environment.

10.2 Department of Natural Resources and Water –Water Resource Planning and Management

The DNRW administers the *Water Act 2000,* which puts in place the overall legislative and institutional framework for the sustainable planning, allocation and use of water. Catchment based WRPs are the key means to deliver sustainable management through:

- providing secure allocations for consumptive needs and environmental flows for river health
- plans developed with extensive consultation to ensure the community—including irrigator, grazier, industry and indigenous interests—is involved and decision-making is transparent
- use of the best available science to inform plan objectives
- water monitoring to ensure plan objectives are met, and to provide information to improve future water management decisions.

These ten-year catchment-based WRPs—developed in consultation with local communities—aim to balance water availability for current and future water demands across different types of water users, and give people a more secure and reliable allocation. A secure allocation is also provided to the environment. This allocation must be sufficient to maintain the ecological health of aquatic ecosystems and the plants and animals that depend on them, through taking into account river flow regimes—such as volume, timing, seasonality, and duration.

These plans are based on the best available scientific knowledge and are revised every ten years to ensure climate change is addressed. Ongoing monitoring and reporting is required to ensure that flow and ecosystem outcomes are being met. This also improved the knowledge base for future water plans.

WRPs detail the plan area, the water to which the plan applies and what the plan aims to achieve. This includes:

- outcomes for water use such as the needs of towns, cities, agriculture and industry within the flow needs of the environment;

- outcomes for the ecosystem arising from environmental flows, for example the needs of specific species, wetland and general river ecology;
- strategies to achieve water use efficiency and the best possible environmental outcomes;
- water allocation security objectives—the performance water users can expect from their allocations; and
- monitoring and reporting requirements to ensure that plans are working.

A Resource Operations Plan (ROP) provides the detailed rules necessary to implement the WRP. These rules are developed in consultation with the community and include:

- specifying operating and management rules for dam owners;
- providing water that can be taken without harming the environment;
- converting existing entitlements into tradable water allocations separate from land title;
- specifying rules for the trading of water allocations; and
- specifying monitoring of water use and environment targets.

WRPs and ROPs are published as subordinate legislation to the *Water Act 2000* and, together, the WRPs and ROPs:

- allow transparent sharing of water to protect environmental and human interests;
- secure water entitlements for the life of the WRP;
- ensure that new entitlements will be issued only if they can be sustained without undue environmental harm;
- establish a basis for water allocations in nominated areas to be permanently traded (transferred to another site or use), subject to important safeguards; and
- protect the health of rivers and underground water reserves.

Extensive consultation is integral to the water resource planning process. Regional communities, industry and other stakeholders, including conservationists and indigenous groups, all have a role to play.

The key elements of the consultation process are as follows:

- *A regional forum:* A community reference panel, drawn from economic, cultural and environmental interests, allows the aspirations and concerns of the people living in the catchment to be fully considered during the planning process.
- *Expert advice:* A technical advisory panel evaluates the best available information on aquatic ecosystems and assesses environmental implications of different water allocation scenarios. The panel's scientific advice is fully considered in developing a water resource plan.
- *Comment and feedback:* Two rounds of community submissions are invited during development of the WRP, first, when the Minister announces the intention to prepare a plan, then after the draft plan's release. Copies of notices and draft plans are supplied to local government offices for public inspection. They can also be viewed on the department's web site.
- *A 10-year plan:* A finalised water resource plan applies for 10 years. Towards the end of this cycle, a review process drawing on past experience and knowledge will establish how the plan might evolve to meet future needs. It will incorporate public consultation and scientific assessment requirements detailed in the *Water Act 2000*, and will benefit from a better understanding of resource sustainability issues. Through stakeholder involvement, long-term resource management approaches will be coordinated.
- *Continuing improvement:* Monitoring and reporting requirements along with an improved understanding of resource sustainability issues will promote community acceptance of a plan's long-term effectiveness.

The proponent of a dam is required by law to adhere to the requirements specified in the WRP relating to the Mary River. The WRP has been developed to meet the outcomes for sustainable management of water, including the provision for environmental outcomes such as:

- maintaining riverine and estuarine ecosystems;
- providing wet season flows; and
- allowing movement of fish.

A key component of the WRP is to ensure sufficient environmental flows at the mouth of the river to cater for the ecological health of the estuary. As part of the EIS and the ROP processes, QWI will be required to produce detailed hydrological data, based on

accredited best-practice models, to prove that the flow requirements set out in the WRP will continue to be met following the development of the dam.

These flows have been established following the substantial consultation processes outlined above, though which all sectors of the community were able to participate.

The extensive water-related legislation approval requirements that must be addressed by QWI include:

- Development Permit Applications to be assessed and approved by the Chief Executive of DNRW in accordance with criteria specified in the *Water Act 2000*;
- the development of detailed submissions containing the specific dam operating procedures to enable the Chief Executive of DNRW to finalise a ROP;
- an application for a Resource Operations Licences (***ROL***) as per process requirements specified in the ROP;
- the development of a Failure Impact Assessment in relation to the dam for the review and approval by accredited engineering experts

ROLs are granted in accordance with a ROP. An ROP is used to implement a WRP in specified areas. They authorise the holder of the licence to interfere with the flow of water to the extent necessary to construct and operate the water infrastructure to which the licence applies.

It is important to note that lawful construction cannot commence until a ROL, or an interim ROL, is issued and an interim ROL or ROL cannot be issued until a finalised WRP or ROP is in place for the specific area or an application and assessment process set out in a WRP or a ROP is successfully completed.

10.3 Queensland Water Commission: Future Needs - Project identification and Preliminary Assessment (previously undertaken by the DNRW)

A Government decision to invest considerable resources in conducting a detailed assessment of a water storage proposal only occurs after preliminary assessments confirm the need for such a proposal. These preliminary assessments and project identification activities are based on a hierarchy of three key principles:

- facilitating the highest value and best use of water through establishing secure and well specified water entitlements;

- promoting efficient use of water, for example, by improving demand management and by recycling water; and
- where demands cannot be met through the above measures, and where unallocated water is available, by the development of additional water supply sources.

The steps in developing a water supply strategy, and/or identifying the need for a water storage proposal to advance in and completing typically include:

(1) identifying existing water use;

(2) estimating future short, medium and long-term water supply requirements;

(3) identifying shortfalls in existing supply systems to meet existing and future water requirements for each sector;

(4) identifying potential for making better use of existing supplies, for example, improved demand management measures and enhanced water reuse;

(5) identifying potential options for new water supply sources to meet shortfalls;

(6) preliminary evaluation of potential infrastructure options on the basis of economic, social and environmental criteria;

(7) combining measures identified in steps 4 and 6 above to provide a supply strategy for the region;

(8) assessing risks associated with the supply strategy; and

(9) identifying actions required to implement the strategy, including new water storage proposals (if any).

The QWC is an independent, statutory authority responsible for planning and achieving safe, secure and sustainable water supplies in SEQ and other designated regions.

The role of the QWC includes ensuring sustainable water supplies by developing long-term water supply strategies, establishing a regional water grid, implementing water restrictions as necessary, managing water demand, providing advice to government and reforming the water industry as necesasry.

The QWC is currently completing a long-term water strategy to guide the region's water initiatives in conjunction with State and local governments, providing advice to Government on the development of the institutional arrangements for the region's water sector, the determination of water restrictions, conducting and monitoring government

approved programs in relation to water infrastructure and providing advice to government on issues such as the demand for and supply of water, water management and water pricing.

10.4 CG - Detailed Assessment of Impacts

The CG is the manager, coordinator and key State decision maker in relation to the impact assessment process of any major water storage proposal. The CG has in recent times coordinated assessment processes for projects such as the Paradise Dam, Kirar Weir, the Awoonga Dam Raising and the Lenthalls Dam Raising.

The State and Commonwealth Governments can only provide the necessary environmental clearances for the Dam on the basis of a comprehensive EIS development and evaluation process, conducted in accordance with the SDPWO Act and the EPBC Act. The main process steps, including extensive public consultation requirements, are set out the SDPWO Act and have been accredited by the Commonwealth for the purposes of the EPBC Act.

In 2001, the Commonwealth formally accredited the State EIS process, pursuant to section 87 of the EPBC Act. The State EIS process was accredited partly because of the public notification and consultation procedures required of the proponent by the State EIS process and the requirement to address matters of national environmental significance, in accordance with the EPBC Act.

The accredited process was that established by Division 4 of the SDPWO Act and Part 5 of the SDPWO Regulation 1999.

The SDPWO Act provides the head of power for the CG to declare a project to be a significant project for the purpose of requiring the proponent to prepare an EIS.

The CG can declare a project to be a ‘significant project’, based on one or more of the following criteria:

- complex approval requirements, including local, State and Australian Government involvement;
- a high level of investment in the State;
- potential effects on infrastructure and/or the environment;
- provision of substantial employment opportunities; and
- strategic significance to a locality, region or the State.

In accordance with the provisions of the SDPWO Act, the CG is required to assess the environmental effects, both beneficial and detrimental of the project, whether these effects are adequately addressed by the draft EIS and supplementary report and whether the detrimental impacts can be adequately addressed through the adoption of the proposed approval conditions and other impact mitigation requirements.

The CG's evaluation report is prepared in accordance with s.35 of the SDPWO Act and Part 5 of the SDPWO Regulation to evaluate the impact assessment documentation. In making the evaluation, the CG draws on information contained in the draft EIS and supplementary reports prepared by the proponent in response to the requirements of the TR. In addition, the CG must take account of comment from key Government agencies, and of issues raised in submissions received on the draft EIS and supplementary reports.

The CG will also be required by the EPBC Act to provide a formal notice to the Federal Minister that the proposed Traveston Crossing Dam has been accessed to the greatest extent practicable.

DNRW, the EPA and the Department of Primary Industries and Fisheries (***DPI***) are closely involved in the whole of Government EIS evaluation process by providing publicly available submissions to the CG on matters of relevance to the legislation administered by those agencies. Formal submissions are provided at three points in the EIS process. In addition, the agencies provide ongoing advice to the CG and the CG's advisers in the Department of Infrastructure throughout the EIS process.

10.5 DNRW

DNRW provides ongoing advisory input and audits the results of the substantial hydrological modeling exercises associated with the EIS and the subsequent granting of a ROL. These results must clearly demonstrate that environmental flow requirements and associated ecological outcomes were being suitably addressed by the proponent's commitments. In addition, DNRW must assess any proposed clearing of native vegetation in accordance with strict codes. In general, these codes require proponents of water storages proposals to produce property lot level plans of existing vegetation, to justify any need to remove vegetation of conservation significance and to devise revegetation and vegetation regeneration proposals to effectively offset any impacts on significant regional ecosystems.

10.6 Environment Protection Agency (EPA)

The EPA is responsible for protecting Queensland's natural and cultural heritage, and promoting sustainable use of its natural capital and ensuring a clean environment.

The Environmental Protection Agency administers the EP Act, the *Nature Conservation Act 1992*, the *Marine Parks Act 2004*, the *Coastal Protection and Management Act 1995* and the *Queensland Heritage Act 1992*.

This legislation sets out detailed requirements for the protection of species of conservation significance and the suitable management of impacts on any quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

The object of the EP Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

Given these responsibilities, the EPA plays a key role in assisting the CG assess the impacts of a water storage proposal and develop strategies to suitably mitigate such impacts on identified environmental values.

The EPA may accept an EIS prepared under another Act (for example the Commonwealth EPBC Act and SDPWO Act) as fulfilling the impact assessment and notification requirements for various licences required under the EPA. This does not mean that the EPA can avoid the mandated decision making requirements of the legislation it administers. In practice, the EPA's close involvement in the EIS process enables the EPA's requirements to be addressed throughout the EIS process and any conditions of approval arising at the end of the EIS process.

10.7 Department of Primary Industries and Fisheries (DPIF)

The DPIF strives to ensure Queensland's primary industries and fisheries support sustainable production systems and use best practice in water management and water allocation, vegetation and pest management, and chemical use.

The main purpose of this *Fisheries Act 1994*, which is administered by DPIF, is to provide for the use, conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to:

(a) apply and balance the principles of ecologically sustainable development; and

(b) promote ecologically sustainable development.

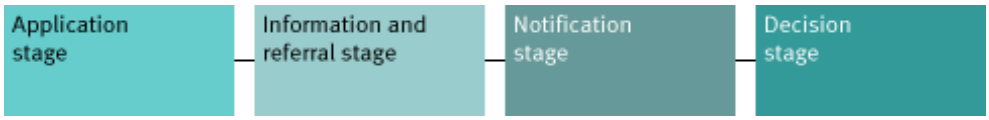
Given these responsibilities, the DPIF plays a key role in assisting the CG assess the fish-related impacts of a water storage proposal and develop strategies to suitably mitigate such impacts on fish habitats and passage.

The DPIF is also involved, as part of a whole of Government task force, to investigate the impacts on existing land uses and infrastructure of the Traveston Crossing Dam and the opportunities to be incorporated in a long-term land use plan and infrastructure program, as well as specific investigations for townships affected by the Traveston Crossing Dam.

10.8 Development Permits and other Authorities – Decisions and Compliance

The environment management plans and other requirements for impact mitigation actions arising out of the EIS process are implemented through the application for, granting of, and monitoring of compliance with, a range of permits, licences and authorities. In relation to State requirements, these licences, permits and authorities are integrated through the Integrated Development Assessment System (IDAS). IDAS is the system detailed in the *Integrated Planning Act 1997* for integrating State and local government assessment and approval processes for development.

The IDAS process incorporates four stages as set out in the figure below. However, the four stages of IDAS may not apply to all development applications. Simple development applications may trigger only two stages. More complex and environmentally sensitive proposals may trigger all four stages. When an EIS process under the SDPWO Act has been completed for a proposal, the information and referral stage and the notification stages have already effectively been addressed and do not need to be replicated except to the extent that the decision-maker requires additional specific information to fulfil legislative requirements. In accordance with section 54 of the SDPWO Act, the CG's EIS evaluation report must be taken into consideration by the person who may give an IDAS or other approval required for the project.



Application Stage—is the stage where the application is lodged with the assessment manager.

Information and Referral Stage—is the stage where the application is reviewed. During this stage the assessment manager and some State Government agencies may request further information and particulars about the proposal.

Notification Stage—is the stage in which an impact assessable application is publicly advertised and comments on the proposal are invited from the community.

Decision Stage—is the stage in which the assessment manager makes a decision on whether the application is to be approved and advises the applicant and any submitters of their decision.

In the case of a dam proposal, IDAS applications seeking permits or other authorities are usually required for matters such as the following:

- reconfiguring a lot under the *Land Title Act 1994*;
- operational work of any kind and for all things constructed or installed that allow the taking, or interfering with, water (other than using a water truck to pump water) under the *Water Act 2000*, taking or interfering with, water from a watercourse, lake or spring or from a dam constructed on a watercourse;
- operational work that is the construction of a referrable dam as defined under the *Water Act 2000*;
- all aspects of development for removing quarry material from a watercourse or lake as defined under the *Water Act 2000*;
- for assessing operational work against the *Fisheries Act 1994*, operational work that is the constructing or raising of a waterway barrier works;
- operational work that is the clearing of native vegetation on freehold land and indigenous land;
- operational work that is the clearing of native vegetation on land subject to a lease issued under the *Land Act 1994* for agriculture or grazing purposes;

- operational work that is the clearing of native vegetation on land subject to a lease under the *Land Act 1994*;
- all aspects of development carried out on a registered place as defined under the *Queensland Heritage Act 1992*;
- an environmentally relevant activity, or aspects of a prescribed environmentally relevant activity (e.g. dredging material from a watercourse; extracting rock or other material from a pit or quarry; screening, washing, crushing, grinding, milling, sizing or separating material extracted from the earth, concrete batching etc).

An application for a permit or other authority may be:

- approved; or
- approved subject to conditions; or
- refused.

If an application is refused, the decision notice must include the reasons for the refusal. If an application is approved, the approval relating to a dam proposal is usually subject to conditions. Conditions must be complied with and may apply to various stages of the development including:

- project planning;
- construction; and
- the on-going life of the development.

Failure to comply with conditions of approval will result in the development being unlawful and substantial penalties apply.

10.9 Other relevant agencies

Department of Infrastructure

The role of the Department of Infrastructure is to focus on delivery, planning facilitation and coordination of major infrastructure projects across Queensland in consultation with the community.

The Department of Infrastructure plays a key role in the facilitation and development of major water infrastructure projects in Queensland. The core infrastructure responsibilities include providing strategic advice to Government on infrastructure development priorities

and facilitating the implementation of major water projects approved as priorities by Government that are consistent with the water resources planning activities led by the DNRW.

DNRW provides administrative support to the CG through the conduct of an EIS process.

CFTF

A CFTF was established to work with communities affected by the dams. The CFTF is chaired by Major-General Peter Arnison, former Governor of Queensland, and comprising relevant state agencies and representatives of councils, the CFTF is developing strategies to maximise the medium to long-term opportunities presented by the development.

Initiatives to be undertaken by the CFTF include:

- undertaking community needs assessment to identify, social, economic and land use implications;
- providing shop front access to advice and support for individuals and community;
- generating a case management approach for affected individuals, businesses and communities;
- establishing community reference groups;
- identifying opportunities for regional employment and business continuity;
- developing industry adjustment initiatives;
- identifying longer term employment opportunities;
- implementing skills and training programs;
- identifying land use planning scheme options;
- identifying social infrastructure and lifestyle needs to rebuild communities;
- identifying access to rural water use; and
- rural futures planning.

The CFTF is working with communities affected by the proposed Traveston Crossing Dam to review issues such as jobs, industry assistance, and how to help local economies capitalise on the construction of the proposed dam in both the short and long-term.

The CFTF, in consultation with the impacted communities is looking to implement practical measures to address immediate community concerns and rebuild and reposition these communities for the future.

Refer to Section 12.3 of this Submission for further detailed information on the role of the CFTF .

10.10 QWI Role

The proponent for the proposed Traveston Crossing Dam project is QWI, a company incorporated on 28 June 2006 pursuant to the *Corporations Act 2001* (Cth) and whose shares are wholly owned by the State of Queensland.

QWI was established by the Queensland Government with the objectives of investigating, obtaining all relevant approvals, constructing and operating a number of water infrastructure projects in SEQ including the Traveston Crossing Dam and the Wyaralong Dam.

11. APPROVALS AND ASSESSMENT PROCESS

Summary

The proposed Traveston Crossing Dam will be subject to a rigorous and transparent assessment process before a decision is made on whether the project is able to proceed, and if so, under what conditions of approval.

The project will be assessed by the Coordinator-General under Queensland's SDPWO Act, and will incorporate the assessment requirements of the Australian Government's EPBC Act. This assessment approach is in accordance with the Queensland-Australian Government Bilateral Agreement on Environmental Assessment and has been commonly used to assess a large number projects throughout Queensland.

The Project will require approval by the Federal Minister for the Environment and Water Resources, after detailed and thorough investigations in the development of an Environmental Impact Statement (EIS).

11.1 Overview

The proposed Traveston Crossing Dam will be subject to a rigorous and transparent assessment process before a decision is made on whether the project is able to proceed, and if so, under what conditions of approval.

The project will be assessed by the Coordinator-General under Queensland's SDPWO Act, and will incorporate the assessment requirements of the Australian Government's EPBC Act. This assessment approach is in accordance with the Queensland-Australian Government Bilateral Agreement on Environmental Assessment and has been commonly used to assess a large number projects throughout Queensland. The Project will require approval by the Federal Minister for the Environment and Water Resources, after detailed and thorough investigations in the development of an EIS.

The development of an EIS to assess the environmental aspects and impacts of the project is being advanced by the project proponent QWI. Strategies to manage any potential impacts will be developed as part of the EIS and incorporated into an Environmental Management Plan for the construction and operational life of the project.

In accordance with the SDPWO Act, the Coordinator-General has prepared a draft Terms of Reference (ToR) for the EIS for the Traveston Crossing Dam project, which was

circulated to key stakeholders and the general public for comment from 9 December 2006 to 19 February 2007.

Submissions have been received in response to the exhibition of the draft ToR for the EIS, including submissions from government agencies, local councils, community groups and individuals. The Coordinator-General is currently considering all submissions in finalising of the ToR, which is anticipated to be released in late April 2007.

QWI has commenced community consultation as part of the development of the Environmental Impact Statement as required by Queensland and Australian legislation and the draft ToR. Over 290 community members have attended information days staged for the project to inform the public about the Environment Impact Assessment process and the opportunities for public involvement in the process.

The EIS is currently under preparation by QWI, and is scheduled to be released for public comment by October 2007. The Coordinator-General will consider all submissions on the EIS, and may require the preparation of a supplementary report to the EIS to address issues arising from the public review.

On completion of the EIS and the supplement to the EIS (if required), the Coordinator-General prepares an assessment report for the project, including a decision is made on whether the project is able to proceed under Queensland legislation, and if so, under what conditions of approval. The project's assessment report, EIS and any supplementary information are then considered by the Federal Minister for the Environment and Water Resources, to inform the Minister's EPBC Act assessment decision.

11.2 Queensland Environmental Assessment Regime

(a) Introduction

The Coordinator-General can declare a project to be a 'significant project' under the SDPWO Act based on one or more of the following criteria:

- Detailed information about the project given by the proponent in an Initial Advice Statement;
- The relevant planning schemes or policy framework including those of a relevant local government or of the State or the Commonwealth;
- The project's potential effect on relevant infrastructure;
- The employment opportunities that will be provided by the project;

- The potential environmental effects of the project;
- The complexity of local, State and Commonwealth requirements for the project;
- The level of investment necessary for the proponent to carry out the project; and
- The strategic significance of the project to the locality, region or the State.

Only the most important or complex projects, are generally declared to be significant projects, signalling that a robust assessment process is warranted involving whole-of-government coordination.

The Coordinator-General's decision to declare a project to be a 'significant project' does not infer Approval of the project, rather it signals that the project warrants a robust environmental impact statement.

The coordination of State interests involved means that an EIS carried out for a such a significant project under the SDPWO Act is the relevant assessment of environmental effects for the purposes of most major approvals that the project may require under all relevant and applicable Queensland legislation.

(b) Initial Advice Statement

Proponents seeking to have their project declared a significant project by the Coordinator-General must prepare detailed information in the form of an Initial Advice Statement (***IAS***).

QWI lodged the IAS with the Coordinator-General for the Traveston Crossing Dam Project – Stage 1 on 18 September 2006. An addendum to the Initial Advice Statement identifies further information as the design progressed. The IAS is at Annexure 13 to this Submission.

(c) Designation of the Project as a "significant project" under the Queensland SDPWO Act

By a gazette notice in the Queensland Government Gazette of 3 November 2006, the Coordinator-General declared the Traveston Crossing Dam Project – Stage 1 to be a significant project for which an EIS is required pursuant to section 26(1)(a) of the SDPWO Act. The gazette notice is at Annexure 17 to this Submission.

The process for an EIS for a significant project under the SDPWO Act involves the following:

- preparation and public notification of draft ToR;
- receipt of comments in respect of the public notification of draft ToR;
- the CG has regard to the comments on the ToR and finalises the ToR;
- the CG can refer details of the project, the IAS and the ToR to any entity that may be able to give comment and information that will help in preparing the EIS;
- a timely response by such an entity must be considered by the proponent in preparing the EIS;
- the proponent prepares the EIS in accordance with the ToR;
- after the EIS has been prepared to the satisfaction of the CG, the proponent publicly notifies the EIS;
- there is a submission period during which any person may make a submission to the CG about the EIS;
- the CG must consider all properly made submissions;
- the CG may ask the proponent for additional information or comment about the EIS, that is, to provide a supplementary EIS;
- the CG prepares a report evaluating the EIS which evaluates the environmental effects of the project and may state outcomes and conditions for particular approvals for the project and make recommendations in relation to other approval processes for the project or, in certain circumstances, impose conditions which will apply directly to the undertaking of the project; and
- the CG's evaluation report must be publicly notified.

The Australian Government has accredited the EIS process to be conducted under the SDPWO Act under the Bilateral Agreement between the Australian and Queensland Governments.

(d) Draft Terms of Reference for EIS

In accordance with the SDPWO Act, the CG prepared draft ToR for the EIS for the Traveston Crossing Dam project which were circulated to key stakeholders

and the general public requesting submissions from 9 December 2006 to 19 February 2007. Typically the CG allows 4 weeks for key stakeholder and general public submissions on Draft ToRs, however a total of 10 weeks was allowed for the Traveston Crossing Dam Project due to the high level of public interest in the Project and comment period taking place over the Christmas/ New Year period.

260 submissions were received in response to the exhibition of the draft ToR for the EIS, including detailed submissions from government agencies, local councils, community groups and individuals. The Coordinator-General is currently considering all submissions in finalising of the ToR, which is anticipated to be released in late April 2007.

Once the ToR have been finalised and issued by the CG, QWI will prepare an EIS which must address the ToR.

As mentioned above, key stakeholders and any member of the general public have had an opportunity to make comments on the draft ToR. The CG is required under the SDPWO Act to have regard to those comments in finalising the ultimate ToR for the EIS for this project.

As discussed below, the draft ToR also deal with relevant matters of national environmental significance under the EPBC Act in accordance with the requirements of the SDPWO Regulation.

A copy of the draft ToR for an EIS for the Traveston Crossing Dam Project is attached as Annexure 19 to this Submission.

(e) Environmental Impact Statement Assessment

Following finalisation of the draft ToR by the Coordinator-General, QWI will be responsible for preparing a draft EIS to address the ToR. Once the EIS has been prepared to the satisfaction of the CG, a public notice is advertised in relevant newspapers circulating in the district, the State and nationally. The notice will state:

- where copies of the EIS are available for inspection and how it can be purchased;
- that submissions may be made to the CG about the EIS; and
- the submission period.

QWI may be required to prepare a Supplementary Report to the EIS to address specific matters raised in submissions on the EIS.

At the completion of the EIS and Supplementary Report (if required), the CG will prepare a report evaluating the EIS and other related material, pursuant to s 35 of SDPWO Act.

The CG's Report will be publicly notified and a copy provided to the Federal Minister to enable his assessment under Part 9 of the EPBC Act to commence.

For any development approvals required under the IPA (refer Section 10.8 for further information on framework for other approvals) the CG's Report may state for the assessment manager one or more of the following:

- the conditions that must attach to the development approval;
- that the development approval must be for part only of the development;
- that the approval must be preliminary approval only.

Alternatively the Report must state for the assessment manager –

- that there are no conditions or requirements for the Project; or
- that the application for development approval be refused.

The project's assessment report, EIS and any supplementary information will be provided by the Coordinator-General to the Federal Minister for the Environment and Water Resources for consideration, to inform the Minister's EPBC Act assessment decision.

(f) Other approvals required

Refer to Section 10.8 Development Permits and other Authorities – Decisions and Compliance, for information on the framework for other approval requirements.

The tables at Annexure 38 to this Submission set out some of the approvals which may be required for the Traveston Crossing Dam project under current Queensland legislation. The list is by no means intended to be definitive or exhaustive. As the project design and assessment progresses, other issues and other potential approvals may arise and become relevant.

The draft ToR requires the proponent to identify all relevant legislation, policies and strategies and assess their specific implications and requirement for the Project, including the provision of a list of all approval required for the Project and the expected program for approval applications.

11.3 Commonwealth Environmental Assessment Regime

(a) EPBC Act Referral

Under the EPBC Act, a person proposing to take an action that the person thinks may be one which would be prohibited under a provision of Part 3 of the EPBC Act without an approval under Part 9, must refer the proposal to the Commonwealth Environment Minister for a decision on whether or not the action is a controlled action.

The IAS for the Traveston Crossing Dam identified potential impacts on various matters of national environmental significance for the purposes of the EPBC Act.

By a Referral dated 14 November 2006, QWI referred the construction and operation of the Traveston Crossing Dam Stage 1 and the construction or relocation of associated infrastructure to the Commonwealth Environment Minister on 15 November 2006 for the Minister's decision on whether or not that action was a "controlled action" for the purposes of the EPBC Act, that is, one that would otherwise be prohibited under Part 3 without an approval under Part 9. The Referral is at Annexure 10 to this Submission.

The Referral made it clear that a separate referral would be required for Stage 2 of the Traveston Crossing Dam Project should it subsequently proceed.

As explained in the Referral, it was not considered prudent to seek full approval for Stage 2 because it is planned for development in 2035, if required. With rapid changes in technology, population projections, climate change and assessment requirements, it is possible a different course of action may be considered at that time. This is discussed further in section 2.6 of the Referral.

The Referral noted in section 2.4 that relocation of some services and infrastructure may be to the Stage 2 planning levels as it would be inefficient in some circumstances to relocate twice and provided the Bruce Highway as an example.

In addition to the infrastructure to be relocated to facilitate the project, the Referral identified in section 2.6 the proposed pipeline and associated pumping infrastructure which is planned to link the dam to water infrastructure servicing other areas of south-east Queensland.

The Referral made it clear that the detailed planning for the pipeline had not yet been developed. Currently only preliminary planning for the Northern Regional Water Pipeline (refer Section 8.5 of this Submission) has commenced as this time and a proponent for this work is yet to be nominated. A referral under the EPBC Act will be made at the appropriate time in the planning process, if required.

(b) EPBC Act controlling provisions

On 29 November 2006, a delegate of the Federal Minister for the Environment and Heritage decided (refer Annexure 20 to this Submission) that the proposed action to construct and operate the Traveston Crossing Dam (Stage 1) and to construct or relocate associated infrastructure as described in the Referral was a controlled action, with the following controlling provisions:

- sections 12 and 15A (World Heritage);
- sections 16 and 17B (Ramsar Wetlands);
- sections 18 and 18A (Listed Threatened Species and Communities); and
- sections 20 and 20A (Listed Migratory Species).

The consequence of this decision is that the Traveston Crossing Dam proposal as set out in the Referral must firstly undergo an assessment of its impacts on the relevant matters of national environmental significance under the controlling provisions and requires an approval from the Federal Minister under Part 9 of the EPBC Act.

(c) Bilateral assessment arrangements

In accordance with provisions of the EPBC Act, the relevant environmental assessment of the Traveston Crossing Dam Project on matters of national environmental significance under the EPBC Act will be assessed under the EIS process conducted for that project as a significant project under Queensland's SDPWO Act. That EIS process under the Queensland SDPWO Act has been outlined earlier.

This is in accordance with clause 9 of the agreement between the Australian Government and the State of Queensland under section 45 of the Australian Government's EPBC Act relating to environmental assessment. This agreement is known as the Queensland bilateral agreement.

Under the bilateral agreement arrangements, Queensland, through the CG, must ensure that all relevant environmental impacts are adequately assessed and the CG must provide an assessment report to the Federal Minister with enough information about the action and its relevant impacts to allow the Federal Minister to make an informed decision whether or not to approve the action under Part 9 of the EPBC Act.

The Bilateral Agreement is at Annexure 21 to this Submission.

The draft ToR issued by the CG under the SDPWO Act includes specific reference to the matters of national environmental significance. These are discussed in more detail below in section 11.4 below.

11.4 Environmental Impact Statement

The objective of the EIS is to ensure that all potential environmental, social and economic impacts of the Project are identified and assessed and, where possible, how adverse impacts would be avoided. Direct, indirect and cumulative impacts must be fully examined and addressed to the extent reasonably practicable. The Project, including selection of the site, should be based on sound environmental protection and management criteria.

The draft ToR identifies the specific requirements for the contents of the EIS and specifically include a requirement for an assessment of cumulative impacts of the project overall and as they relate to particular issues, for example, air, water, noise emissions, cultural heritage or social impacts. This requirement is detailed in Section 3.13 of the draft ToR which is to be read with the comments on cumulative impacts in Section 3 of Part A of the draft ToR on information and advice on preparation of the EIS.

The draft ToR are extensive and require an assessment of feasible alternatives to the Traveston Crossing Dam project in sufficient detail to enable an understanding of reasons for preferring certain options and courses of action and rejecting others. These reasons are to be delineated in terms of technical, commercial, social and natural environment aspects. Section 1.4 of the draft ToR sets out some specific alternatives which should be assessed.

A summary of the issues identified in the draft ToR are provided below, with a copy of the draft ToR being made available in Annexure 19 to this Submission. The summary is not intended to be exhaustive, but provide an overview of the breath of issues contained in the draft ToR to be assessed in the EIS.

(a) Summary of Environment Issues

As outlined above in section 11.3 and 11.4, the environmental impacts of the Traveston Crossing Dam project on relevant matters of national environmental significance under the EPBC Act will be fully considered in the EIS required to be prepared by QWI under Queensland's SDPWO Act.

The draft ToR for this EIS issued by the CG identifies the specific matters of national environmental significance which must be addressed. They are set out in section 3.3.1 of Part B of the draft ToR and require the following to be specifically addressed under the requirements of the EPBC Act:

(i) Sections 12 and 15A (World Heritage)

- Fraser Island World Heritage Area – consideration should be given to impacts on physical quality, water quality and habitat as a result of changed hydrology and water quality as a result of the proposal. Migratory species dependent on this habitat are also likely to be affected.

(ii) Section 18 and 18A (listed threatened species and ecological communities)

- *Endangered*
  - Coxen's Fig Parrot (Cyclopsitta diophthalma coxeni)
  - Southern Barred Frog (Mixophyes iterates)
  - Spotted-tailed Quoll (SE mainland population)
  - Mary River Cod (Maccullochella peelii mariensis)
  - Mary River Tortoise (Elusor macrurus)
  - Plectranthus torrenticola
  - Triunia robusta
- *Vulnerable*
  - Red Goshawk (Erythrotriorchis radiatus)

- Black-breasted Button Quail (Turnix melanogaster)
- Grey-headed Flying-fox (Pteropus poliocephalus)
- Australian Lungfish (Neoceratodus forsteri)
- Green Turtle (Chelonian mydas)
- Hairy-joint Grass (Arthaxon hispidus)
- Three-leaved Bosistoa (Bosistoa transversa)
- Ball nut (Floydia praelta)
- Fontainea rostrata
- Small fruited Queensland Nut (Macadamia ternifolia)
- Southern Penda (Xanthostemon oppositifolius)

(iii) Sections 16 and 16B (Ramsar Wetlands)

- Great Sandy Strait Ramsar Wetland - consideration should be given to impacts on physical quality, water quality and habitat as a result of changed hydrology and water quality as a result of the proposal. Migratory species dependent on this habitat are also likely to be affected.

(iv) Sections 20 and 20A (Listed Migratory Species)

- Coxen's Fig Parrot (Cyclopsitta diophthalma coxeni)
- Green Turtle (Chelonian mydas)
- Dugong (Dugong dugong)
- Eastern Curlew (Numenius madagascariensis)
- Grey-tailed Tattler (Heteroscelus brevipes)
- Lesser Sand Plover (Charadrius mongolus)
- Terek Sandpiper (Xenus cinereus)
- Whimbrel (Numenius phaeopus)
- Bar-tailed Godwit (Limosa lapponica)
- Greenshank (Tringa nebularia)
- Grey Plover (Pluvialis squatarola)

The draft ToR also requires the proximity of project elements to any of these areas to be identified and mapped.

The draft ToR have requirements within section 3.3.1 to assess the impact of the Traveston Crossing Dam on these matters of national environmental significance and proposals to mitigate those impacts.

The draft ToR of course also require assessment of other impacts and aspects of the project such as:

- other flora and fauna;
- environmental flows of water;
- river valley geomorphology and hydrology;
- impact mitigation measures;
- flood risk mitigation.

This is consistent with Queensland's obligation under the bilateral agreement to ensure that the environmental impacts, other than impacts on matters of national environmental significance, that the action has, will have or is likely to have are assessed to the greatest extent practicable.

(b) Summary of Social Issues

The draft ToR requires the EIS to outline regional social impacts including community disruption, related land use changes, employment, skills development and any workforce accommodation issues.

A separate process (not part of the EIS) is being undertaken by the Community Futures Task Force, the objective of which is to work with affected communities to review issues such as jobs, industry assistance, and how to help local economies capitalise on the construction of the proposed dam in both the short and long-terms. The Task Force, in consultation with affected communities, is seeking to implement practical measures to address immediate community concerns and rebuild and reposition these communities for the future. (Section 12.3 details the initiatives to be undertaken by the Task Force.)

The EIS will consider relevant issues and outcomes of the Community Futures Taskforce process, including identified mitigation strategies.

The ToR requires the EIS to define and describe the objectives and practical measures for protecting or enhancing social values, describe how nominated quantitative standards and indicators may be achieved for social impacts management, and how the achievement of the objectives should be monitored, audited and managed.

The social impact assessment of the project will consider the information gathered in the community consultation program and the analysis of the existing socio-economic environment, and describe the project's impact, both beneficial and adverse, on the local community. The impacts of the project on local and regional residents, community services and recreational activities are to be analysed and discussed for all stages of the development. The nature and extent of the community consultation program are to be described and a summary of the results incorporated in the EIS.

The assessment of impacts also must describe the likely response of affected communities and identify possible beneficial and adverse impacts (both immediate and cumulative). These impacts are to be considered both at the regional and local level.

The EIS, through various assessments, will address the following matters:

- impacts on affected landholders and communities; for example, property values and local authority rates;
- impacts on current land uses (for example, existing agricultural and grazing uses) and existing lifestyles and enterprises;
- impacts on demographic, social, cultural and economic profiles;
- impacts on labour markets, with regard to the source of the workforce;
- impacts of construction workforces and associated contractors on housing demand, community services and community cohesion. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project construction is to be discussed;
- impact of the project on public health and safety of adjacent communities, including such impacts as noise, dust, waste, transport, and other hazards, including physiological stress;

- intrusion;
- community severance;
- disruption to recreation and tourism, changes to access patterns;
- impacts on existing local resident values and aspirations; and
- impacts on places of value to the community or individuals (for example, Kandanga Cemetery).

(c) Summary of the Economic Issues

In line with the ToR, when finalised, the EIS will specify the economic costs and benefits of the project to industry and the wider community. Analysis will be conducted at local, regional, State and national levels.

The draft ToR requires the economic analysis component of the EIS to consider:

- the significance of the project on the local and regional economic context;
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- the economic impacts of the proposal on individuals, businesses, industries or communities, including proposed measures to mitigate any negative impact;
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

The EIS will specify direct and indirect impact of the project on the regional, State and national economies in terms of direct and indirect effects on employment, income, supply of goods and services and production.

For identified impacts to social and economic values, mitigation and enhancement strategies will be suggested in the EIS. Practical monitoring regimes will also be recommended.

In compliance with the draft ToR, the EIS will also discuss/describe, for the construction and operational phases of the project, the following:

- the effects of the project on local residents, including land acquisition and relocation issues and property valuation and marketability, community services and recreational activities;
- the potential mechanisms for local communities and businesses to meet contracts for services and supplies for the construction, rehabilitation and operation phases of the project;
- strategies for local residents including members of Indigenous communities interested in employment opportunities, which would identify skills required for the project and initiate appropriate recruitment and training programs;
- the potential environmental impacts on the amenity of adjacent areas used for rural pursuits;
- the implications of the proposal for future developments in the local area including constraints on surrounding land uses; and
- strategies responding to Government policy relating to:
    - the level of training provided for construction contracts on Queensland Government building and construction contracts – *The State Government Building and Construction Contracts Structured Training Policy (the 10% Policy)*;
    - Indigenous employment opportunities – *Indigenous Employment Policy for Queensland Government Building and Civil Construction Projects (the 20% Policy)*;
    - the use of locally sourced goods and services – Department of State Development, Trade and Innovation Local Industry Policy.

It is expected that significant further assessment will be undertaken as part of the EIS process to fully determine the likely impacts of the construction and operation of the proposed Traveston Crossing Dam.

12. COMMUNITY AND STAKEHOLDER ISSUES

Summary

In making decisions that are essential to secure the long-term security of water supply for SEQ, the Queensland Government needs to act in the overall best interest of the region in the longer term. There is no question that some decisions will have local impacts that are difficult for individuals and communities that are directly affected to accept. The Queensland Government acknowledges that, in particular, the decision to progress the Traveston Crossing Dam has caused a high degree of local anxiety. However, the Queensland Government has made this decision because on the basis of the evidence before it, the development of new bulk storage options is absolutely necessary to secure long-term water supplies for the region, and because the siting of the dam at Traveston Crossing on the Mary River clearly represents the best option in terms of all available new bulk storage opportunities within the region.

The Queensland Government has also acknowledged the absolute need to address to the greatest extent possible the understandable anxieties of affected residents. Through a range of mechanisms outlined in detail in this Submission, including the establishment of the CFTF under Major General Peter Arnison and the purchase of affected properties at independently determined market value, the Queensland Government has demonstrated its commitment to treating affected parties with respect and compassion.

12.1 Background

In making decisions that are essential to secure the long-term security of water supply for SEQ, the Queensland Government needs to act in the overall best interest of the region in the longer term. There is no question that some decisions will have local impacts that are difficult for individuals and communities that are directly affected to accept. The Queensland Government acknowledges that, in particular, the decision to progress the Traveston Crossing Dam has caused a high degree of local anxiety. However, the Queensland Government has made this decision because on the basis of the evidence before it, the development of new bulk storage options is absolutely necessary to secure long-term water supplies for the region, and because the siting of the dam at Traveston Crossing on the Mary River clearly represents the best option in terms of all available new bulk storage opportunities within the region.

The Queensland Government has also acknowledged the absolute need to address to the greatest extent possible the understandable anxieties of affected residents. Through

a range of mechanisms outlined in detail in this Submission, including the establishment of the CFTF under Major General Peter Arnison and the purchase of affected properties at independently determined market value, the Queensland Government has demonstrated its commitment to treating affected parties with respect and compassion.

The following section details the community and stakeholder consultation processes that are currently being undertaken, the role of the CFTF, and the approach to addressing the position of landowners directly affected by the proposed dam.

12.2 Community and Stakeholder Consultation

Consultation Program

QWI has undertaken an extensive program of community consultation and is committed to continue with its consultation program as milestones in the project are reached.

QWI engaged 'Three Plus' as a community consultation adviser to conduct the community engagement and consultation process to provide information to the community on the project and the assessment and approvals processes, and to provide opportunities for community to provide feedback and submissions on the project.

The elements of the consultations undertaken to date include:

- stakeholder briefings to community groups, elected representatives and the media;
- community information days;
- the publication of fact sheets; and
- agency consultations (Commonwealth, State and local).

Stakeholder Briefings

Three Plus met with a number of stakeholders to explain the community engagement process and opportunities for involvement, including:

- Mary River Catchment Coordination Association Inc;
- The Hon Warren Truss MP, Federal Member for Wide Bay (through the provision of hardcopy materials);
- Mr David Gibson MP, State Member for Gympie;
- Sunshine Coast Environment Council;
- The Gympie Times;

- Mr Glen Elmes MP, State Member for Noosa; and
- The Hon Alex Somlyay MP, Federal Member for Fairfax.

Telephone briefings were also conducted with:

- Save the Mary River Coordinating Group; and
- Friends of Kandanga.

Community Information Days

Two community information days were organised by Three Plus, with a strong attendance of over 290 people. An information day was held at Amamoor on 16 December 2006, with a subsequent day staged for the community downstream of the dam, at Maryborough on 20 January 2007. The information days were promoted widely through local media.

Figure 12.1: Photographs from Community Information Days at Amamoor and Maryborough

Source: Three Plus

Invitations to the information days were issued to the following elected representatives:

State Members

- Mr David Gibson MP, Member for Gympie
- Mr Glen Elmes MP, Member for Noosa
- Mr Chris Foley MP, Member for Maryborough
- Mr Peter Wellington MP, Member for Nicklin
- Mr Steve Dickson MP, Member for Kawana

Federal Members

- Hon Alex Somlyay MP, Member for Fairfax
- Hon Warren Truss MP, Member for Wide Bay

Local Councils

- Biggenden Shire Council, Mayor Cr Betty Johnson
- Caloundra City Council, Mayor Cr Don Aldous
- Cooloola Shire Council, Mayor Cr Mick Venardos
- Hervey Bay City Council, Mayor Cr Ted Sorensen
- Kilkivan Shire Council, Mayor Cr Ron Dyne
- Maroochy Council, Mayor Cr Joe Natoli
- Maryborough City Council, Mayor Cr Barbara Hovard
- Noosa Council, Mayor Cr Bob Abbot
- Tiaro Shire Council, Mayor Cr Linda Harris
- Woocoo Shire Council, Mayor Cr Kev Mahoney

Invitations were also sent to the following community members and groups to attend the information days:

- Ag Force
- APEX
- Australian Conservation Foundation
- Australian National Committee of Large Dams Incorporated
- Australian Water Association (Qld)

- Barung Landcare
- Burnett Mary Regional Group
- Burnett May Regional Group for Natural Resource Management
- Community Futures Task Force
- Conondale Range Committee
- Cooloola Bushwalkers
- Cooloola Shire Libraries
- Cooroy Chamber of Commerce
- Environment Institute of Australia and New Zealand
- Environmental Defenders Officer (Qld) Inc
- Eumundi and District Historical Association
- Eumundi Information Office – Chamber of Commerce
- eWater Cooperative Research Centre
- Federal State Primary School
- Florabunda Bushcare
- Friends of Kandanga
- Goomeri Chamber of Commerce
- Great Sandy Region Conservation Council
- Greening Maroochy
- Maroochy Mooloolah Catchment Coordinating Assoc Inc
- Maroochy Waterwatch Inc
- Mary River Catchment Coordination Association Inc
- National Parks Association of Queensland Inc
- Noosa and District Community Hatchery
- Noosa and District Landcare Group Inc
- Noosa Chamber of Commerce & Industry
- Noosa Council Library Service

- Noosa Integrated Catchment Association Inc
- Noosa Parks Association Inc
- Noosa Shire Residents and Ratepayers Association Inc
- Office of Urban Management
- Parks and Recreation (Noosa Shire Parks)
- Planning Institute of Australia Qld Division
- Queensland Country Women's Association (Imbil)
- Queensland Conservation Council
- Queensland Country Women's Association (Cooroy)
- Queensland Frog Society Inc
- Queensland Irrigators Council (Mary Valley)
- Queensland Rural Women's Network – Gympie Branch
- Greening Noosa
- Greening Noosa (environment centre)
- Gubbi Gubbi people
- Gympie & District Landcare Group
- Gympie Family History
- Gympie Library
- Gympie South Lions Club
- Healthy Waterways
- Imbil Library
- Imbil Police Station
- Imbil Post Office
- Institute of Engineers, Australia (Sunshine Coast Group)
- Kabi Kabi people
- Kandanga Creek State School
- Kandanga Creek State School P & C Association

- Kandanga One Stop Shop
- Kandanga State School
- Kandanga State School P & C Association
- Kenilworth & District Chamber of Commerce and Citizens Inc
- Kenilworth Information Centre
- Kenilworth Library
- Kenilworth Police Station
- Kenilworth State Community College
- Kenilworth State Community College P& C Association
- Lake Baroon Catchment Care Group Inc
- Maroochy Landcare Group
- Riparian Landholders Group
- Rotary – Cooloola/Gympie
- Royal Geographic Association of Queensland
- Save the Mary River Coordinating Group
- SEQ Water
- Southern Region Water Pipeline Alliance
- Sunfish
- Sunfish Fraser Coast
- Sunshine Coast Environment Council
- Sunshine Coast Ratepayers and Residents Association Inc
- SunWater
- The Irrigation Association of Australia
- The Mary Valley Team
- The Wilderness Society
- Threatened Species Network
- Tiaro and District Landcare

- Traveston Progress Association Inc
- University of Technology, Institute for Sustainable Futures
- Urban Development Institute of Australia, Sunshine Coast Branch
- Water Services Association of Australia
- Wide Bay Burnett Conservation Council Inc
- Wide Bay Burnett Regional Organisation of Councils
- Wildlife Preservation Society of Qld
- World Wildlife Fund

Information day promotional materials were also sent to the following community venues:

- Albert Bowls Club
- Amamoor Post Office
- Amamoor State School
- Anglican Parish of Gympie
- Cooran State School
- Cooroora Secondary College
- Cooroy Bowls Club
- Cooroy Golf Club
- Cooroy-Pomona Lions Club
- Cooroy Seventh Day Adventist Church
- Cooroy State Primary School
- Federal Memorial Hall and Community Centre
- Federal State Primary School
- Gympie Bowls Club
- Gympie Civic Centre
- Gympie Community Church
- Gympie Library

- Gympie Post Office
- Gympie Town Hall
- Imbil Bowls Club
- Imbil Library
- Imbil Post Office
- Kandanga Bowls Club
- Kandanga One Stop Shop
- Kandanga Post Office
- Kandanga Public Hall Association
- Kenilworth Post Office
- Lions Club of Gympie
- Pomona Bowls Club
- Pomona Progress Arts and Tourism Inc

Three Plus has prepared reports which summarise the consultations undertaken by QWI and summarise the feedback provided by members of the public in response to the presentation materials exhibited at the information days. The reports by Three Plus are at Annexures 30 and 31 to this Submission.

As a result of community feedback, QWI will conduct additional Information Days at key project milestones, for example, when the EIS is released.

Information Sheets

QWI has established a website with significant information regarding the proposed infrastructure projects which is kept continuously up to date. Available from the website are numerous fact sheets which provide detailed information regarding various aspects of the proposed dam projects. Copies of the information sheets are at Annexure 32 to this Submission.

Media Coverage

The Traveston Crossing Dam has received widespread media coverage across Queensland and Australia. Media Monitors advise that in the period 1 April 2006 to 20 March 2007, there were over 2,100 mentions in broadcast media alone of 'Traveston Crossing Dam' or 'Traveston Dam'. The proposed project has been well publicised in the local and State media.

Agency Consultations

Commonwealth and State Government departments and agencies were widely consulted by the CG on exhibition of the draft ToR for the EIS.

Pending finalisation of the ToR and the formal commencement of negotiations with relevant Commonwealth, State and local government authorities, QWI has provided briefings to the Commonwealth Department of Environment and Heritage (now Department of Environment and Water Resources) concerning the project and the Referral.

Consultation with Indigenous Community

QWI has commenced a broad-ranging engagement process with indigenous stakeholders for the area of the proposed Traveston Crossing Dam. There are multiple objectives to this engagement, including:

- an agreement in relation to the impact of the proposed dam on native title rights and interests;
- a process for managing existing cultural heritage values within the project area, including a comprehensive cultural heritage survey, and management and mitigation measures designed to ensure that QWI employs best practice in relation to cultural heritage protection; and
- the opportunity for traditional owners to be consulted about the impact of the proposed dam on existing cultural heritage values within the project area through the EIS process.

QWI is in active consultation with a range of indigenous stakeholders through this engagement process, including the following native title interests:

- Gubbi Gubbi People #2, a discontinued native title claim;
- Kabi Kabi People #2, an active native title claim which has not met the registration test; and
- Kabi Kabi People #3, an active native title claim which has not met the registration test.

It is QWI's intention to reach agreement with all the indigenous interests who will be affected by the construction of the proposed dam. QWI proposes to integrate cultural heritage and native title into a single process to allow for the involvement of the broadest range of indigenous interests. This is proposed to occur through the reaching of an agreement known as an ILUA. To that end, QWI has convened public information meetings, meets regularly with the relevant

indigenous parties and is currently positively engaged in a negotiation process with representatives of relevant native title parties towards the ILUA.

12.3 Community Futures Task Force

A CFTF was established to work with communities affected by the dams. The CFTF is chaired by Major General Peter Arnison, former Governor of Queensland, and comprises relevant state agencies and representatives of councils. The CFTF is addressing the immediate impacts of the proposed dams at Traveston Crossing and Wyaralong and is developing strategies to maximise the medium to long-term opportunities presented by the dam projects.

A full list of the members of the CFTF is provided in the table below:

Table 12.1: Members of the Community Futures Task Force

Chair		
Major General Peter Arnison AC, CVO (Ret'd)		
Members		**Delegates**
Cr Mick Venardos	Mayor, Cooloola Shire Council	Cr Ian Petersen
Cr Bob Abbott	Mayor, Noosa Shire Council	-
Cr Joe Natoli	Mayor, Maroochy Shire Council	Cr Greg Rogerson
Cr John Brent	Mayor, Boonah Shire Council	Ian Flint
Cr Joy Drescher	Mayor, Beaudesert Shire Council	-
Ken Smith	Director–General, Department of Infrastructure	Geoff Dickie
Linda Apelt	Director-General, Department of Communities	Betty Gill Peter Ryan
Lindsay Enright	Executive Director, Office of Urban Management	Ian Schmidt
Michael Kinnane	Director-General, Department of Local Government, Planning, Sport and Recreation	Andrew McEwan
Bob McCarthy	Director-General, Department of State Development and Trade	Mark Bermingham
Jim Varghese	Director-General, Department of Primary Industries and Fisheries	Sue Ryan John Daniels
Ian Mitchell	Chief Executive Officer, Tourism Queensland	David Morgans
Scott Spencer	Director-General, Department of Natural Resources and Water	Debbie Best Greg Claydon
Alan Tesch	Director-General, Department of Main Roads	Dennis Tennant
Mal Grierson	Director-General, Department of Public Works	Max Smith
Rachel Hunter	Director-General, Department of Education, Training and the Arts	Kirsti Kee
Graeme Newton	Chief Executive Officer, Queensland Water Infrastructure Pty Ltd	Scott Smith
Steve Mill	Executive Director, Community Futures Task Force	Mick Lord

The CFTF is the central coordination mechanism which assists all members to meet their responsibilities for the proposed Traveston Crossing and Wyaralong Dams to:

- Address the immediate effects on individuals and communities, arising from the proposals to build the dams;
- Develop strategies to maximise the longer term opportunities presented by the proposed dams;
- Undertake community engagement and provide regular information to the communities; and
- Develop community and government linkages to address issues and impacts.

Further information on the purpose, structure and initiatives of the CFTF are set out in Annexure 39 to this Submission.

The CFTF has developed strategies to respond to the immediate and ongoing community needs in terms of:

- emotional support, information provision and access to government agencies for individuals and community groups;
- assistance to address the immediate needs of those businesses and workers affected by the proposal, and to identify opportunities for medium and long-term economic and business development;
- ongoing consultation with community members to develop sustainable land use and infrastructure planning options; and
- assistance for communities to document their cultural heritage and promote the area as a tourist destination.

A suite of projects are underway to support the strategies of the CFTF. The projects are complementary and often interdependent. These projects will address and offset impacts of the proposed dams on individuals and communities and will inform the EIS and the social impact statements for the proposed dams. These projects include programs that are currently being applied by Queensland Government agencies to mitigate economic and social impacts.

Key projects include:

- Community support strategies including one stop shops, provision of counselling services and community development activities;

- The Economic Futures Project for primary and non-primary industries;
- Tourism development and marketing activities;
- The Land Use and Infrastructure Planning Study; and
- Historical research projects for the Boonah and Cooloola communities.

The CFTF acts as a governance and coordination body to ensure the projects and programs support the objectives of the CFTF and are achieved in a timely and effective manner.

Community Support Strategies

Following the announcement of the proposed dams, the Queensland Department of Communities immediately established a range of support strategies, including the engagement of Lifeline counselling services and establishment of two One Stop Shops to connect individuals with Government – one at Kandanga and one at Boonah.

A number of Queensland Government agencies have had staff visit the shops to provide assistance to people in the affected areas. Lifeline has a counselling service operating from the One Stop Shops.

The One Stop Shops provide:

(a) advice on government services;

(b) referral service to other government agencies; and

(c) counselling support to individuals.

As the social, emotional and information requirements of affected communities will change over time, it is vital that existing support continue and other responses be established and available, as required. For example, in recognition of changing service needs, the Boonah One Stop Shop closed in March 2007 to be replaced by services to be provided through the Boonah Shire Council. Lifeline counselling services will continue to be available by appointment and access to the 24 hour telephone service has been maintained.

In addition to services provided through the Kandanga One Stop Shop and through the Boonah Shire Council, the Department of Communities is also providing:

- emergency relief funding to meet short-term needs;

- a range of community awareness and community development projects to provide accurate information and to support local networks; and
- engagement of a community development worker at the Kandanga One Stop Shop to focus on community development and capacity strategies to help communities realise the opportunities available and manage change.

To better understand the potential impacts of the proposed dams on the affected communities and the associated service needs, the Department of Communities has completed social overviews for the Traveston Crossing and Wyaralong areas which include:

- broad community overviews and demographic profiling;
- key developments and community responses to date; and
- summary of emerging needs in the community.

Economic Futures Project

The CFTF has established an Economic Profile and Future Outlook Working Group co-chaired by the Directors-General of the Queensland Departments of State Development and Primary Industries and Fisheries and supported by other relevant agencies.

The CFTF has endorsed an Economic Futures Project to plan for the long-term economic future of the Traveston Crossing and Wyaralong regions, post dam construction. The project focuses on primary and non-primary industries.

The Economic Futures Project seeks to assist the communities in the vicinity of the proposed Traveston Crossing and Wyaralong Dams to gain significant economic benefit from these projects and associated infrastructure works. The Economic Futures Project will provide information and build economic development capacity to facilitate local businesses to participate in the emerging opportunities.

The Economic Futures Project will also inform land use and infrastructure planning, broader infrastructure planning and contribute to the EIS.

The Queensland Department of State Development commissioned consultants, ACIL Tasman, to prepare a report on the economic impact of the proposed Traveston Dam. This report will contribute to the Economic Futures Project. The report was released in March 2007 and is available on the CFTF website. The Economic Futures Report is in Annexure 25 to this Submission.

Also, programs have been developed that are addressing the immediate impacts on businesses and workers in the communities affected by the proposed dams.

Tourism Development and Marketing

It is proposed that Tourism Queensland develop tourism actions plans to provide a direction for the future of tourism in the Mary Valley and Scenic Rim regions. The action plans will be developed in consultation with local stakeholders and will link with existing tourism plans. The aim of this project is to identify and map current tourism products in the Mary Valley and to identify priority tourism development and marketing initiatives for the region.

In addition to identifying key development, marketing and tourism management priorities for the period up to the end of 2009, the projects will also identify long-term strategic priorities for the five year period up to 2012.

Land Use and Infrastructure Planning Studies

The Office of Urban Management and the Queensland Department of Local Government and Planning, Sport and Recreation are jointly undertaking the land use and infrastructure planning studies for the communities impacted by the proposed Traveston Crossing and Wyaralong dams.

The purpose of the planning studies is to investigate the land use and infrastructure implications of the proposed Traveston Crossing Dam and Wyaralong Dam and the implications of the proposed dams and the potential opportunities that can be incorporated in a long-term land use plan and infrastructure program.

These studies are required in order to investigate the specific impacts (direct and indirect) on existing land uses and settlement patterns around the dam sites and on existing infrastructure, identify and assess options for location of future land uses and infrastructure, and produce the long-term land use plan and infrastructure program for each area.

The planning studies will complement other projects such as the Economic Futures Study and support any economic strategies that arise. The planning studies will also inform the preparation of the EIS for the dams.

Historical Research Projects

The Queensland State Archives is undertaking a project to acknowledge and document selected aspects of the historical significance of the regions and communities close to the proposed Traveston Crossing Dam.

The project has two components; firstly, a quality booklet incorporating text and photographs which would provide a lasting acknowledgement of selected aspects of the history of the areas affected by the proposed dam. Secondly, the staging of community archive workshops by Queensland State Archives will assist local historical groups and individuals in recording and managing local historically significant materials, including photographic collections.

This project encourages members of the community to share and celebrate aspects of their history in a meaningful and enduring way. Recognition of historical and cultural value in these regions will assist in strengthening social cohesion and highlighting community distinctiveness.

Community Futures Task Force Futures Fund

In addition to this governance and coordination role the chair of the CFTF administers a grants program, the Community Futures Task Force Futures Fund (the Fund). The Fund provides support to community groups including service clubs, associations and charitable organisations for events and community led initiatives. The Fund was proposed as a means of supporting traditional community events where these may be under threat as a consequence of the announcement of the proposed dams. The Fund also provides a means to respond to emergent events and opportunities that can not be addressed by other departmental programs.

Regional Services Forum: Local Response

As part of her CFTF responsibilities, the Director-General of the Queensland Department of Communities has established the Regional Services Forum on the Sunshine Coast to ensure a local whole-of-government response to community needs and to be a mechanism to implement aspects of the CFTF's program of activities over the medium to longer term.

The Forum includes representatives from Queensland Government agencies in the region and is chaired by the Regional Director, Maroochydore Regional Service Centre, Department of Communities. The CFTF is also represented on the Forum.

The Forum is responsible for raising issues and concerns of the affected communities with the CFTF for information and action as well as responding to these at a regional level.

Community Futures Task Force Unit

The CFTF is supported by a small executive team headed by an executive director who reports to Major-General Arnison and the CG. This team:

- Assists in the coordination of departmental responses and activities;
- Undertakes individual and community consultations;
- Produces information on behalf of the CFTF for community members;
- Gathers information and identifies issues for consideration by government; and
- Uses this information to inform government responses and activities and shape the development of future opportunities.

Communication

The CFTF has published 8 newsletters to the communities in the Mary Valley, and 6 newsletters to the communities in the Wyaralong region informing them about services that are available and developments in relation to the proposed dams. The newsletters are currently published on a monthly basis, with the most recent newsletters being released on 20 March 2007.

The CFTF has established a website to inform communities about information resources and services that are available as well as forthcoming events. www.communityfutures.qld.gov.au This material is also available in hard copy through the One Stop Shops.

Also, the CFTF has an 1800 number that individuals can use to speak to a member of the CFTF Unit (1800 133 258).

The work of the CFTF, including the implementation of projects is to continue until mid 2009.

12.4 Land Acquisition and Management

Overview

The proposed project will affect 332 properties, including 76 houses, in Stage 1 and a further 265 properties, including 128 houses in Stage 2.

Following the Queensland Government's announcement regarding the Traveston Crossing Dam, the State, via DNRW has stood in the market to purchase the properties of affected landowners who voluntarily wish to sell. Following its establishment, QWI is now managing land purchases for the dam.

As at 29 March 2006, QWI has reached voluntary agreements in respect of properties as indicated in the following table.

Table 12.2: Voluntary agreements for property purchases

	Properties affected	No. of agreements	Percentage agreed
Stage 1	332	121	36.4%
Stage 2	265	144	54.3%
Total	**597**	**265**	**44.4%**

Figure 12.2: Voluntary Land Purchasing as at 2 April 2007

This forward commitment to dealing with landholders who may be affected by Stage 2, notwithstanding that Stage 2 may only proceed on future approval under State and Commonwealth law, provides security and certainty for community members and certainty for on going business investment within the region. In particular, this is supported by the QWI land purchasing policy for purchase and lease back of lands within the dam catchment at concessional rates to the existing landholders.

Land Purchasing Policy

QWI has made a firm commitment to treat all landowners affected by the dam fairly and with respect. QWI has developed a land purchasing policy, a copy of which is contained in Annexure 29 to this Submission, to ensure that negotiations are fair and transparent and landowners are paid fair market value for their land, including provision for reasonable costs incurred as a result of selling their property to QWI.

Stages 1 and 2

The Traveston Crossing Dam will be completed in two stages. Stage 1 is scheduled for completion in 2011 and Stage 2, if required, may be completed in around 2035. As noted in the IAS, at this time it is not considered appropriate to seek full approval for Stage 2 as the current planning horizon does not envisage construction for another 28 years.

However, in order to give certainty to landowners, QWI is prepared now to purchase land identified for Stages 1 and 2. This will allow affected landowners to plan for the future with confidence and certainty.

Land Purchasing Principles and Process

The land purchasing policy outlines the purchasing process which has been and will be followed by QWI in its negotiations with landowners.

The purchase price to be paid for land purchased by QWI (and, where relevant, for a water storage or access easement) will be negotiated based on valuation advice given to QWI. If they wish, landowners may also obtain an independent valuation. To ensure that landowners are not financially disadvantaged, QWI will also meet reasonable costs incurred by landowners in agreeing a sale, including:

- reasonable valuation, legal, accounting and financial planning fees for advice regarding the sale;
- an allowance for stamp duty incurred on the purchase of another property (calculated on the stamp duty payable in respect of the sold property);
- a lump sum payment for disturbance costs and general relocation expenses; and
- any additional disturbance items agreed between QWI and the landowner.

To provide certainty and minimise disruption for landowners, QWI aims to conclude purchases within approximately four months of commencement of negotiations. This timeframe is to give the landholders certainty that QWI will not intentionally prolong the

land purchase negotiations. If negotiations are complex, and the landholder is actively participating, this timeframe may be extended.

In the event that QWI and landholders cannot agree on a fair and reasonable purchase price, as a matter of last resort, QWI would request the CG to initiate procedures for compulsory acquisition of the relevant land and any water storage and access easement (if required) under the provisions of the SDPWO Act. The process of compulsory acquisition entitles the affected landowner to an independent assessment of compensation by the Land Court.

The State has confirmed that compulsory acquisition of properties will not be commenced until after the required Federal Minister for Environment's approval of the project has been obtained under the EPBC Act.

Land Requirements for Dam

QWI seeks to purchase land that will be within the reservoir area (which is the land inundated by water when the dam is at FSL) when the dam is complete. In addition, QWI will purchase a buffer area around the dam, which is based on the 1% annual exceedence probability flood level.

Land that is purchased for the buffer area will not be under water after the dam is complete, except when the river is in flood. After the dam is complete, the original landowner may be granted a contractual right to use the land in the buffer area for grazing and other low impact uses, subject to certain land use controls.

The buffer area is required to protect water quality and ensure public safety and prevent property damage in the event of a flood.

QWI may also seek to purchase a water storage easement over flatter flood prone areas where flooding may occur beyond the buffer zone (flood margin area).

Individual characteristics of properties will affect the buffer and flood margin area.

Other properties may be required for road or infrastructure relocation or may be impacted in other ways such as loss of access and/or services resulting from inundation of roads or land providing access or services. For such land, a site specific proposal based on the proposed post-dam network will be developed. This may involve the provision of alternative access or services and/or the purchase of some or all of the land.

Leaseback to Landowners

As outlined in its land purchasing policy, QWI recognises that there is substantial benefit to the local community in allowing land required for the dam to remain in productive use by existing landowners for as long as possible. Consequently, land that is purchased now by QWI will be leased back to the original owners, if they wish, at favourable concessional rents until required for the dam. Depending on whether the land is needed for Stage 1 or Stage 2 (to be proceed around 2035 if required), land could continue to be available for use by the existing landowners for up to 28 years.

Where only part of a property is required for the dam, but QWI agrees to purchase the entire property, the land that is not needed for the dam will be leased back to the previous owner at concessional rates.

Land acquired by QWI and leased back to original landowners until required for the dam, will be subject to certain usage controls to protect the long-term quality of the water.

Land that is leased back to landowners will be able to be used for grazing and other low impact uses. There will be restrictions on cropping or other intensive agriculture activities and landowners will not be able to build any permanent structures on the land other than fencing. The particular controls which will apply are specified in detail in the land purchasing policy.

Some controls will also apply to land over which QWI has acquired a water storage easement.

The appropriate controlled activities will be contractual obligations contained in the leases or water storage easements (if relevant).

Given that the dam will be operated in stages, it will be necessary to protect the buffer and flood margin areas for Stages 1 and 2 until the relevant stage is completed. The controls are to ensure that improvements and/or significant infrastructure are not constructed or incompatible land uses developed up to the proposed flood margin area for the relevant Stage.

The land use controls provide contractually for varying levels of control at the various stages of the project.

12.5 Frequently Asked Questions

The following list of questions and answers provided below, whilst not intended to be comprehensive, have been developed in response to the high level of interest by the public and interest groups on specific issues associated with the proposed Traveston Crossing Dam. Much of the detail in the answers provided below is contained in the body of the Submission, however it has been highlighted here for the purpose of ease of reference to specific questions.

Q **Is there not a conflict of interest in having QWI, the proponent, an entity wholly owned by the State, refer the project to the State for approval?**

A: QWI was established by the Queensland Government with the objectives of investigating, obtaining all relevant approvals, constructing and operating a number of water infrastructure projects in SEQ including the Traveston Crossing Dam and the Wyaralong Dam. Although QWI is owned by the State of Queensland, the State and QWI are distinct legal entities.

Furthermore, the CG, who must recommend the grant or refusal of approval under the SDPWO Act, has a statutory responsibility to discharge his duties under the SDPWO Act when considering whether to approve or reject the project and, if deciding to approve it, the conditions under which to approve it.

The approval process required under the SDPWO Act is rigorous and ensures that the CG exercises an objective and independent judgement in assessing the environmental impact of the project, as documented in the CG's assessment report.

It should also be noted that it is common in all Australian jurisdictions for State or Territory Government developments to be carried out by State authorities. The State authorities must apply for relevant State and local government planning and environmental approvals from other State agencies responsible for their assessment and determination in accordance with the applicable statutory regimes of that State. Major road infrastructure projects developed by State or local government agencies, such as the Queensland Department of Main Roads, are typical examples of these type of projects.

In the context of the approval process under the EPBC Act and the Bilateral Agreement, the Federal Minister retains ultimate responsibility for deciding whether to grant or refuse approval for the project: the CG provides an

assessment report to the Federal Minister, who then makes a decision in relation to the matters of national environmental significance.

Q: Should not both Stage 1 *and* Stage 2 of the Project have been referred to the Federal Minister under the EPBC Act?

A: The structure to be built in Stage 1 cannot operate at the Stage 2 level under the current proposal for the following reasons:

- There will only be environmental approval for Stage 1 and operating the dam storage in excess of the Stage 1 approved operating range will be a breach of the approval and expose the dam operator to prosecution and injunction proceedings;
- The dam spillway gates are only designed to accommodate the Stage 1 operation of the dam. New gates would need to be installed to allow the dam to operate at the Stage 2 FSL. It is physically impossible to operate the dam at the Stage 2 height with the Stage 1 gates;
- QWI has entered into long-term leaseback arrangement with landholders whose part or whole property would not be required unless the dam is operated at the Stage 2 height. These leaseback conditions are outlined in detail in the QWI land purchasing policy (refer to Annexure 29 to this Submission). This land purchasing policy has been sent to all landholders and is available on the QWI website.

  These leases are valid until 2035, and would require QWI to purchase the unexpired terms of the leases (to 2035) to operate the dam at the Stage 2 level. The cost of purchasing the unexpired terms of the leases would be very significant.

The reason the main dam wall is to be constructed to Stage 2 height is associated with the efficiency of construction, given the plant, equipment, materials, workforce and batching plant that will be established at the site during Stage 1 construction. The volume of the material for the height difference between the Stage 1 and Stage 2 dam wall height is not significant in comparison to the balance of the wall's volume. Furthermore, there is the opportunity to build the access road, fencing, concrete protection walling and necessary safety barriers once, which would otherwise need to be removed and reinstalled when the dam wall was upgraded to Stage 2 level.

The reason that properties, which may be required for Stage 2 are being purchased now is to provide as much certainty as possible to landholders in the area that would be affected by Stage 2. This approach was adopted as a result of feedback from the community.

Q: Should not Project referred to the Federal Minister under the EPBC Act, have included the associated infrastructure requirements, including the pipeline connecting Traveston Crossing Dam to the Northern Pipeline Interconnector, distribution and water treatment, together with the Northern Pipeline Interconnector ?

A: At the time of lodging the Referral, these additional infrastructure projects were not well advanced in their formulation. Each of the pipelines connecting Traveston Crossing Dam to the Northern Pipeline Interconnector, the water distribution and treatment systems, and the Northern Pipeline Interconnector are separate projects being delivered under the SEQ Water Grid. Each of these projects is currently at various stages of either preliminary planning or detailed planning processes and is being delivered under different delivery structures. As each of these projects advances through their detailed planning, the projects will be subject to rigorous and transparent assessment in accordance with Queensland Government and Australian Government legislation, which will include an assessment of the cumulative impacts of the Projects on the receiving environment.

QWI cannot refer for approval a project proposed by a different proponent.

Q: How will the EIS process ensure that the following environmental issues are adequately assessed:

(1) scientifically based environmental flow is maintained, which is critical to the environmental health of downstream locations at Dagun Pocket and at the Mary River Barrage;

(2) the potential impact on the Great Sandy Straits (Ramsar Wetland) and Fraser Island (World Heritage Area) of any changes to the river flow, volume and frequency of sediment load within the Mary River;

(3) the potential impact on rare and threatened species;

(4) the impacts of potentially contaminated sites;

(5) the potential impact of the Project on Green House Gas emissions; and

(6) the potential impact of the project on salinity, both upstream and downstream of the Dam.

A: The detailed identification and assessment of the potential impacts identified above and the proposed mitigation measures related to the specific issues will be presented in the EIS for assessment by the CG and the Federal Minister for Environment and Water Resources, in accordance with the EIS process outlined in Section 11 of this Submission.

The draft ToR requires QWI to identify and assess potential environmental impacts (including downstream impacts) associated with any proposed changes to the current flow regimes (low, high, mean flow, etc), and to propose appropriate mitigation measures, based on appropriate scientific studies. In addition, the draft ToR requires the proponent to demonstrate how the project will comply with the flow requirements set out in the Mary Basin WRP.

The process by which WRPs are finalised is a separate process from the EIS process. Public consultation with respect to the Mary Basin WRP itself has taken place and the Mary Basin WRP has been finalised, with the final WRP approved on 28 July 2006.

The draft ToR requires QWI to identify and assess the potential environmental impacts on the matters of national environmental significance under the requirements of the EPBC Act, including but not limited to:

- World Heritage (EPBC Sections 12 and 15A);
- Listed Threatened Species (EPBC Sections 18 and 18A);
- Ramsar Wetlands (EPBC Sections 16 and 16B); and
- Listed Migratory Species (EPBC Sections 20 and 20A).

The draft ToR also requires the identification, assessment and proposal of mitigation measures, in relation to the potential impact on rare and threatened species under both Australian Government and Queensland Government legislation.

The draft ToR requires the identification and assessment of the impact of potentially contaminated sites within the inundation area and buffer zone.

The draft ToR also requires an assessment of the type and volume of greenhouse gases emitted by the Project during construction and operation, and the measures taken to reduce emissions in line with national and state abatement policies and guidelines.

The draft ToR requires an assessment of the potential water quality impacts on existing surface water, ground water and the storage, including the proposed mitigation measures to manage any impacts.

Q: Has sufficient consideration been given to climate change by the Proponent of the Project?

A: The CSIRO has prepared a report for the Queensland Government entitled "Climate Change in Queensland under Enhanced Greenhouse Conditions Report 2004-2005". A preliminary assessment of impacts of climate change on inflows into SEQ storages has been conducted using the outputs from a range of general circulation models and an approximate method of down-scaling the climate information to the catchment scale. The results show average annual inflows tending to decrease by up to 16%.

The SEQLTS caters for a climate change impact of ten percent on yields which is consistent with the preliminary estimates of reduction in flows and yields.

Further work is being carried out in relation to the potential impact of climate change in the finalisation of the SEQRWSS.

Additionally the draft ToR requires QWI to explain and justify the methods and assumptions used to derive future rainfall patterns and predicted possible flows, including comment on climate variability and the effect of evaporation processes.

Q: Is the dam capable of withstanding major flood events?

A: The proposed Traveston Crossing Dam is to be built to a standard required by the Queensland Dam Safety Regulator and will be capable of withstanding a flood so large that there is less than a one in 500,000 probability of it actually occurring (such a flood has never been experienced anywhere in Australia).

Importantly, the flood control gates on the spillway will allow the dam to reduce the downstream flooding impacts in a major flood. This is the same way flood

management is achieved at Wivenhoe Dam, upstream of Brisbane, along with many other dams around the world.

The preliminary design has a non-overflow embankment and a concrete spillway with flood control gates designed to pass a probable maximum flood. The gates are designed to manage the Stage 1 Full Supply Level. At Stage 2, new gates will be required to manage the increased volume.

As a result of detailed flood modelling, the appropriate land purchase boundary for the proposed Traveston Crossing Dam allows for a buffer zone to manage a flood so severe that it would occur, on average, only once every one hundred years (called the 1% AEP). This is a flood height that is consistent with many town planning development constraints in cities and towns across Australia (Refer to Section 8.4 fo this submission)

Q: What impact will the proposed Traveston Crossing Dam have on the regional economy, including agriculture?

A: The proposed Traveston Crossing Dam project has the potential to substantially reinvigorate the region's economy according to a recent study by economic consultants, ACIL Tasman, commissioned by the Queensland Department of State Development and Department of Primary Industries and Fisheries.

The February 2007 report, which examines future economic and business development scenarios, says that the project is "a major opportunity to attract new investment, introduce and retain a new workforce to the area and to reinvigorate existing agricultural production".*

About 1.7% of agricultural land in the Mary River Basin will be affected by Stage 1 of the proposed Traveston Crossing Dam. The value of production, as a percentage of Queensland output, represents 4.3% of dairy production and 0.1% of beef, horticulture and other industries.

However, as the February 2007 ACIL Tasman report notes, the Traveston Crossing region will be able to use the business and entrepreneurial experience of those farmers and business people who have adopted lease-back arrangements to drive enhanced agricultural and business practices in the vicinity.

It also notes that the release of water to the area below the dam may open possibilities for intensive agricultural uses.

In terms of direct opportunities, about 500 workers will be needed during the construction phase of the dam and if the experience at the Paradise Dam on the Burnett River is repeated, about 30-40 percent of the workforce, or about 150-200 jobs, could be sourced locally.#

The Paradise Dam experience also indicates that at least 600 suppliers will be required and that about 240 of these, or 40 percent, will be sourced locally.#

QWI is already receiving many enquiries from local businesses looking to supply goods and services for the project.

The ACIL Tasman report also identifies a number of other aspects that could stimulate the local economy including:

- Capital injected into farms and businesses following the sale and lease back of lands required for the dam;
- Recreational and tourism activities associated with the dam;
- New local water allocations, which may allow more intensive agricultural uses; and
- Changes to infrastructure, in particular, improved roads and access associated with them.

“These stimuli will create opportunities to engage some new entrants in the local economy, to restructure some traditional activities and promote some new ones” the report says.

The report also says that the dam will be a catalyst to enhance the link between Gympie and the Mary Valley and the Sunshine Coast economy.

“From an economic prosperity perspective, it is in the best interests of the region to deepen the connection between the hinterland and the main centres”.*

Source: Industry Suppliers Office (Queensland)

* Source: ACIL Tasman

Glossary / Abbreviations

The following terms and abbreviations have been used in this Submission.

ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
AIEM Net	Australian Industry Engineering and Manufacturing Network Cooperative Limited
ACH Act	*Aboriginal Cultural Heritage Act 2003* (Qld)
ACIL Tasman Report	ACIL Tasman (Feb 2007) Report to Queensland Government *"Scoping Economic and Business Development Scenarios – Traveston Crossing Region – Future Economic and Business Development Scenarios"*
AEP	Annual Exceedence Probability
AMTD	Adopted Middle Thread Distance
ANCOLD Guidelines	Australian National Committee on Large Dam Guidelines
BAU	Business as usual
Bilateral Agreement	Bilateral Agreement on Environmental Assessment between the State of Queensland and the Commonwealth
BOS	Bromelton Offstream Storage project
CAMBA	China-Australia Migratory Bird Agreement
CCCC	Cooroy-Curra Community Committee
CFG	Community Focus Groups
CG	The Coordinator-General of the State of Queensland
CHIMS	Cultural Heritage Investigation and Management Strategy
CHMP	Cultural Heritage Management Plan
Committee	The Senate Committee on Rural and Regional Affairs and Transport of the Commonwealth Parliament
CFTF	Community Futures Taskforce, being the taskforce comprising the Mayors of Cooloola, Noosa, Maroochy, Boonah and Beaudesert, the Director-General of a range of Government Departments and chaired by Major General Peter Arnison
DEWR	Commonwealth Department of the Environment and Water Resources
DMR	Department of Main Roads
DNRW	Department of Natural Resources and Water
DPIF	Department of Primary Industries and Fisheries
DSD	Department of State Development
EHA	Environmental Hydrology Associates
EIS	Environmental Impact Statement
EL	Elevation Level
EMP	Environmental Management Plan
EP Act	*Environmental Protection Act 1994 (Qld)*

EPA	Environmental Protection Agency
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ET	Equivalent Tenement
FSL	Full Supply Level
GHD	GHD Pty Ltd
HNFY	Historical No Failure Yield
Home WaterWise Service	The service established by the Queensland Government in partnership with the 21 Councils across SEQ, which subsidises the cost of having a licensed plumber install a range of water efficient devices and advise homeowners about water saving strategies.
IAS	Initial Advice Statement
IDAS	Integrated Development Assessment System
ILUA	Indigenous Land Use Agreement
Infrastructure Plan	The South East Queensland Infrastructure Plan and Program 2006-2026 developed by the Queensland Government
Inquiry	The Inquiry into "Additional Water Supplies for South East Queensland – Traveston Crossing Dam" established by the Committee
IPA	*Integrated Planning Act 1997* (Qld)
IROL	Interim Resource Operations Licence under the *Water Act 2000* (Qld)
IUWM/water efficiency	Integrated Urban Water Management, a concept of water management involving the integration of all aspects of the water cycle in the decision making process so as to optimise water services while minimising the social, environmental and economic costs
IWSC	Irrigation and Water Supply Commission
JAMBA	Japan-Australia Migratory Bird Agreement
Logan Basin WRP	*Water Resource (Logan Basin) Plan 2007* (Qld)
LOS	Levels of Service approach advocated by the WSAA being implemented by the Queensland Government
Mary Basin WRP	*Water Resource (Mary Basin) Plan 2006* (Qld)
ML	megalitres
ML/day	megalitre/s per day
ML/a	megalitre/s per year
NWI	National Water Initiative formulated by the Commonwealth and agreed to by the States
NRM	The then Department of Natural Resources and Mines
OESR	Office of Economic and Statistical Research, Queensland
PIFU	Planning Information and Forecasting Unit
PMF	Probable Maximum Flood
QDSM Guidelines	Queensland Dam Safety Management Guidelines
QWC	Queensland Water Commission

QWI	Queensland Water Infrastructure Pty Limited
Referral	Referral by QWI to the Federal Minister for the Environment under the EPBC Act
ROL	Resource Operations Licence under the *Water Act 2000* (Qld)
ROP	Resource Operations Plan under the *Water Act 2000* (Qld)
SDPWO Act	*State Development and Public Works Organisation Act 1971* (Qld)
SEQ	South East Queensland
SEQLTS	State of Queensland (Department of Natural Resources, Mines and Water) (August 2006) *Water for South East Queensland: A long-term solution*
SEQ Regional Plan	the statutory regional planning strategy developed and finalised by the Queensland Government in 2005 to guide growth and development in SEQ
SEQROC	South East Queensland Regional Organisation of Councils
SEQRWSS	*South East Queensland Regional Water Supply Strategy*
ToR	Terms of Reference for the EIS to be prepared in accordance with the SDPWO Act
Water Grid	the network of two-way pipelines connecting (or that will connect) various major SEQ water storages including: • the Wivenhoe/Somerset/Mount Crosby system, the Hinze dam, the proposed Traveston Crossing dam and Wyaralong dam; • the pipeline from the proposed desalination plant at Tugun on the Gold Coast • the Western Corridor Recycled Water Project; • the southern regional pipeline; and • the proposed eastern and northern pipeline inter-connectors
Water Grid Manager	any person appointed by the State to operate, manage and/or control the Water Grid
WaterWise Initiative	The initiative formulated by the Queensland Government in collaboration with local governments to preserve water
Western Corridor Recycled Water Project	An initiative by the Queensland Government to build pipelines connecting various existing wastewater treatment plants in Brisbane and Ipswich and to build three new advanced water treatment plants at Bundamba, Gibson Island and Luggage Point to take recycled water to end users in the region
WRP	Water Resource Plan under the *Water Act 2000* (Qld)
WSAA	Water Services Association of Australia
WTP	Water Treatment Plant

Annexures

Vol	Tab	Item
1 & 2	1.	State of Queensland (Department of Natural Resources, Mines and Water) (August 2006) *Water for South East Queensland: A long-term solution*
	2.	GHD (June 2006) *Desktop Review of identified Dam and Weir Sites*
3	3.	State of Queensland (Department of Natural Resources, Mines and Water) (November 2000) *Improving Water Use Efficiency in Queensland's Urban Communities*
	4.	Mary River Council of Mayors (February 2007) *Review of Water Supply – Demand Options for South East Queensland: Final Report*
	5.	State of Queensland (Department of Natural Resources, Mines and Water) (November 2005) *Mary Basin Draft Water Resource Plan: Incorporating the Mary River, Burrum River and Sunshine Coast Catchments – Overview Report and Draft Plan*
	6.	State of Queensland (Department of Natural Resources, Mines and Water) (July 2006) *Logan Basin Overview Report and Draft Water Resource Plan*
	7.	State of Queensland (Department of Natural Resources, Mines and Water) (2007) *The South East Queensland Drought to 2007*
	8.	State of Queensland (Department of Natural Resources, Mines and Water) (June 2005) *Mary Basin Draft Water Resource Plan: Environmental Flow Assessment Framework and Scenario Implications*
	9.	Queensland Water Commission (February 2007) *Draft Report 1: Institutional Arrangements for Urban Water Supply in South East Queensland – Draft Report for Consultation*

Vol	Tab	Item
4	10.	QWI (14 November 2006) *Referral under EPBC Act for Traveston Crossing Dam Stage 1*
	11.	Location Map (Extract from Referral by QWI under the EPBC Act – see also Annexure 10)
	12.	Dam Wall Alignment Map (Extract from Referral by QWI under the EPBC Act – see also Annexure 10)
	13.	QWI (18 September 2006) *Initial Advice Statement Traveston Dam*
	14.	Dam Design-expert peer review panel – CVs of experts
	15.	State of Queensland (Department of Natural Resources, Mines and Water) (February 2002) *Queensland Dam Safety Management Guidelines*
	16.	*Australian National Committee on Large Dams Guidelines*
	17.	Queensland Government (3 November 2006) *Government Gazette* Issue 69 Notification of significant project
	18.	*Water Resource (Mary Basin) Plan 2006*
	19.	Coordinator-General (2006) *Draft Terms of Reference for Environmental Impact Statement for the Traveston Crossing Dam Stage 1*
	20.	Commonwealth Department of Environment and Heritage (29 November 2006) Notification of Controlled Action
	21.	Bilateral Agreement between the State of Queensland and Commonwealth Government under EPBC Act (3 August 2004)

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	22.	Department of Employment and Training *State Government Building and Construction Contracts Structured Training Policy ("The 10% Policy")*
	23.	State of Queensland (Department of Public Works and Department of Employment and Training (November 2002) *Indigenous Employment Policy for Queensland Government Building and Construction Projects*
	24.	Department of State Development, Trade and Innovation (1999), *Local Industry Policy: A Fair Go for Industry*
	25.	ACIL Tasman (February 2007) *Scoping Economic Futures – Traveston Crossing Region – Future Economic and Business Development Scenarios*
	26.	QWI (12 February 2007) *Geotechnical Investigations*
	27.	Road Network Design – expert peer review panel – CVs of experts
	28.	QWI (October 2006) *Traveston Crossing Dam: Overview Gympie Flood Mitigation*
	29.	QWI (2006) *Land Purchasing Policy*
5	30.	Three Plus Media (December 2006) *Proposed Traveston Crossing Dam Information Day Report, Amamoor*
	31.	Three Plus Media (January 2007) *Proposed Traveston Crossing Dam Information Day Report, Maryborough*
	32.	QWI (various dates) Fact Sheets
	33.	*Water Resource (Logan Basin) Plan 2007*
	34.	QWI (19 September 2006) *Initial Advice Statement Wyaralong Dam*

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	35.	QWI (17 November 2006) *Referral under EPBC Act for Wyaralong Dam*
	36.	Commonwealth Department of Environment and Heritage (13 December 2006) Notification of Controlled Action
	37.	Coordinator-General (2007) *Draft Terms of Reference for Environmental Impact Statement for Wyaralong Dam*
	38.	*Other Approvals Required*
	39.	Community Futures Task Force – Purpose, Structure and Initiatives
	40.	Community Futures Task Force Progress
	41.	NOT USED
	42.	State of Queensland (Department of Main Roads) *Bruce Highway (Cooroy to Gympie) Strategic Planning Study Frequently Asked Questions*
	43.	State of Queensland (Department of Main Roads) – *Property Acquisition Hardship Policy*
	44.	Commonwealth Department of Transport and Regional Services and State of Queensland (Department of Main Roads) – *Proposed Gympie Bypass Corridor Locality Map*
6 & 7	45.	*Mary Basin Water Resource Plan Supporting Documents*
8 & 9	46.	*Logan Basin Water Resource Plan Supporting Documents*
10	47.	*Gold Coast Water Resource Plan Supporting Documents*
11	48.	*Moreton Water Resource Plan Supporting Documents*

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12	49.	State of Queensland (Office of Urban Management (May 2006)) *South East Queensland Infrastructure and Program 2006-2026*
	50.	State of Queensland (Office of Urban Management (June 2005)) *South East Queensland Regional Plan 2005-2026*
	51.	State of Queensland (Department of Natural Resources and Water (August 2005)) *Queensland Water Plan 2005-2010*
	52.	State of Queensland (Department of Natural Resources and Mines (November 2005)) *South East Queensland Regional Water Supply Strategy: Stage 2 Interim Report*
	53.	State of Queensland (Department of Natural Resources and Mines (2005)) *Climate Smart Adaptation: What Does Climate Change Mean For You?*
	54.	State of Queensland (Department of Natural Resources and Mines (2004)) *Climate Change: The Challenge For Natural Resource Management*
	55.	Water Services Association of Australia (June 2005) *Framework for Urban Resource Planning*
	56.	Kellogg Brown & Root Pty Ltd (June 2005) *Southern Regional Water Pipeline Project: Executive Summary*
	57.	Estimated Resident Population by Statistical Division, Subdivision and Queensland 2000, 2004, 2005
	58.	SEQWater (September 2005) *Responding to Drought in South East Queensland Technical Report Series No. 1*
	59.	Office of Economic and Statistical Research *Queensland Regional Profiles 2004*

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	60.	GHD & Kinhill (April 1999) South East Queensland Water and Wastewater Management and Infrastructure Study: *Final Report for Phase 1 (Volume 1)*