institute for sustainable futures

UNIVERSITY OF TECHNOLOGY SYDNEY

Project Manager
SEQ Infrastructure (Water) - Traveston Crossing Dam
Department of Infrastructure and Planning
PO Box 15009
City East QLD 4002

11 January 2008

Dear Sir/Madam,

Submission on Traveston Crossing Dam Environmental Impact Statement

Please find attached a submission from the Institute for Sustainable Futures, University of Technology, Sydney on the Environmental Impact Statement (EIS) for the proposed Traveston Crossing Dam.

The Institute for Sustainable Futures at UTS is known nationally and internationally for research that supports cost-effective, sustainable and adaptive water management solutions to the challenges presented by drought, rising urban populations, and environmental flow demands. Our highly skilled team has worked on projects in most Australian states and internationally.

The Institute, in collaboration with Cardno Australia, has undertaken extensive analysis of water security and water planning in South East Queensland and its staff are familiar with the water needs of the region and the context in which Traveston Crossing Dam has been proposed.

The attached submission outlines significant flaws in the Traveston Crossing Dam EIS relating to the transparency and rigour of analysis and conclusions. Of particular concern is the failure of the EIS to address several cost effective practical alternatives to Traveston Crossing Dam, the failure to report basic assumptions behind assessment of water security needs and the absence of an adequate assessment of the greenhouse gas impacts of Traveston Crossing Dam in comparison to other alternatives.

In light of these and other issues as outlined in this submission, it is apparent that the findings of the EIS have not been developed with sufficient rigour to constitute reliable evidence to inform decision making regarding water infrastructure for SEQ.

Yours faithfully,

SWhite

Stuart White
Director, Institute for Sustainable Futures
University of Technology, Sydney

SUMMARY

The EIS is not a reliable basis for decision making with regards to the Dam at Traveston Crossing. Several essential considerations were omitted from the EIS, which if included, have the potential to fundamentally alter the core findings of the EIS. In order to adequately assess the impacts of the Dam, a full consideration of the following is required:

1. Water security in SEQ will be achieved to at least 2026, surplus to requirements, even without the construction of Traveston Crossing Dam. The EIS assessment of the supply-demand balance to 2026 is based on **unsubstantiated assumptions** such as the use of high population growth projections in the analysis of demand, which significantly inflates the anticipated supply shortfall.

2. Low cost alternative measures, such as demand management, can ensure supply security to 2051. The EIS **neglects to consider several low cost alternatives** to the Dam, including a suite of demand management options and readiness options described in this submission and in a previous report available to the proponent (Turner et al. 2007).

3. The EIS **fails to adequately assess the greenhouse gas impacts** of the Traveston Crossing Dam in comparison to other alternatives. It is essential that the emissions produced in the operation of the Northern Interconnector Pipeline, as a key component of the Dam, be factored into the assessment of the Traveston Dam option.

4. The proponent is **selective in reporting costs** associated with Traveston Crossing Dam. It makes no mention of the cost or impacts of the Northern Interconnector Pipeline, which is a significant part of the supporting infrastructure for the operation of the Dam.

5. The EIS **fails to consider alternatives to Traveston Crossing Dam with reference to the principles of ESD**, as required by the ToR.

6. The EIS **fails to justify the inclusion of a 50 GL/a supply security buffer** in projections of supply requirements. A 50 GL/a supply surplus is unnecessary given the many other existing ‘buffers’ incorporated into the projections of demand and estimates of yield.

SUBMISSION ON TRAVESTON CROSSING DAM EIS

1 INTRODUCTION

This is a submission from the Institute for Sustainable Futures (ISF) on the Traveston Crossing Dam Environmental Impact Statement (EIS). ISF has undertaken extensive analysis of water security and water planning in South East Queensland (SEQ) and is familiar with the water needs of the region and the context in which Traveston Crossing Dam has been proposed. This submission outlines significant flaws in the EIS relating to the analysis of water security needs and assessment of practicable alternatives to Traveston Crossing Dam.

In February 2007, the Institute for Sustainable Futures, in conjunction with Cardno Australia released a Review of Water Supply-Demand Options for South East Queensland (the Review). The Review was submitted to the Senate Rural and Regional Affairs and Transport Committee Inquiry into Additional Water Supplies for South East Queensland.

The key finding of the ISF/Cardno Review is that Traveston Crossing Dam will not be useful in terms of water security in the current drought, and is unnecessary to ensure water security for South East Queensland for decades to come. This finding was based on a comprehensive analysis of water security in South East Queensland.

A theme that is central to this submission is the questionable validity of the conclusion that Traveston Crossing Dam is necessary for ensuring water security in South East Queensland. The following issues are of particular concern:

- The EIS fails to consider the costs and impacts of the Northern Interconnector Pipeline as part of the Traveston Crossing Dam option, even though these costs and impacts occur as a direct result of the Dam.
- The proponent neglects to conduct a cost-benefit assessment of low cost alternatives to the Dam included extended demand management and a readiness-to-build strategy for additional indirect potable reuse and for desalination. It is likely that these options would have compared favourably with the Traveston Dam, and they are proposed and analysed in research by the Institute for Sustainable Futures (Turner et al. 2007) commissioned by the Mary River Council of Mayors and available to the proponents.
- The EIS does not conduct an adequate comparison of the greenhouse gas impacts of the Dam and alternatives. The relative greenhouse emissions of water security options should form a key part of the information provided to decision makers.
- The EIS makes unsubstantiated assumptions such as the use of high population growth projections in the analysis of demand, which significantly inflates the anticipated supply shortfall.
- The proponent fails to justify the inclusion of a 50 GL/a supply security buffer, which is unnecessary given the many other existing ‘buffers’ incorporated into the projections of demand and estimates of yield.

- There is no evidence in the EIS to support the claim that the demand management strategy proposed by Turner et al. (2007) in the Review of Supply-Demand Options as an alternative strategy for ensuring water security to 2051 is aggressive and imprudent.
- The EIS fails to adequately assess alternatives to Traveston Crossing Dam with reference to the principles of ESD, as required by the Terms of Reference.

In light of these and other issues as outlined in this submission, it is apparent that the findings of the EIS have not been developed with sufficient rigour to constitute reliable evidence to inform decision making regarding water infrastructure for South East Queensland.

2 THE SUPPLY-DEMAND GAP IN SOUTH EAST QUEENSLAND

2.1 The supply-demand gap

Unreliable rainfall and the presence of drought conditions in South East Queensland in recent years have undoubtedly resulted in a reduction in water supply and a focus on the ability of current supplies to cater for demand into the future. Reductions in water supply in conjunction with population increases and escalations in demand have resulted in a supply shortfall, commonly referred to as a supply-demand gap.

In order to address this issue of water security, a comprehensive analysis of supply and demand and potential options for the future is required to ensure that this has been adequately addressed into the future.

2.2 Water security to 2026

▶ **Water security is achieved to at least 2026, surplus to requirements, even without the construction of Traveston Crossing Dam**

The supply demand balance for SEQ was reported in the EIS (QWI, 2007: 2-14), and has been shown in Table 2-1 below. The outcome of this analysis is a shortfall or surplus in supply, which is a major factor in determining the level of water security in the region of SEQ. The presence of a shortfall in supply in the future implies that, based on the set of assumptions incorporated in the analysis, water security measures such as supply augmentations or demand management measures will be required to bridge the shortfall.

The results of the analysis conducted in the EIS (Table 2-1) show that the shortfall in supply in 2026 is 140 GL/a based on medium population projections.

This shortfall is based on estimates of the sustainable yield from current water supplies and the projected demand for water in the region. In addition, the shortfall has already accounted for a range of demand management measures, so the EIS regards the supply shortfall (or supply demand gap) reported in the table below as being indicative of the additional supply needs to 2026.

Table 2-1 Assessment of the supply demand balance (QWI, 2007: 2-13)

Demand source	2026 Population Projection		2051 Population Projection	
	Medium Series	High Series	Medium Series	High Series
Forecast population	4.0 million	4.3 million	5.1 million	6.2 million
Anticipated urban and industrial demand (ML/a)	520,000	590,000	710,000	870,000
Climate change allowance (10% of existing prudent yield) (ML/a)	40,000	40,000	40,000	40,000
Allowance for rural sector (ML/a)	20,000	20,000	20,000	20,000
TOTAL DEMAND	580,000	650,000	770,000	930,000
Existing prudent yield (ML/a)	440,000	440,000	440,000	440,000
Supply / Demand shortfall (ML/a)	140,000	210,000	330,000	490,000

In order to cater for the 2026 additional supply needs of 140 GL/a and 210 GL/a assuming medium and high population scenarios respectively, a suite of supply options is proposed, as shown in Table 2-2 below. These supply measures, which include Stage 1 of Traveston Dam, result in 261

GL/a of additional supply. This is well in excess of the supply shortfall of 140 GL/a, based on a medium population projection.

Table 2-2 Additional supply measures to 2012

Project	Scheduled Completion	Prudent yield (ML/a)
Cedar Grove Weir (stand-alone yield)	2007	3,000
SEQ (Gold Coast) Desalination Facility (Tugun)	2008	45,000
Western Corridor Recycled Water Scheme (including yield increase resulting from addition of purified recycled water to the normal supply through delivery to Wivenhoe Dam)	2008	76,000
Raised Hinze Dam Stage 3 (incremental yield)	2008	6,000
Bromelton Off-stream Storage	2009	5,000
Traveston Crossing Dam Stage 1	2011	70,000
Wyaralong Dam (yield when managed with Cedar Grove Weir and including Cedar Grove Weir stand-alone yield of 3,000ML/annum)	2011	21,000
Small projects	2006-2011	38,000
Stage 1 components of the Water Grid	2008	
Total (excluding Cedar Grove stand-alone yield)		261,000

If the suite of supply options is now considered with the Traveston Dam option not included, the contribution to supply in 2026 is 191 GL/a (Table 2-3). An additional 191 GL/a would exceed the requirements for water security in 2026, given that the supply shortfall is 140 GL/a. Based on this analysis, the Traveston Crossing Dam is not required to ensure water security until 2026.

Table 2-3 Supply demand gap in 2026 with additional supply measures

Supply demand scenario		2026 population projection	
		medium series	high series
i	Supply/Demand Gap (ML/a)	140,000 shortfall	210,000 shortfall
ii	Supply infrastructure up to 2012 (ML/a)	261,000	
i-ii	Supply / Demand Gap with additional supply infrastructure (ML/a)	121,000 surplus	51,000 surplus
iii	Additional supply infrastructure to 2012 except Traveston Dam (ML/a)	191,000	
i-iii	Supply / Demand Gap with additional supply infrastructure except Traveston Dam (ML/a)	51,000 surplus	19,000 shortfall

In failing to address the potential for the suite of supply options without the Traveston Dam in place to ensure water security, the EIS fails to acknowledge a crucial piece of analysis that informs decision making regarding the Traveston Crossing Dam.

▶ Inadequate supporting evidence for the adoption of an unnecessary 50 GL/a security buffer

The EIS outlines the need for a supply security buffer to be factored into the analysis without due explanation or justification. This buffer is excessively conservative given the other effective 'buffers' that are already incorporated, and is not consistent with approaches to water planning adopted around Australia. The supply security buffer exaggerates the assessment of the supply demand gap by 50 GL/a, and therefore makes a substantial difference to an assessment of water security in SEQ by increasing the need for additional supply options such as the Traveston Crossing Dam.

The EIS states the need for a supply security buffer in stating that the Governments strategy:

> *aims to develop a 50,000 ML/annum supply buffer to provide security in case those latter initiatives do not provide the savings necessary, in case the worst-case reality of climate change eventuates and in case of increased climatic variability, such as another significant drought.*

While a conservative ethos is undoubtedly a sound approach to guide the analysis of water security, how this principle is interpreted in the analysis must be substantiated by evidence. DNRW (2006: p. 50) provides a further statement in support of a supply security buffer:

> *In such circumstances, it is considered that it would be prudent to develop supplies somewhat in excess of that required on the basis of historical patterns of climate variability to provide some buffer against climate change. On the basis of work done elsewhere in Australia and in SEQ, maintaining a prudent yield about 10% in excess of that actually required to meet demand on the basis of consumption for areas reliant on surface water supplies is considered to be appropriate.*

However, without the supply security buffer, there are already many additional provisions to ensure that a conservative and prudent approach has been adopted in the analysis. Significantly, the yield available from existing supplies has been de-rated in two instances in response the potential for climate change to reduce available supplies from 630 GL/a to 440 GL/a.

The assumptions underlying the demand projections incorporate a high degree of conservatism, relative to similar planning exercises conducted around the country. For example, the figure of 300 Litres per Capita per Day (LCD) is adopted as a basis for projecting demand. This is high compared to other major cities such as Sydney and Melbourne, which have an LCD of 230 and lower (WSAA Facts, 2005).

In fact, if the LCD of 300 is an accurate reflection of current water use in SEQ, this implies significant potential for conservation measures to be rolled out further to reduce residential demand, even though conservative estimates of uptake rates for demand management options have already been assumed by the proponent.

▶ Summary

The EIS neglects to acknowledge that the results of the Government's assessment of water security in SEQ imply that supply security will be met until at least 2026 even without the construction of the Traveston Crossing Dam, and with a 51 GL/a surplus.

The EIS analysis of water security is excessively conservative and out of step with water security analysis around the country. If an additional 50 GL/a is required for the analysis of water security needs in SEQ, then the reasons for this need to be made explicit and must be supported by evidence.

The choice of a high population growth scenario further exaggerates the 2026 supply shortfall and this choice is not substantiated with evidence justifying why the medium scenario is not sufficient.

These factors throw into question the basis for deciding to proceed with the construction of Traveston Crossing Dam to ensure water security in SEQ to 2026.

2.3 Water security to 2051

The supply demand balance as reported in the EIS (QWI, 2007: 2-14) is shown in Table 2-4, including the projected supply demand gap for 2051. As demand has continued to rise over time, the gap between supply and demand has also increased by 2051, resulting in a 330 GL/a supply shortfall in 2051, assuming medium population. As with Table 2-1, the shortfall in supply incorporates a range of demand management measures, and conservative estimates of yield and demand. This shortfall therefore represents the proponent's estimation of additional supply needs to 2051.

Table 2-4 Estimation of the supply demand gap in 2051

Demand source	2026 Population Projection		2051 Population Projection	
	Medium Series	High Series	Medium Series	High Series
Forecast population	4.0 million	4.3 million	5.1 million	6.2 million
Anticipated urban and industrial demand (ML/a)	520,000	590,000	710,000	870,000
Climate change allowance (10% of existing prudent yield) (ML/a)	40,000	40,000	40,000	40,000
Allowance for rural sector (ML/a)	20,000	20,000	20,000	20,000
TOTAL DEMAND	580,000	650,000	770,000	930,000
Existing prudent yield (ML/a)	440,000	440,000	440,000	440,000
Supply / Demand shortfall (ML/a)	140,000	210,000	330,000	490,000

The strategy for responding to this shortfall is a range of supply measures, including a Dam at Traveston Crossing. These measures consist of the options that appear in Table 2-2 and Table 2-5, which together result in a 381 GL/a augmentation to supply.

Table 2-5 Additional supply measures after 2012

Project	Scheduled Completion	Prudent yield (ML/a)
Water harvesting into Hinze Dam Stage 3	2016	10,000
Additional recycling to industry and other minor sources including groundwater developments	2020	30,000
Borumba Dam Stage 3 (additional yield when managed with Traveston Crossing Dam Stage 1)	2025	40,000
Traveston Crossing Dam Stage 2 – if required (additional yield when managed with Borumba Dam Stage 3)	2035	40,000
Total		120,000

As this supply augmentation is much greater that the supply shortfall in 2051 of 330 GL/a, this suite of options will ensure supply security until 2051, based on the assumed projections of demand and yield estimates.

Table 2-6 Supply demand gap in 2051 with and without Traveston Crossing Dam

Supply demand scenario		2051 population projection	
		medium series	high series
i	Supply/Demand Gap (ML/a)	330,000 shortfall	490,000 shortfall
ii	Supply infrastructure to 2051 (ML/a)	381,000[1]	
i-ii	Supply / Demand Gap with additional supply infrastructure (ML/a)	51,000 surplus	109,000 deficit
iii	Additional supply infrastructure to 2012 excluding Traveston Crossing Dam (ML/a)	231,000[2]	
i-iii	Supply / Demand Gap with additional supply infrastructure excluding Traveston Crossing Dam (ML/a)	99,000 shortfall	259,000 shortfall

[1] 381,000 ML/a is the sum of 261,000 ML/a up to 2012 (Table 2-2) and supply infrastructure after 2012 (Table 2-5) 120,000 ML/a

[2] 231,000 ML/a consists of the three stages as represented in the EIS: Traveston Stage 1 (70,000 ML/a), Borumba Dam Stage 3 (40,000 ML/a) and Traveston Stage 2 (40,000 ML/a).

▶ Alternative measures, such as demand management, can ensure supply security to 2051

As noted in section 2-1, if the analysis adopts a medium population scenario, supply security is ensured until 2026 with a 51 GL/a surplus, without the construction of Traveston Crossing Dam. If the same assumption is adopted for 2051, the proponents' suite of supply measures results in a 51 GL/a surplus with Traveston Crossing Dam. If the Traveston Crossing Dam is removed from the suite of options considered, a 99 GL/a shortfall results in 2051.

The supply demand gap that is projected in 2051 assuming a medium population scenario and no construction of Traveston Dam can be adequately addressed with alternative low cost demand management measures. A suite of adequately designed and funded demand management measures will provides a sufficient contribution to the supply demand balance that supply security is met until 2051. A possible suite of demand measures have been specified by Turner *et al.* (2007) and would provide well in excess of the 99 GL/a required at an average unit cost of $1.15/kL.

Demand management measures include home retrofit program, minimum standards on efficient appliances, a water efficiency program for businesses and encouraging 'Smart Growth' in new residential developments. These measures, summarised in Table 2-7, have the potential to save up to 180 GL/a of additional water by 2051. These calculations have acknowledged and accounted for any double counting with existing and planned demand management programs. Three of these programs are summarised below.

Smart growth – additional 49 GL/a by 2051, unit cost $1.85/kL

Significant savings are already being assumed as part of the SEQ requirements for new developments. However, the practical experience in, for example, Pimpama-Coomera on the Gold Coast, and proposed requirements in Caloundra has gone much further, assuming an 80% reduction in demand compared to current household use. This is achieved through ultra-high efficiency fixtures and appliances, maximising the capture of rainwater on site, and maximising the reuse of treated effluent. Costs are reduced through integration of the water supply components and infrastructure and the use of 'smart sewers' and localised treatment to reduce water and effluent reticulation and transport costs. For modelling purposes, the date for implementation of such a requirement for all new developments has been deferred until 2020 and care has been taken not to double count with the existing SEQ demand-side initiatives. This option is particularly powerful as it deals with the main driver for growth in demand in the SEQ region – new developments.

Non residential high water users – additional 35 GL/a by 2051, unit cost $0.50/kL

Extension of the high water users program to additional customers, assuming a 25% saving is available. This option is rolled out over a longer period than the current program to increase the probability of adoption and assumes that sufficient incentives are provided to attract customers to implement the results of audit and assessment recommendations. Regulatory instruments could be used to increase the uptake of this option.

Outdoor garden program – additional 18 GL/a by 2051 Unit cost $0.71/kL

This option assumes an outdoor 'tune up' program involving an inspection, assessment, advice and hardware support, would be implemented for existing households and could obtain 20% savings of the outdoor component of demand. Such a program would be implemented in a similar way to the retrofit program. To ensure the high level of uptake and the maintenance of savings the use of regulations would be used to ensure that at point of sale all households must undertake the outdoor garden program inspection and service. To maintain these savings it is assumed that such households would participate in the program several times over the 2050 planning horizon as they are re-sold.[1]

Table 2-7 Proposed demand side options with associated costs and savings

Option	Total costs present value ($M)	Unit cost present value ($/kL)	Savings in 2010 ML/a	Savings in 2030 ML/a	Savings in 2050 ML/a
Retrofit (extension)	59	0.47	4,000	14,000	14,000
Rainwater tank (extension)	615	3.96	5,000	17,500	17,500
MWEPS	2	0.01	1,708	38,770	47,696
Outdoor (existing households)	125	0.71	7,014	17,535	17,535
Smart growth (new households)	1,076	1.85	0	16,582	49,137
BWEPS (extension)	44	0.50	1,774	8,870	8,870
Non residential smart growth (new properties)	76	0.50	3,464	20,626	34,780
Totals	**1,997**		**22,960**	**133,813**	**189,518**

[1] This program would effectively be a significant extension of the Home Garden Waterwise Rebate Scheme recently released by the Qld Government [http://www.nrw.qld.gov.au/water/saverscheme/pdf/garden_scheme.pdf - accessed 09/07/02].

The implications of not assessing the demand options are significant, as these options throw into question the decision to proceed with the dam if reliable lower cost alternatives exist. The strategic role these options could play to ensure water security means that the proponent has a responsibility to assess these options in detail.

▶ Inconsistent assumptions regarding population growth

The EIS reports that the long-term strategy assumes a high population scenario in the analysis:

> *It should be noted that the Queensland Government is ensuring capacity to meet the high population growth scenario (QWI, 2007: 2-13)*

However, in planning for the 2051 scenario, the medium population scenario has been assumed as relevant. Indeed, this analysis shows that if the high population scenario is assumed in 2051, even the proponent's highly conservative strategy for increasing supply will not ensure supply security in 2051. This is not, however, due to the suite of supply options being insufficient, but rather that the assumption of the high population scenario results in a calculated supply shortfall well in excess of what is necessary for prudent planning.

This inconsistent reporting with regard to population scenario assumptions means that significantly different parameters are chosen for the analysis of the supply shortfall in 2051 compared to 2026, without any justification of why this is necessary. This represents a failure of the EIS to meet basic reporting standards that require the choice of assumptions to be adequately substantiated and justified.

▶ Summary

In this section the figures adopted to evaluate the supply demand gap have been reassessed, applying best-practice principles of Integrated Resource Planning (this is documented more fully in Turner *et al.*, 2007).

In assessing water security to 2051, the EIS has established that there is a 330 GL/a supply shortfall assuming medium population projections, and compiled a suite of supply options to provide 381 GL/a by 2051 to ensure supply security.

Alternative measures, such as a suite of demand management programs (Turner *et al.*, 2007), can ensure water security in SEQ until 2051, without the construction of a Dam at Traveston Crossing. The supply demand gap in 2051, without the construction of Traveston Dam, amounts to 99 GL/a. Additional demand management programs which have been designed using conservative uptake rates and based of evidence of programs already in existence around the country, would result in water savings up to 190 GL/a. This is in addition to the existing and planned demand management programs that the Government has developed.

The analysis of water security in 2051 fails to meet basic reporting standards that require assumptions to be adequately justified and explained. There is a lack of any supporting evidence for the selective use of a high population scenario in 2026, and a medium population scenario in 2051 to calculate the supply shortfall at these time horizons. Population assumptions have a significant impact upon the findings of the EIS, and the lack of supporting evidence therefore casts doubt on conclusions about the supply shortfall in 2026 and 2051.

3 ALTERNATIVES TO TRAVESTON CROSSING DAM

3.1 Assessment of alternatives

This section addresses part 2.4 of the EIS, which discusses potential alternatives to Traveston Crossing Dam. The EIS considers alternative surface water supply options and alternative locations for surface water supplies with reference to quantity of water supplied and relative costs of various options, concluding that there are no feasible alternatives to the proposed Traveston Crossing Dam. This section explains why the assessment and conclusions within the EIS are flawed:

- The EIS fails to meet basic reporting standards by neglecting to disclose evidence or references in support of claims about the inadequacy of an extended demand management program in SEQ.
- The EIS neglects to consider several low cost alternatives to the Dam, including a suite of options to improve water efficiency, which represent extensions of existing programs, as well as 'readiness-to-build', or contingency options for indirect potable reuse and desalination and in doing so has ignored recent best practice water supply planning. For example, the EIS only compares Traveston with desalination as a 'build' option rather than as a 'readiness to build' or contingency option, which has a much lower risk weighted cost.
- In the discussion of alternative locations for surface water supplies, the EIS considers a 'small dams portfolio', purported to be an alternative to Traveston Crossing Dam proposed by Turner et al. (2007) in the Review of Supply-Demand Options for SEQ. No such portfolio was suggested in the Review and assessment of a suite of small dams within the EIS as presenting an alternative to Traveston is therefore unfounded and misleading.
- The EIS assessment of alternatives is narrowly focused on quantity of water supplied and relative costs of different options. An assessment of alternatives with reference to the principles of ESD, as required by the EIS Terms of Reference (ToR), has not been undertaken.

3.2 Alternatives to surface water supply – demand management

In addressing alternatives to surface water supply, the proponents dismiss consideration of any demand management measures additional to those already planned as part of the Qld Government strategy, claiming any additional demand management measures such as those proposed by Turner et al. (2007) would need to be "highly aggressive" and would therefore be "high risk".

However, there is empirical evidence from around Australia and internationally that potential savings associated with demand management initiatives other than those already part of the Qld Government strategy are significant. For example:

- Perth water efficient washing machine rebate program: A rebate program has been operating in Perth since February 2003 for a variety of water saving appliances and fixtures. In a 2 year period, 70,000 rebates were issued for water efficient washing machines in Perth alone (total of 576,800 households). This indicates the potential for rapid uptake (about 6% per year) even in circumstances where accelerated uptake was not the goal of the program. The program has resulted in savings of more than 2 GL to date.

- Retrofits in Sydney: A retrofit program has been operating in Sydney since 2000 with uptake by 2006 of almost 400,000 homes. The program has resulted in savings of almost 9 GL to date.
- Every Drop Counts business program in Sydney: The Every Drop Counts program provides advice and free audits for business customers, including management support and free software to encourage customers to sign on to an agreement with Sydney Water to implement savings. The program has resulted in savings of approximately 11 GL to date.
- Toilet rebate program in New York City: The New York toilet rebate program (1994-1997) achieved a replacement rate of 25-30% of all residential toilets during the program (1.3 million).
- Efficient fixtures and rebates in Santa Barbara Goleta Water District: A district wide showerhead replacement program and a district wide toilet rebate program that also applied to hotels and restaurants operated in the late 1980s. As a result of the program, 95% of showerheads were efficient at the end of program. For toilets, 15,000 rebates were achieved replacing 33% of the 45,000 non-ultra low flow toilets. 20-45% of inefficient toilets in hotels and restaurants were replaced. The high adoption rates indicate potential for rebates to achieve rapid savings.

Despite the significant potential associated with demand management above and beyond the program already planned by the Qld Government, the proponents provide no solid evidence in support of their claim that additional demand management would be high risk. The one example cited is that of Sydney with the statement:

> *Lessons can be taken from the situation that arose recently in Sydney, which forced the planned augmentation of water supply facilities to be brought forward as a result of not achieving projected demand management targets (Marsden Jacob Associates 2007).* (QWI 2007: p2-21)

In fact, the decision by the NSW Government to bring forward the construction of a desalination plant on a pre-emptive (rather than readiness) basis is a political decision and one that is *not* related to a failure to meet demand reduction targets.

Without providing any accurate evidence to dispute the potential water savings associated with demand management as proposed by Turner et al. (2007), the proponent dismisses the possibility of achieving additional demand-side water savings in SEQ. Demand management initiatives have proven successful in many jurisdictions in Australia and overseas. Furthermore, in contrast to surface water supply options, demand management is highly cost-effective and is associated with positive environmental and social outcomes. In failing to consider the possibilities of incorporating additional demand management measures into the Qld Government water security strategy in an informed and reasoned manner, the EIS has failed to adequately address the range of feasible alternatives to Traveston Crossing Dam.

3.3 Alternatives to surface water supply – 'readiness' options

In evaluating the range of alternatives to the Traveston Crossing Dam options, the proponent rejects extended water efficiency options and also fails to acknowledge the range of low cost readiness options that were described in Turner *et al.* (2007). These included readiness to build indirect potable reuse capacity at smaller sewage treatment plants in the region, as well as readiness to construct desalination capacity in the event of a future drought worse than the worst on record. By overlooking this analysis, the proponent neglects to consider recent best practice in water supply planning. These options are often low-cost and are particularly relevant in uncertain planning environments. Readiness options undoubtedly have a role to play to achieve water security in SEQ in the future.

The idea of readiness options is that the planning, design, land acquisition and approvals are all obtained. However, the construction is triggered only in the event of a deep and prolonged drought, thus offering effective insurance against a low probability event and the ability to adaptively respond to changed circumstances. The risk-weighted cost of such a strategy is a fraction of the cost of preemptively building new supply options, especially such a high cost, high-risk alternative as the proposed dam at Traveston Crossing on the Mary River.

Research conducted for the NSW Cabinet Office by the ISF and ACIL Tasman in Sydney (White *et al.*, 2006) developed a strategy that allowed options to be rolled out at short notice to deal with an emerging need. These options would also be available to remain in the 'back pocket' until the need passes some pre-determined trigger point. Both desalination and groundwater emerged as valuable readiness options in Sydney, and were included in the strategy at very low cost.

In SEQ, the scope for such alternatives is substantial, particularly when compared with investing in new supply options such as a Dam at Traveston Crossing. Suitable candidates for such a readiness strategy include Indirect Potable Reuse in a range of locations, followed by scaleable desalination capacity at Bribie Island.

The analysis of readiness options occurs within a framework of real options analysis, which allows risk-weighted costs to be developed for options that may or may not eventuate but nevertheless contribute toward the water security strategy.

For example, a desalination readiness option would contribute to the water security strategy simply from the knowledge that it could be deployed in the instance of a trigger level being reached in the existing storages. Hydrological modeling may, for example, reveal that this trigger level would only be reached in 1 in 100 years, and therefore the risk-weighted cost of this option is one hundredth of the cost of deploying this option preemptively.

3.4 Alternative locations for surface water supplies

The assessment of alternative locations for surface water supplies to that associated with the proposed Traveston Crossing Dam in the EIS is similarly limited. Of most concern is the inclusion of a 'small dams portfolio' within the analysis, purported to be an alternative to Traveston proposed by Turner et al. (2007) in the Review of Supply-Demand Options for SEQ. No such portfolio was suggested in the Review and assessment of a suite of small dams within the EIS as presenting an alternative to Traveston is unfounded, misleading and casts doubt on the overall rigour and conclusions of the analysis of alternatives to Traveston Crossing Dam.

The small surface water supply options outlined by Turner et al. (2007) including Glendower Dam, Amamoor Dam, Cambroon Dam and raised Wappa Dam are described in the Review (Turner et al. 2007: 45) as follows:

> *A small number of options have been selected and proposed in this study as potential medium to long-term supply options, should they be required.*

The supply options described are not proposed as a portfolio – that is, they are not a linked set of dams intended to be constructed in tandem – and are not proposed as presenting an alternative to Traveston Crossing Dam. The options described by Turner et al. (2007) are intended to be constructed independently if and when required by the water security situation. This strategy is in accordance with best practice adaptive management principles for water planning.

3.5 Failure to consider principles of ESD

In assessing alternatives to Traveston Crossing Dam, the EIS fails to consider options with reference to the principles of Ecologically Sustainable Development (ESD), as required by the Terms of Reference (ToR).

The assessment of potential alternatives to Traveston Crossing Dam is heavily focused on quantity of supply associated with the option and with their relative costs. While these are important considerations, additional factors which must be assessed if the analysis of alternatives is to be comprehensive. In particular, as described by the ToR, potential alternatives to Traveston Crossing Dam must be considered with reference to the principles of ESD.

The ToR (p19) states:

> *Reasons for selecting preferred options should be delineated in terms of technical, commercial, social and natural environmental aspects. In particular, discussion of reasonably practicable alternatives to the Project should include…How the principles of Ecologically Sustainable Development (ESD) and sustainable development should be included.*

Within Australian State and Commonwealth legislation and policy, ESD is specifically defined with reference to 5 principles as outlined, for example, in Section 3A of the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999:

> (a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;
> (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
> (c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced
> for the benefit of future generations;
> (d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;
> (e) improved valuation, pricing and incentive mechanisms should be promoted.

The EIS has failed at the most basic level to consider alternatives within the ESD framework. There is no mention within the EIS assessment of alternatives of ESD or the principles that underpin it in the Australian legislative and policy framework. Failure to consider alternatives with reference to the principles of ESD constitutes a failure to comply with the ToR. As the purpose of the ToR is to ensure that the Traveston Crossing Dam EIS satisfies the requirements of all relevant Commonwealth and State statutes, failure to meet the requirements of the ToR has serious implications for the validity of the EIS.

4 LACK OF CONSIDERATION OF THE GREENHOUSE GAS ISSUE

The proponent has failed to adequately consider the greenhouse gas implications of the Traveston Crossing Dam scheme, an issue which is now at the top of the global environmental and economic agenda.

The EIS addresses the greenhouse gas issue by assessing the greenhouse gases that result from the following activities:

- Project construction (a once off 0.044 Mt CO_2-e);
- Clearing vegetation and beneficial reuse of half of the material (a once off 0.097 Mt CO_2-e);
- Change in land use from grazing to inundation (0.005 Mt CO_2-e annually); and,
- Energy use associated with the operation of the dam gates and associated infrastructure (0.001 Mt CO_2-e annually).

However, this inventory of greenhouse gas impacts makes no mention of what is the largest greenhouse gas producing component of the Dam – the operation of the Northern Interconnector Pipeline.

The EIS neglects to include the costs and impacts of the Pipeline throughout the document, even through it will be operated to convey water from the Dam and therefore has impacts that directly result from the operation of the dam.

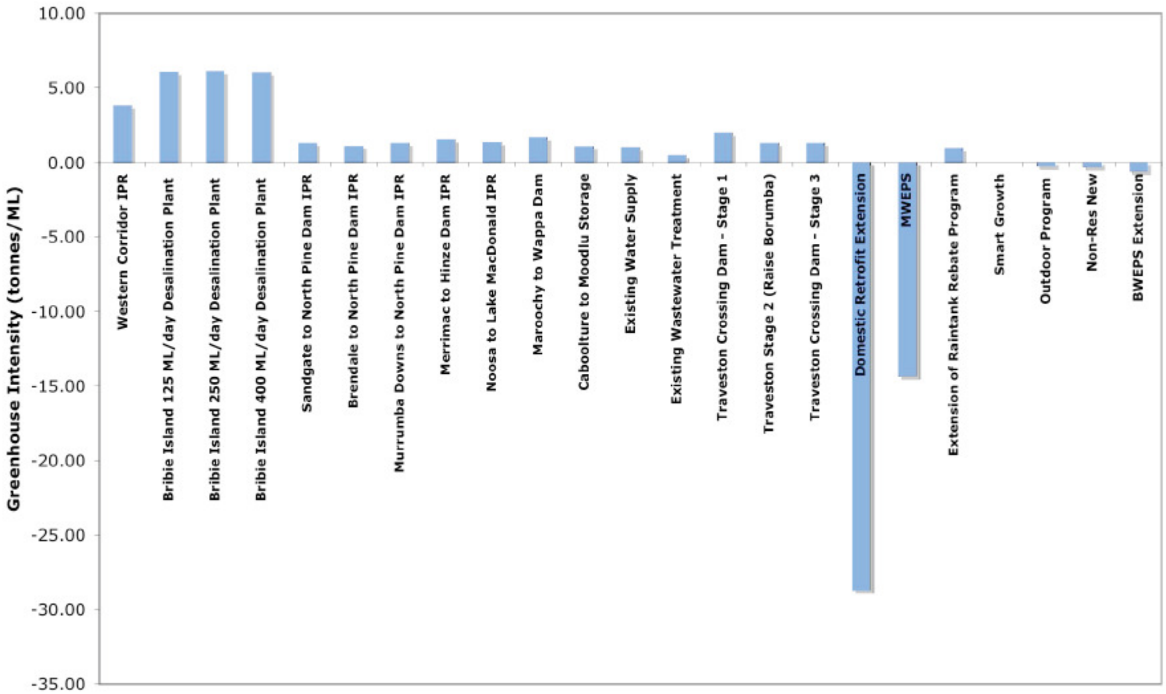
The operation of this pipeline would result in over 100 times the level of annual greenhouse gas emissions that are reported in the EIS as a result of the energy use associated with operation of the dam gates and associated infrastructure. Investigation conducted by Turner *et al.* (2007) found that the total emissions resulting from the construction of the dam, resulting from the pumping of water through the Northern Interconnector Pipeline, are 0.143 Mt CO_2-e annually for Stage 1 (70,000 ML/a yield).

The EIS failed to include an adequate comparison of the greenhouse gas impact of each of the alternatives to the Traveston Dam, even though this is a key part of information required for decision making regarding water security strategy.

An analysis of the greenhouse gas impact of a range of alternatives to the Dam was considered in Turner *et al.* (2007). This analysis showed that some of the options had a particularly high greenhouse gas impact, including desalination plants, advanced wastewater treatment and those options that involved pumping long distances. In the case of other options, such as home retrofit and water efficiency options, there was a net reduction of emissions as a result of the reduced need for water to be treated and pumped, and due to a reduced demand for hot water associated with some of these options.

The key finding of this investigation was that the majority of the emissions from Traveston Crossing were as a result of the operation of the Northern Interconnector Pipeline, and that most of the alternatives to the dam have lower emissions than the Traveston Crossing Scheme (Figure 1-1).

Figure 1-1 Relative greenhouse gas intensity of the Traveston Crossing Dam and alternatives (Turner *et al.*, 2007)



The greenhouse gases produced by operating the Dam constitute approximately 75% of the emissions produced by supplying and treating water to the entire city of Brisbane. The greenhouse gases produced annually as a result of the construction of the Dam would be expected to total 143,804 tonnes/a, and the greenhouse intensity of the water produced would be 2.05 tonnes/ML. This is compared with current water supply in (say) Brisbane, which has a greenhouse intensity of 0.97 tonnes/ML.

The greenhouse gas issue is of primary importance for decision making regarding the Dam at Traveston Crossing, and should be explicitly assessed in comparison to a range of alternatives. In assessing the greenhouse gas impacts of the Dam and recognising that pumping is the most significant emission-producing component of the Dam option, it is essential that the operation of the Northern Interconnector Pipeline be factored into the assessment of the Traveston Dam.

5 CONCLUSION

This submission highlights a number of significant flaws in the analysis and conclusions of the Traveston Crossing Dam EIS:

- The EIS makes no mention of the cost or impacts of the Northern Interconnector Pipeline, which is a significant part of the supporting infrastructure for the operation of the Dam.
- A full assessment of the greenhouse gas impacts of the Traveston Crossing Dam in comparison to other alternatives is required. It is essential that the emissions produced in the operation of the Pipeline be factored into the assessment of the Traveston Dam option.
- The EIS assessment of the supply-demand balance to 2026 is based on unsubstantiated assumptions such as the use of high population growth projections in the analysis of demand, which significantly inflates the anticipated supply shortfall.
- The EIS neglects to consider several low cost alternatives to the Dam, including a suite of demand management options and readiness options described in this submission and in a previous report available to the proponent (Turner et al. 2007). This omission ignores recent best practice water supply planning.
- The proponent fails to justify the inclusion of a 50 GL/a supply security buffer, which is unnecessary given the many other existing 'buffers' incorporated into the projections of demand and estimates of yield.
- The potential contribution of additional demand management as offering an alternative, low cost and no impact alternative to Traveston Crossing Dam is dismissed by the proponents without any reasonable justification or supporting evidence.
- The EIS misrepresents the small dams described by Turner et al. (2007) in the Review of Supply-Demand Options for SEQ as a portfolio alternative to Traveston Crossing Dam and assesses the dams relative to other options on this basis.
- The EIS fails to consider alternatives to Traveston Crossing Dam with reference to the principles of ESD, as required by the ToR.

In light of these issues as outlined in this submission, it is apparent that the findings of the EIS have not been developed with sufficient rigour to constitute reliable evidence to inform decision making regarding water infrastructure for SEQ.

REFERENCES

DNRW (2006) *Water for South East Queensland: A Long Term Solution*, Department of Natural Resources, Mines and Water, Brisbane.

Queensland Government Coordinator General (2007) *Traveston Crossing Dam Stage 1 Mary River, Queensland: Terms of Reference for an Environmental Impact Statement*, August 2007.

Queensland Water Commission (2007) *Fact Sheet – Traveston Crossing Dam*, Queensland Water Commission, 6 August 2007.

Queensland Water Infrastructure, *Traveston Crossing Dam Environmental Impact Statement*, October 2007.

Turner, A., Hausler, G., Carrard, N., Kazaglis, A., White, S., Hughes, A. and Johnson, T. (2007) *Review of Water Supply-Demand Options for South East Queensland*, Institute for Sustainable Futures, Sydney and Cardno, Brisbane, February.

Water Services Association of Australia (2004) *WSAA Facts 2005*.

White, S., Campbell, D., Giurco, D., Snelling, C., Kazaglis, A. & Fane, S.A. 2006, Review of the Metropolitan Water Plan: Final Report, Institute for Sustainable Futures, UTS, Australia, pp. 1 -94 .