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**Save the Mary River Coordinating Group**  
Support and Information Centre, Kandanga Railway, Ph: 5488 4800  
<http://www.savethemaryriver.com>

14 Jan 2008

**To the Coordinator-General**

SEQ Infrastructure (Water) – Traveston Crossing Dam  
Department of Infrastructure and Planning  
PO Box 15009  
City East Qld 4002

Dear Sir,

**Re: Submission on the EIS – Traveston Crossing Dam Proposal**

The purpose of this submission is to provide feedback on the Environmental Impact Statement (EIS) regarding the proposed Traveston Crossing Dam (TCD). The attached submission outlines significant flaws in the EIS relating to the transparency and rigor of analysis and conclusions. Of particular concern are the inadequate evaluations of alternatives, particularly desalination, destruction of habitat of listed species and failure to prove mitigation will work, inadequate address of Climate Change impacts and failure to quantify long term, cumulative environmental and social impacts including adverse impacts on Great Sandy Strait RAMSAR Wetlands and Fraser Island World Heritage Area.

The Save the Mary River Coordinating Group Inc (STMRCG) is a community-based group formed two days after the Queensland Government's surprise announcement that it intended to dam the Mary River at Traveston Crossing. It has a committee comprised of landholders in the region of the dam footprint; a membership of over 300 members and has attracted very substantial community support for its legitimacy and its actions. It has members from a wide range of professional backgrounds possessing expertise relevant to the issues addressed in the EIS. STMRCG requests that it be considered a stakeholder in the ongoing consultation process concerning the project and in the Mary River Resource Operations Plan that would license its operations under the Water Act 2000 should the project be approved.

STMRCG strongly advocates the publication of the Supplementary EIS for review prior to submitting to the Federal Government for consideration. The community view is that having gone to the expense and taken the time to provide input into the EIS process, contributors should have the opportunity to understand the government's treatment of suggestions and, in particular, explanations as to why any of the suggestions provided are not incorporated. Your confirmation that this will be the case will be appreciated.

If any part of this submission is unclear, or if you require further information please contact me.

Yours Sincerely,

Glenda Pickersgill *on behalf of the Research Section of the Save the Mary River Coordinating Group Inc*  
Ph 07 54843150 Email: [pickerg@bigpond.com](mailto:pickerg@bigpond.com)

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**Submission on the EIS  
–Traveston Crossing Dam Proposal**

**January 2008**

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## Chapter 1 Introduction

### 1.2 Suitability of Proponent

The EIS states “*The company has employed a senior and middle management team with a wealth of experience in delivering large infrastructure projects, supported by an extensive range of specialised consultants with a wealth of experience in delivering sound environmental and technical advice for water infrastructure projects*”. **The STMRCG questions some of the “sound environmental and technical advice”** for the following reasons:

- **An examination of the environmental, economic and social impacts of recent water infrastructure projects managed by the directors of Queensland Water Infrastructure Pty Ltd (QWI), senior staff and major contractors of the corporation is relevant.**
- **A suitable case study would be a thorough appraisal of the performance of Paradise Dam.** Have the mitigation strategies in the EIS for that project been successfully implemented? Have the economic benefits outlined in the EIS been realized? Has the project complied with the environmental flow outcomes and water security provisions of the Burnett Water Resource Plan? Have the measures outlined in the Environmental Management Plans for the project been properly implemented? Are the stakeholders identified in that project happy with the outcomes? Has there been successful mitigation of adverse impacts on Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) listed species in the Burnett catchment? Did the economic outcomes meet predictions for the dam?
- The comparison between Paradise dam and the proposed TCD is directly relevant to the proponent of this project – the two projects share the same Chief Executive Officer, the same consulting firm conducting the EIS, the same corporation doing the hydrological planning and operating the storage as is contracted to do the hydrological planning for the current project.
- There are a number of examples from Paradise Dam where mitigation strategies used in that project have not been effectively carried out. These include:
  - Water manager Sunwater has conceded that the fishway mechanism at Paradise Dam to help fish navigate the dam wall has never worked in both directions. Acting chief executive Peter Boettcher says fish are able to travel upstream but not downstream. *"It's designed to operate at between 57 per cent and 100 per cent capacity and the current level of the dam is at 15 per cent,"* he said. The height of this wall is 25.6m compared to the proposed Traveston Crossing wall height of 45m. There is a high risk that the same problem of insufficient water in the dam will apply to the TCD. This combined with loss of prime breeding habitat for the lungfish has put this species under considerable survival risk.
  - Although Sunwater claims the fish ladder works at water levels over 57% there is no published proof that the fish ladder actually works at any water level. The scientist responsible for monitoring the fish ladder admitted in an email dated 28 June 2006 that *“although the Paradise Dam wall and fishlift was completed late last year the construction of other infrastructure and operational testing continues and for this reason the operation of the fishlift is irregular. As you would appreciate in order to undertake rigorous scientific studies we require regular routine operation so we can perform replicated experiments. All can say for now is that the fishway has been observed passing fish but we are yet to begin replicated studies.”*
  - The EPBC Variation of Approval (EPBC 2001/422) required Burnett Water Pty Ltd to, *“adhere to the environmental flow requirements specified in the Water Resource Plan (Burnett Basin) 2000 (WRP) and the Resource Operation Plan (Burnett Basin) 2003 (ROP) and the Burnett River Dam Flow Strategy for Lungfish (dated 22 May*

2003).” The EPBC audit and an admission by Sunwater confirm all requirements have not been met.

- The Burnett River Dam Flow Strategy for Lungfish has a specific ecological outcome which is recognized under the WRP, which is:

Water is to be managed and allocated:

- a. To maintain pool habitats, native plants and animals associated with habitats in watercourses;
- b. To maintain long term water quality suitable for riverine and estuarine ecosystems;
- c. To provide flow regimes that favour native plants and animals associated with watercourses and riparian zones;
- d. To provide wet season flow to benefit native plants and animals, including for example fish and prawns in estuaries;
- e. To improve stream flow conditions to assist the movement of fish along watercourses.

In particular, for the Burnett River Basin and Burnett River the WRP states:

1. Water in the Burnett River is to be managed and allocated to provide for lungfish habitat in the river particularly habitat downstream of Gayndah at AMTD 200KM;
2. *“Operational water release from the dam must occur in a manner that enables the Environmental Flow Objectives and Indicators specified in the WRP to be achieved. As a result, the operation of the dam will promote the proposed ecological outcomes targeted by the WRP, including for lungfish habitat.”*<sup>1</sup>

- Published evidence that Sunwater has failed includes:

1. The Queensland Environmental Protection Agency (EPA) has noted in its *“Final Report: Operation of the Ned Churchward Weir between 1998-2005”* that the report has been prepared in response to a request from Sunwater (the operator who subsumed Burnett Water Pty Ltd), for confirmation that they have fulfilled the monitoring requirements as part of the agreement between the Commonwealth and State governments. The report focuses on the review of the Storage Operations Management Plan (SOMP).”
2. The report indicates that, “a **major** (not minor) omission in the SOMP process has been the failure to update the SOMP in light of new scientific data, particularly in relation to lungfish and macrophyte management. This has meant that while Sunwater may have complied with the SOMP monitoring requirements, compliance itself was not achieving the biological goals for some of the SOMP elements, namely, to date there has been no successful spawning of lungfish with the Ned Churchward Weir”.<sup>2</sup>
3. The importance of providing suitable habitat for lungfish spawning and recruitment was recognized right at the inception of the Weir Project, with the Administrative Arrangements requiring that investigations were to be

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<sup>1</sup> Burnett River Dam Flow Strategy for Lungfish  
Burnett Water Pty Ltd May 2003 , Introduction , pp 1

<sup>2</sup> QEPA 2007 *Final Report: Operation of the Ned Churchward Weir between 1998-2005, Executive Summary* , pp2 .

undertaken to establish requirements for the maintenance of lungfish breeding habitat and juvenile recruitment so that these could be incorporated into the operational rules for the weir (specifically to stabilize water levels). There was an understanding then that operation of the weir would be based on the results of studies subsequent to the construction of the weir and that rules would be changed to accommodate those results.

4. While the spawning habitat requirements of lungfish have been established through subsequent studies (Brooks and Kind, 2002), the reason behind complete failure of macrophytes to establish and provide habitat within the weir have not been addressed. As a priority the operating requirements to establish macrophyte beds need to be agreed by Sunwater with macrophyte experts. Until appropriate spawning habitat can be established in the Weir and suitable stable water levels are maintained during spawning, incubation and hatching, lungfish populations in the weir will either fail to reproduce or will need to travel to suitable spawning habitat in unimpounded waters.
5. The ability for Lungfish to successfully travel upstream to unimpounded waters is compounded by the operators' admission that the Burnett Dam Fishway can only operate during times of high flow and greater than 57% storage. The Burnett River Dam has only ever achieved 31 %<sup>3</sup> capacity since commencement of operation.
6. The following issues have not been resolved over the life of the SOMP, nor will they be resolved under current arrangements within the ROP:

No lungfish spawning or recruitment within the Ned Churchward Weir to date due to:

- a. Insufficient establishment of suitable macrophyte beds for lungfish spawning and recruitment;
- b. Lack of suitable substrate;
- c. Egg mortality if spawning did occur<sup>4</sup>

This report gives a reasonable insight into the inability of the resource operator (Sunwater) to implement the *Burnett River Dam Flow Strategy for Lungfish May 2003* with particular reference to special ecological outcomes of the WRP (a) –(e) and (1):

- The failure on behalf of the operator (Sunwater) to implement agreed water level stability management is a demonstration of non-compliance with the policy intent of the Lungfish Flow Strategy and it can successfully be argued as a non compliance of the EPBC Variation of Approval ( EPBC 2001/422) to , “*adhere to the environmental flow requirements specified in the Water Resource Plan (Burnett Basin) 2000, the Resource Operation Plan (Burnett Basin) 2003 and the Burnett River Dam Flow Strategy for Lungfish dated 22 May 2003.*”
- **It is therefore requested that the Federal Minister for the Environment take this into account under ‘section 137’ of the EPBC 1999, relating to “Person’s environmental history”. In deciding whether or not to approve the taking of an action by a person, (proponent) and what conditions to attach to an**

<sup>3</sup> [www.sunwater.com.au/storage/summary/](http://www.sunwater.com.au/storage/summary/)

<sup>4</sup> *Final Report: Operation of the Ned Churchward Weir between 1998-2005, PP 32.*

**approval, the Minister may consider whether the person (proponent) is a suitable person to be granted an approval, having regard to the person's (proponent's) history in relation to environmental matters, in respect of any decisions regarding approval for TCD.**

- There has been no publicly available documents demonstrating that the \$1.1 m turtle hatchery has ever produced hatchlings, except from eggs collected in the wild. Additionally, these are not Mary River Turtles. The Queensland Government has not successfully bred Mary River Turtles.
- Turtles in dams are dying due to starvation (loss of food supplies), crushing in fish ladders and locks, being smashed going over dam walls, loss of sheltering sites, physical barriers impeding movement, reproductive output declined due to loss of habitat and injury (EPA report - Hamann *et al.*, 2007).
- Planting of 100 000 trees for environmental offsets not successful due to dry conditions.
- Removal of vegetation before inundation not completed and this has contributed to rotting of vegetation and poor water quality. In April 2006, a 17 km fish kill occurred at Paradise Dam – Sunwater's comment was, "We started to collect the dead fish, but stopped after a while – there were just too many."
- The Audit of Paradise dam is still to be released by Department of Environment, Water, Heritage and Arts.

**Recommendation** Section 1.2

Given the track record of the Paradise Dam, the suitability of the proponent is questioned. An examination of the environmental, economic and social impacts of recent water infrastructure projects managed by the **directors, senior staff and major contractors** be conducted to determine the appropriateness of the proponent for the project.

The **Federal audit of Paradise Dam** must be used as evidence that the proponent needs more environmental or technical advice to assess all the environmental impacts or provide evidence of efficient mitigation strategies.

**Do not finalise the EIS assessment until the Paradise dam Audit is released.** Additionally, have a panel comprised of community and government appointed independent experts review the Audit and determine if QWI is a suitable proponent and make recommendations regarding the future of the proposal.

## 1.5 The Environmental Impact Assessment Process

### 1.5.3 Submissions

**Timeframe for submissions was insufficient and unreasonable.** People willing to respond to the EIS have been placed under undue stress and pressure to respond to a very wordy and long document. This short time frame was exacerbated by the delays in people receiving printed copies, confusion from lack of document control and difficulties in accessing the electronic copies because of production on DVDs which only a limited number of computers have the capacity to play. The extension to January 14 was appreciated but given that this extension occurred over the Christmas break when family commitments are greatest, the task of compiling submissions has remained onerous for the community.

## 1.6 Stakeholder Consultation

The EIS states that “*an extensive consultation program was undertaken between October 2006 and 28 September 2007*” and that “*the consultation has included communities located in and around the Project area.*” **The STMRCG strongly believe that there are many stakeholders who have not been adequately consulted for the following reasons:**

- Under assessment of the impacts and the extent to which these impacts and mitigation strategies will affect communities:
  - There has been a reliance on the flawed WRP for the Mary Basin (which provides inadequate allowance for environmental flows between the barrage and proposed dam wall and does not address environmental flows required for health of the Mary River estuary and the Great Sandy Strait). This has resulted in **entire groups of stakeholders being excluded from the public participation process**. For example, QWI has not held public information events in Gympie, Tiaro, Hervey Bay or in the communities adjacent to the Great Sandy Strait, such as Tin Can Bay or Fraser Island.
  - As a result of the inadequate identification of stakeholders, mitigation strategies for significant industries and communities have not even been considered. For example, the EIS(p.15-92) suggests: ‘*some participants in the consultation process from downstream areas, stated that the lack of certainty regarding future water supplies was affecting farming confidence and that some workers had left the industry and the area as a result. The range of externalities including drought and trends to changing land use are considered to be stronger. There is no change proposed to the existing entitlements for water allocations downstream of the Project.*’ **This is in complete contradiction. Even before the dam is built, Sunwater is unable to fully supply water allocations to all water users who have purchased allocations in good faith.**
  - Inadequate flood modelling has resulted in many people upstream not being fully informed or involved in consultation as a stakeholder.
  - **Poor communication of intended environmental offsets for mitigation of clearing and greenhouse gas emissions has resulted in many people in the Mary Valley not being fully informed or involved in consultation as a stakeholder.** For example, QWI has proposed planting 2000-5000 Ha of plantation timber in the Mary Valley on land they have purchased and negotiate with more landholders for environmental offsets regionally, yet have not consulted these people about their intentions.
  - **Poor communication of intended restriction to land use for mitigation of water quality issues** has resulted in many people in the Mary Valley upstream or bordering on the proposed inundation area not being fully informed or involved in consultation as a stakeholder.
  - **Poor communication of intended road changes has resulted in many people not being fully informed or involved.** The EIS shows a revised road plan significantly different to the one provided to the stakeholders in November 2006 in the Property Purchase Plan.
- Lack of disclosure of all information relevant to the public’s understanding and evaluation of a decision, for example:
  - A large body of information relating to alternatives that has not been made public (such as a major study on desalination, stormwater harvesting and recycling opportunities).
  - Effectiveness of proposed mitigation strategies such as the Paradise Dam audit and the DPI reports on fish ladder performance.



**Recommendation** Section 1.6

**STMRCG believe there are many more environmental and social impacts than have been presented in the EIS as described in this submission. Impacts and their mitigation strategies need to be revised.** Then a comprehensive list of stakeholders be consulted that will be impacted from a reassessment of the impacts and mitigation strategies particularly downstream communities, upstream landholders and communities that will be potentially impacted from flooding and restrictions on land use. Flow on from this acknowledgement of these new stakeholders would be businesses and community groups impacted. **These people need to be consulted in an open and informed way, their concerns registered and resolution of issues negotiated through before any costs can be accurately estimated for this project.**

## 1.7 Sustainability

### 1.7.1 Background

**The EIS fails to consider principles of Ecological Sustainable Development (ESD)** as required by the Terms of Reference. Within Australian State and Commonwealth legislation and policy, ESD is specifically defined with reference to five principles as outlined, for example, in Section 3A of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999:

- Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.
- 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.
- 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.
- The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.
- 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.**

The EIS states that:

*“The CSIRO team, which consisted of sustainability, catchment management, ecological and economic specialists, met with QWI and developed the issues that defined sustainability across the three core areas of social, economic and environmental capital.”*

The CSIRO principles therefore focused on the need to address equity issues across the geographic distribution of negative and positive impacts. However, the way the sustainability principles provided by CSIRO apply to the project totally ignore the issue of equity with respect to:

- Downstream areas;
- The issue of equity with respect to the removal of water from one catchment for use in another;
- Impacts of future growth within the communities downstream of the dam. For example, as indicated in the EIS, Tiaro is one of the fastest growing communities in the South East

Queensland (SEQ) area and yet, there have been no guarantees for Tiaro's water supply made in the EIS. Similarly for Woocoo Shire;

- Local irrigation-dependent industries;
- Ability of future generations in these area to enjoy the same quality of ecosystem services from the Mary River (ecosystem services are defined to include provisioning, regulating and cultural/enriching services (Millennium Ecosystem Assessment 2005)– the Mary River provides all of these to the community surrounding it;
- The value of ecosystem services to the community and the impact of a likely loss of these values if the Mary River was dammed;
- A comparison of the impacts on equity of dislocating people and devastating local communities and impact on the future of these communities for the sake of another (when in this case there are many other options for the water supply to these communities);
- The implications for future sustainability of the Mary River region and the validity from a sustainability perspective of taking 70,000 ML (and ultimately 150,000ML) from a region for use elsewhere. Some modern sustainability theories would suggest that catchments/regions should aim to be as self sufficient as possible in key resources such as water and that the ability to be self sufficient should determine population size and so on. This modern sustainability concept has been completely disregarded by CSIRO.

The comparison of alternatives for providing Brisbane's water supply must be assessed using sustainability principles. The EIS claims the project to be sustainable, however the inherent sustainability of the TCD versus other alternatives has not been considered. A failure to apply these principles to the comparison of alternatives is inconsistent with a systems approach, which is the contemporary approach to sustainability (Martin 2005; Meadows 1998).

Unless the choice of alternatives is tested under the principles developed, it is not possible for the proponent to argue that the project is sustainable.

An example of the inappropriate application of principles is that the EIS suggested that communities in the vicinity of the dam should be sustainable and that *“Developing these new enterprises and managing their operation needs to be informed by sustainability principles that, for example, integrate conservation and production values and reduce per capita resource use and waste generation.”* **If they applied these principles to Brisbane, they wouldn't be contemplating a dam.**

**Recommendation** Section 1.7

**The sustainability principles of Ecological Sustainable Development as outlined in the EPBC Act must be used in the comparison of alternatives for providing Brisbane's water supply.**

### 1.7.2 Outcomes

Design Principles for Ecologically Sustainable Catchments

According to the EIS these principles include:

- *“Principle 3. Provide for the conservation of the Mary River Cod, Mary River Turtle, and Queensland Lungfish through habitat management and any other management practices determined through research.*
- *Principle 4. Maintain the health of downstream aquatic ecosystems by mimicking the natural hydrological regime through managed dam releases.”*

**The inconsistency and inability to prove compliance with the sustainability renders the sustainability principles provided by the CSIRO meaningless** for the following reason:

- In order for all sustainability principles listed in this section to have any meaning or significance, the proponent must demonstrate and prove that the project will comply with these principles. However they admit that they will not be able to do this in later sections of the EIS. The two principles are of particular concern:
  - With respect to principle 3, there is no proof that the proposed strategies will work;
  - With respect to principle 4, the hydrological modelling provided in the EIS already demonstrates that the operations of the dam will not mimic the natural hydrological regime.

**Recommendation** Section 1.7.2

Evidence of the project being sustainable has not been addressed in this section. **The project and alternatives should be revisited and tested for compliance with EPBC Act Ecological Sustainable Development principles.**

### 1.7.3 Sustainability Implementation

It is stated “*CSIRO has also developed a Multiple Criteria Analysis (MCA) tool for QWI that can be used to facilitate the weighting, transformation and aggregation of indicators.*”

- This could be treated as a portfolio analysis problem (i.e. select the portfolio of projects that maximises the Triple Bottom Line (TBL) benefit of sustainability projects whilst not exceeding an acceptable budgetary threshold).
- This could be used in the choice of the strategy for supplying South East Queensland’s future water needs. As pointed out this section of the EIS, Multi Criteria Analysis requires consultation with the community to decide the relative weights and importance given to criteria.

**Recommendation** Section 1.7.3

The community has not been involved in the decision making process to dam the Mary River. **The Queensland Government must undertake a community consultation process and employ a tool such as Multi Criteria Analysis to facilitate the choice of the most sustainable option for South East Queensland’s water supply.** This consultation process must include communities who would use the water and communities that are impacted by detrimental impacts on the Mary River and a decline in access to water.

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## Chapter 2 Project Rationale and Alternatives

### 2.1 Summary

**It is of grave concern that the assessment of alternatives is dealt with in less than 44 pages of an EIS covering some 1800 pages.** Despite public statements by the State Government that the alternatives would be fully investigated in the EIS, such an investigation does not appear to have been performed. If the proponent claims that this work has been completed, then the investigations are of such a cursory nature that only one conclusion can be drawn – they were deliberately undertaken with the aim of supporting the proponent’s desired outcome.

- The community has neither the time nor resources to undertake a full and detailed assessment of the alternatives section of the EIS. The proponent has unlimited resources to engage international engineering and economic consulting firms to undertake work on its behalf. The community does not enjoy this luxury. However, **there is sufficient information available within the public domain to shed very serious doubt on the credibility of the work undertaken by the proponent in dismissing the alternatives.**
- The community is of the view, as expressed by the Mary Council of Mayors in their submission to the EIS, that the State Government must revisit in a serious, independent and honest manner the findings of the Cardno/Institute for Sustainable Futures (ISF) report (Appendix 1). The community is supportive of the demand management and drought readiness infrastructure approach as outlined in the Cardno/ISF Report including the “*readiness*” option of a second desalination plant at Bribie or an equivalent site north of Brisbane as a permanent, sustainable, cost effective and responsible solution to the water supply problems facing South East Queensland. The content of that report and its recommendations are supported by the community.
- It seems that the cost estimates for the proposed TCD have been deliberately minimized, while the costings for the proposed desalination option have been deliberately maximized. This approach has been clearly taken to support the proposition that the proposed TCD is a more cost effective solution. This work is highly suspect.
- Proper interpretation of cost estimates for the various alternatives, as outlined in Section 2.7 of this response; clearly show that a 70 GL staged desalination portfolio is a more cost effective option. Even if the figures contained within the EIS are accepted as true, there is only a \$210 m difference in terms of whole of life cost estimates between the proposed TCD and desalination over the next 50 years. Surely the destruction of a river system is worth more than this? This is small change for a robust and growing economy like Australia.
- Furthermore, if you use the cost estimates directly from the EIS together with calculations and methodology from Marsden Jacob Associates\* in their supplementary letter dated 7-9-07 regarding the “portfolio” assessments in the EIS. The cost difference equates to less than \$0.20 per household per week, or less than \$10 per household per year. Most people must agree that the destruction of a river system is worth more than this! (\*Marsden Jacob Associates did the cost estimates / comparisons used in the EIS).
- The Tugun desalination plant will only provide 5% of the bulk water supply needs of SEQ. There would seem to be considerable scope for increasing the percentage contribution from desalination, which is independent of decreasing and highly variable patterns of rainfall. The argument put forward about desalination in the Australian context is irrelevant. **Desalination as a bulk water supply alternative well and truly stacks up against major dams and will provide a guaranteed and cost effective source of bulk water, regardless of drought or the impact of climate change**

- The EIS considers “*Portfolio*” options which support the Governments stated outcome: “*the construction of the proposed TCD.*” There has been no serious consideration of a staged desalination option, which would defer significant capital expenditure for many years, or a mix of smaller yielding bulk water supply alternatives which could deliver the same outcome. Similarly, there has been no consideration of other alternatives previously proposed by authoritative organizations including the Wentworth Group and the Australian Water Association.
- A recent announcement into investigating two desalination plants located on barges in the Brisbane River to produce 36.5ML/yr at an estimated cost of \$675M that could be producing water by 2009 would seem to be a reliable cost effective alternative with minimal social and environmental costs.

**Recommendation** Section 2.1

Despite public statements by the State Government that the alternatives would be fully investigated in the EIS, such an investigation does not appear to have been performed. **The alternatives must be re-examined and costed in an honest and independent manner.**

## 2.2 Water Supply Planning and Policy Context

It must be noted that in consideration of the policy and water planning context, international obligations have been omitted. Whilst many of these obligations are considered under Matters of National Environmental Significance they ought to be included when considering the rationale and alternatives.

**Recommendation** Section 2.2

**International obligations have not been included.** International obligations considered under Matters of National Environmental Significance must be included in the Planning and Policy context in which the project rationale and alternatives are considered.

### 2.2.1 National Planning and Policy Context

There are a number of relevant planning and policy frameworks not listed.

The following National Action Plans and Agreements relating to catchment management and climate change should also be addressed in assessing the impacts of the Project on the existing environment:

- Intergovernmental Agreement on the Environment (IGAE),
- National Biodiversity and Climate Change Action Plan (NBCCAP) 2004-2007,
- National Agriculture and Climate Change Action Plan 2006-2009 and
- The Mary Basin is a priority catchment under the National Action Plan for Salinity and Water Quality

**This section of the EIS has failed to address several of the recommendations from the latest review of the National Water Initiative (NWI).** These were released in August 2007 in the Biennial Assessment of compliance with the NWI (National Water Commission, 2007).

**Recommendation** Section 2.2.1

**The EIS has failed to address recommendations from the NWI August 2007 review.** The section must be reviewed in the light of these new recommendations which include best practice climate scenario planning, strategies to introduce non-climate dependant water supply options, recognition of the connectivity between surface and groundwater. The EIS needs to compare greenhouse gas impacts and consider environmental externalities of alternatives.

NWI recommendations include on-ground delivery of water supply and demand management options, including through measures to ensure:

- 3 Develop a supplementary set of urban water actions as soon as possible, to be implemented as additional actions required under the NWI and covering:
  - 3.1 Urban water planning, including to ensure:
    - 3.1.2 Consideration of all supply options (including recycled water, desalination, rural-to-urban water trade, and cross-border and inter-basin water transfers where economically viable and environmentally sustainable).
    - 3.1.3 Best practice climate change scenario planning, and strategies to introduce non-climate dependent water supply options when required to secure water supplies.
    - 3.3.1 A full assessment of the relative cost effectiveness of various water supply options gives consideration to environmental externalities, including a full assessment of greenhouse gas impacts.

**The EIS does not compare greenhouse gas impacts of options nor does it consider environmental externalities** and doesn't consider all the options mentioned under 3.1.2 (above) and doesn't engage in best practice climate change scenario planning (climate change is dealt with by adding 10% to required supply).

The following objectives of the NWI as relevant to the project are not being met:

- Statutory provision for environmental and other public benefit outcomes, and improved environmental management practice;
- Recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource.

The government continues to pursue the additional extraction of 150 000 ML/year out of the Mary River catchment to supply water to SEQ urban development which their own modelling has shown is not sustainable based on long term average flows from 1890 to 2000. This modelling does not include the last 10 years of declining stream flow data and conflicts with the NWI, which calls for sustainable levels of extraction of water and ensuring the health of river and groundwater systems, including by establishing clear pathways to return all systems to environmentally sustainable levels of extraction (COAG, 2004).

The IQQM hydrological modelling used in the Mary Basin Water Resource Plan does not take into account the connectivity between surface and groundwater resources. **Groundwater studies undertaken in this project are very preliminary and do not take into account seasonal variation.**

## 2.2.2 State Planning and Policy Context

**The community is particularly concerned with the process involved in the adoption of the Mary Basin Water Resource Plan (WRP).** A WRP has been created for the river, and is used as the basis to justify the conclusion that there are no downstream impacts. However the plan is not endorsed by

the community reference panel, it doesn't protect downstream estuarine sections of the river as it is only legally valid to the Mary River Barrage. Also the operation rules in the WRP do not address environmental flows required in the estuarine section of the river and protect the Matters of National Environmental Significance in that area.

- **The decision making process of the WRP has not incorporated the Precautionary Principle and advanced sustainable management.** According to s 10(1) of the *Water Act 2000 (Qld)* (the Act) the purpose of Ch 2 is “to advance sustainable management and efficient use of water and other resources by establishing a system for the planning, allocation and use of water”. The term “sustainable management” is defined in s 10(2) of the Act as management that:
  - (a) Allows for the allocation and use of water for the physical, economic and social well being of the people of Queensland and Australia within limits that can be sustained indefinitely; and
  - (b) Protects the biological diversity and health of natural ecosystems; and
  - (c) Contributes to the following:
    - (i) Improving planning confidence of water users now and in the future regarding availability and security of water entitlements;
    - (ii) The economic development of Queensland in accordance with the principles of ESD;<sup>5</sup>
    - (iii) Maintaining or improving the quality of naturally occurring water and other resources that benefit the natural resources of the State;
    - (iv) Protecting water, watercourses, lakes, springs, aquifers, natural ecosystems and other resources from degradation and, if practicable, reversing degradation that has occurred;
    - (v) Recognising the interests of Aboriginal people and Torres Strait Islanders and their connection with the landscape in water planning;
    - (vi) Providing for the fair, orderly and efficient allocation of water to meet community needs.

The principles of ecological sustainable development as defined in the Act include the precautionary principle.<sup>6</sup>

- A draft Mary Basin Water Resource Plan (WRP) was released for public comment in November 2005. The final Mary Basin Water Resource Plan was legislated in September 2006. There were significant changes made between the draft and final versions of the plan. Notably, the inclusion of words “to minimise the extent” in lieu of “must be adhered to” will have a profound effect on the Mary River and the Great Sandy Strait. **This is akin to simply indicating what should happen, but “if we can't do it, we don't have to”.**
- The Government's own dam operator, Sunwater, in January 2006, seriously questioned the ability to achieve Environmental Flow Objectives (EFOs) contained in the draft WRP and questioned the impact of the ‘strategic reserve’ as further undermining EFOs in the draft WRP. Sunwater correspondence relating to the draft Mary Basin WRP as tabled by Noosa Shire Council (submission 89 in the Senate Inquiry) to investigate alternative water supplies for SEQ 2007 clearly states the inability to supply existing allocations before even considering an additional 150 000 ML as a “strategic Reserve”. The final WRP was even more restrictive.

<sup>5</sup> “Principles of ecologically sustainable development” (ESD) are defined in the *Water Act 2000 (Qld)*, s 11

<sup>6</sup> *Water Act 2000 (Qld)*, s 11(b).

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- By analysing historical river flows the extent of “*change from natural*” can be determined. It is then a question of how much change from natural condition is allowable before ecosystems cease to function properly. In particular how much freshwater flow does the estuary need for fish spawning? The proposed dam will have a dramatic effect on river flows, particularly in drier years. It is irrelevant that the mean annual flow at the river mouth is maintained at 85% of pre-development flows because most of the flows that influence the mean average occur in times of moderate to heavy flooding over very short time periods and at very infrequent intervals. What is the point of providing for average flows over a 110 year period when the dam operator could legally provide no flow at all year after year if necessary? The number 85% has no documented empirical basis (Arthington *et al.*, 2006).
  - The draft WRP completed its public notification stage in February 2006. The intention of the dam was not part of the publicly notified WRP. As the dam represents a major departure from the policy intent of the draft Plan, the final Plan is open to the criticism that it unfairly represented the government’s ultimate intentions. The community is aware that the final WRP was created following mandatory inclusion of a precondition that 150 000 ML per annum was to be available for extraction. Scientists have already provided the State Government with scientific data that shows the Mary River is already over-allocated and has water quality problems where increasingly salinity and dissolved oxygen are outside the EPA recommended guidelines (Brizga *et al.*, 2006).
  - Generally, denial of the opportunity for the community to comment on the proposed dam as a part of the draft Water Resource Plan is a denial of the rights intended by the legislation to accrue to the community and the final Plan ought to be seen as substantially flawed in its process.
  - The Community Reference Panel, appointed by the State Government to provide input into the Water Resource Plan has publicly advised that it had been profoundly deceived by the State Government in relation to the proposed dam. A conference in Noosa on 24 April 2006 (two days prior to the TCD announcement) regarding water resource planning in the Mary Basin failed to highlight the proposal for a major dam on the Mary River. Any reasonable person would consider this type of conduct to be highly deceptive and grossly misleading. In essence, the EIS is based on a fundamentally flawed and deceptive water planning process.
  - The Resource Operations Plan (ROP) has not been completed which would approve allocations from the strategic reserve for the proposed TCD to extract 70 000ML per year from the catchment. This process so far has not involved community consultation.



**Recommendation** Section 2.2.2

**The EIS is based on a flawed and highly questionable water resource planning process that has not incorporated the Precautionary Principle and advanced sustainable management.** An EIS which is based on such planning is itself, fundamentally flawed. The current Mary Basin WRP needs to be reworked to provide adequate scientifically based environmental flows to critical downstream locations at Dagon Pocket (an important breeding ground for the Australian Lungfish and Mary River Turtle) and at the Mary River Barrage to protect the RAMSAR wetlands. **The outcomes from the WRP must be required to comply with the EPBC Act.**

Given that the project proposes to have an intake for the treatment plant at 30m below the surface water level (i.e. about 14m below the stream level), the effects of the proposal on the interaction between groundwater and surface water flow regimes in the Mary Valley must be quantified and the surface flow modelling and water allocation framework of the WRP for the catchment must be reworked to account for this. A thorough re-examination of the hydrology of the Mary River Barrage is required to enable the freshwater flows past the barrage to be accurately measured and monitored as part of the co-operating conditions of the proposed dam and the downstream barrage.

That the proposed dam be assessed against the requirements of the Coastal Management Protection Act 1995, in particular the environmental values policy and the National Principles for the provision of water to ecosystems. The Lower Obi Obi Creek Rehabilitation Management Plan (Earth Tech and Department of National Resources & Mines 2002) and Mary Valley and Tributaries Rehabilitation Plan (Implementation Version) (MRCCC 2001.) needs to be considered also.

### **2.2.3 Regional Planning and Policy Context**

One of the issues not covered by the EIS is the impact of the allocation of 70 000ML per annum to South East Queensland on the Wide Bay Burnett Region.

- It is reported that without this water, dollars will be lost in economic growth within the SEQ region. This is a region with a Regulatory Regional Plan that failed to investigate water availability when determining growth patterns and populations. An analogy could be made to a farmer stocking his land having no regard to the availability of resources required to sustain his flock (i.e., grass and water). This would appear to be a fundamental flaw in the SEQ Regional Plan.
- Having regard to equity of natural resources, and with regional communities, an analysis needs to be undertaken on the potential loss of future growth within the Wide Bay Burnett Region as a result of the water decline and from the degradation of natural resources from impacts on the Mary River. It is noted that the Wide Bay Burnett Region is yet to have a regulatory Regional Plan similar to SEQ. Water availability should form an integral part of such a plan, as it is likely to be a significant driver in growth, particularly having regard to predicted climate changes.
- Numerous relevant regional planning processes have been ignored in the draft EIS. These include:
  - The Wide Bay Regional Plan, which was adopted early in 2007. The draft of the document presented to the government by the Wide Bay Burnett Regional Planning Advisory Committee (WBBRPAC) did not include a reference to the proposed dam,

This reference was inserted by the State Government and approval of the document was made contingent on inclusion of the proposed dam in the plan.

- Burnett Mary Regional Groups Coast to Country Regional Plan which has been approved by State and Federal Governments

**Recommendation** Section 2.2.3

No assessment has been carried out on the impact of taking 70 000ML/year from the Wide Bay Burnett Region. This needs to be done in consultation with the developing Regional Plan.

## 2.2.4 Local Planning and Policy Context

Local Council plans downstream have not been taken into account. Each council has Local Government Corporate and Operational Plans which are binding on the local government, but do not include the proposed dam or its effects. Significant plans affected by the dam include:

- Maryborough Council's proposed marina. The viability of this proposal is affected by ongoing siltation of the river, which is likely to get worse if the dam is built. Silting of the river mouth is a common experience when impoundments are constructed on rivers.
- The draft EIS alleges flood mitigation benefits to Maryborough, however these are largely unsubstantiated and certainly questionable given the possibility that floods can occur in several tributaries downstream of the proposed dam wall and that floods in Maryborough is also significantly impacted by tide heights.
- Plans for future water supply security are cast in doubt by the proposed dam. This will have direct implications on future growth of residential areas and of industries, which require either a source of water.

## 2.3 Need for the Project

In a time of decreasing and highly variable rainfall patterns, the community questions the efficacy of building large dams. The EIS recognizes that urban communities in SEQ rely on supplies from 19 surface water storages (EIS Section 2.3.2), most of which have failed in the current drought. Despite this, the State Government's plan is to build yet another surface water storage in SEQ.

- In a report prepared by Marsden Jacob Associates for the Federal Government titled 'securing Australia's Urban Water Supplies' dated November 2006, the authors note that (para 55):
  - Environmental objectives and the desire to preserve or restore river health have become increasingly important;
  - The environmental damage and costs of dams is increasingly recognized and there is a desire to preserve remaining river systems;
  - The net cost of water from dams is rising with climate change resulting in reduced rainfall and streamflows;
  - Dams are not very useful in extended drought regimes.
- The Wentworth Group, the most authoritative group of scientists on water resources in Australia noted in its November 2006 statement on Climate Change that *"integrated solutions, purposefully designed for each city must become the norm. Every city is different and it will require innovation, creativity and discipline through economic and environmental analyses to find the most effective and efficient solutions. Desalination, potable re-use, stormwater capture and recycling, all need to be recognised as viable economic options to be costed properly. Often they are better options than building more dams and damaging more coastal rivers"*.

- The Australian Water Association has advised that “*the single point all AWA members agree upon is that any dam proposal, together with all other options, must be assessed comprehensively and fairly across all economic, environmental and social aspects*”. There is no such assessment in the EIS and no mention of a plan for such an assessment.

#### Rainwater tanks and recycling opportunities

- The government has made good progress on the Western Corridor Recycling Scheme. It should be noted however that there is still a lot more water in southeast Queensland that could be recycled. About half the water that we normally use arrives at the sewage treatment plant and is available for recycling. It is a more energy efficient way of providing a source of water than desalination and more reliable than water stored in dams.
- Rainwater tanks can provide significant water into the system to be recycled.
- The technology to safely and reliably reclaim water is available and well proven. Water has been recycled for many decades where towns upstream discharge their effluent that becomes part of the water source for the towns downstream. This type of recycling relies on “*dilution being the solution to pollution*” and sophisticated water treatment plants. Modern technology that includes reclamation of water using membranes and advanced oxidation enables us an even safer product.
- There is a considerable amount of water available for recycling – about half of the water we normally use goes to a sewage treatment plant and is available for recycling. The Sunshine Coast and Gold Coast still do not recycle and Caboolture reclamation plant has water reclaimed to a potable standard that is currently being disposed of into the Pine River. This is very irresponsible in times of water shortages.
- Unlike the proposed dam, recycling provides environmental benefits .It minimises the amount of effluent discharged to waterways. The Healthy Waterways Partnership estimates that, unless there is 100% recycling, the condition of SE Queensland waterways will continue to deteriorate.

#### **Recommendation** Section 2.3

**Despite the fact that there are numerous dams in Queensland that have failed during the drought, the Government wants to build more dams. Desalination, potable reuse, stormwater capture and recycling, all need to be recognised as viable economic options and must be assessed comprehensively and fairly across all economic, environmental and social aspects.**

#### **2.3.5 Bridging the South-East Queensland Water Supply/Demand Gap**

The EIS states that “*It has been observed that the planned supply is actually greater than the projected demand at 2026. This 50 000ML/a buffer is Government strategy to ensure that supply will be secure regardless of possible failure to meet demand management targets or of more extreme than predicted climatic variation or climate change.*” (p2-16)

#### **Recommendation** Section 2.3.5

The planned supply is actually greater than the projected demand at 2026 by 50GL.year. That the Queensland Government be required to **provide a thorough and detailed justification as to why the contingency incorporated in the methodology is not sufficient** and why an additional 50GL/a is required as buffer in the water planning process.

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## 2.4 Alternatives to the Project

As feedback to the Draft Terms of Reference (ToR) for the EIS, Noosa Council requested that the following Clause be inserted into the Terms of Reference for this section:

- This section should include a rigorous assessment of feasible alternatives to the proposed Project, including the option of taking no action (i.e. not building the dam).
- A preliminary phase of the work should include a desktop review of existing and proposed SEQ drought management, demand management, effluent reuse, water supply strategies and demand forecasts for the purpose of identifying any obvious deficiencies, omissions or errors with the current work or the underlying assumptions.
- For the purpose of determining alternative options for meeting the supply demand balance, this part of the EIS will:
  - Review all available reports that may be relevant to the identification of suitable alternative options;
  - Identify any other alternative options to the proposed dam (not previously identified) as well as variations to existing options;
  - Develop and populate a model which allows the comparison of options and portfolios of options that can meet the supply-demand balance for SEQ;
  - Review the impact of uncertainty in relation to the costs and yield of proposed and alternative options, including the potential impact of climate change and of the likely shift in the proportion of rain-fed supply sources;
  - Produce a concept design for the alternative options, together with a robust methodology for determining their full cost including social and environmental factors.

The alternatives considered should include:

- Demand reduction techniques;
- Other bulk supply methods including:
  - Recycling, including Indirect Potable Reuse Schemes;
  - New pipelines forming a water grid between storages;
  - Desalination.;
  - Groundwater.
- Other dam locations, including a detailed technical and economic assessment of reasonably practicable alternatives, which singly, or in combination with other dam or non-dam alternatives, can yield the same amount of quantity of water as Stage 1 of the proposed TCD.

The relative cost of options will be expressed in dollars per megalitre terms utilising industry standard pay-off times and discounted cash flow analysis for infrastructure items and cost equivalents for social and environmental items. Since the EIS is required to also address economic impacts, analysis of combinations of alternatives that deliver equivalent “*sustainable yields*” sensibly should take into account the time value of money. It is anticipated that the preferred alternative options would be financed and delivered over a time frame that aligns with the growth in demand.

The community considers that such a study of alternatives in accordance with the above ToR was a completely reasonable request. Unfortunately, the request has been largely ignored.

**Recommendation** Section 2.4

**A rigorous assessment of feasible alternatives has not been done. The Alternatives section must be reworked to include a rigorous assessment of feasible alternatives to the proposed Project** (demand reduction techniques, other bulk supply methods, other dam locations), **including a proper assessment of the option of taking no action** (i.e. not building the dam).

#### 2.4.1.5 Desalination

The EIS states that “*while sites on Bribie Island and the Sunshine Coast have been suggested as options by members of the community, there are very limited opportunities to site such a plant because of the high population density on the coast, the value of coastal land and need to access clean oceanic water*”. To suggest that there are very limited opportunities to site such a plant because of high population density is not true, because:

- The Kwinana desalination plant is located on 6 ha on coastal land within 30 minutes of Perth;
- Two thirds of Bribie Island is uninhabited;
- There exists a GHD report on desalination that the government has commissioned that includes a desalination plant on Bribie Island which is yet to be publicly released.

The EIS also refers to the energy-intensive nature of desalination and to unspecified issues associated with greenhouse gas emissions, disposal of brine wastes and footprint impacts and states that dams on the other hand can offer flood mitigation benefits, recreational opportunities and are aesthetically pleasing. We do not agree with these conclusions for the following reasons:

- The energy-intensive nature can be offset by renewable energy sources such as wind power, as used in WA. Recent advances in renewable energies show the UK, Germany and Spain planning construction of large offshore wind farms overcoming the concerns of aesthetics and noise from the rotors. In 2000, Denmark completed its new windfarms offshore in the Oresund strait between Denmark and Sweden (McCully, 2001). A second desalination plant in WA is being planned so that by 2015, Perth will supply more than 50% of its water from desalination. Geothermal energy and wave action are being investigated for renewable energy supplies.
- Disposal of brine waste can be mitigated. In the Kwinana plant in WA salinity is restored to background levels within 50m of discharge. However the impact from increase in salinity in the Great Sandy RAMSAR Wetlands that could be caused by building the TCD and extraction of 70GL/annum plus the evaporative losses of approximately 30GL/annum from the Mary River catchment is not mitigatable. Ribbe (2006) in a study on hyper salinity in Hervey Bay, has revealed that a contributing factor is the lack of freshwater flows from both the Burnett and Mary Rivers. Studies since 1980 show that runoff from these catchments have declined and are only greater than the minimum evaporation rate for the region – in less than 10% of all instances. This period corresponds to an increase in tidal barrage and dam infrastructure, within both the Burnett and Mary Rivers. This preliminary research is revealing the first impacts on estuarine ecosystems (RAMSAR wetlands) from infrastructure related flow reductions to the Great Sandy Straits RAMSAR wetlands. These findings also raise serious questions as to what effect further reductions in freshwater flows will have under the Mary Water Resources Plan.
- A footprint of about 10–15 ha for a 70 000 ML desalination plant (6 ha for a 45000ML desalination plant at Kwinana) is hardly considered a footprint impact compared to 3000+ ha of inundated land, a 1.6 km dam wall that has a grout curtain down to 20-30m below ground level interrupting a whole valley of groundwater, 2000–5000 ha of environmental offset forestry plantations, and the degradation of the downstream river for 200 km to the sea and beyond to an international RAMSAR wetland of the Great Sandy Straits.

- Flood mitigation benefits that will only marginally assist Gympie at the expense of flooding three towns upstream of the dam wall in areas that have never flooded before.
- Promoting recreational opportunities that are already available to the community – canoeing, fishing and horse riding. Canoeing and fishing with floating aquatic weed on a dam is not a safe or pleasurable activity.
- It is highly questionable that a puddle of water surrounded by drowned trees with a highly variable area of mudflats and weeds could be aesthetically more pleasing than a winding river through a beautiful lush valley of farmland and remnant vegetation.
- The emission of greenhouse gases (GHG) from dams due to rotting vegetation and carbon inflows from the catchment is a recently identified ecosystem impact (on climate) of storage dams. Estimates suggest that the gross emissions from reservoirs may account for between 1% and 28% of the global warming potential of GHG emissions. (World Commission on Dams 2000).

**Recommendation** Section 2.4.1.5

**The data be made available from the GHD, KBR and all other desalination reports to provide up to date comparisons of costings and techniques used to mitigate impacts.**

#### 2.4.2.2 Other SEQ Dam Locations

*The method of using % of mean annual flow to justify the potential for the development of additional water storage in Table 2.10 “existing water storage capacity” (taken in relation to pre-development stream discharge at end of system for major SEQ Rivers) is fundamentally flawed (Burgess and Edward 2006). “Reference to the GHD 2006 report showing that the Traveston Crossing site had by far the highest yield of any site investigated is incorrect.*

- Data presented in the Senate Inquiry 2007 into the Options for additional water supplies for South East Queensland showed TCD was placed 4th on that list with the yield listed as 213 000 megalitres for a cost of \$1 billion. However updated yield figures are now 110 000 ML with a cost of \$1.7 billion plus extra costs for Northern Pipeline Interconnector, treatment plant and highway realignment making the proposed TCD the most expensive of any of the dam options considered by the State Government.

**Recommendation** Section 2.4.2.2

**The 2006 Senate Inquiry into “Options for additional water supplies for South East Queensland” found evidence that the desktop GHD report was inaccurate. To justify that the proposed TCD is the best location for a dam using the report is misleading and the use of % mean annual flow should be replaced by % median annual flow.**

#### 2.4.2.3 Northern NSW Alternative Dams

The consideration of Northern NSW dam options raises a number of concerns regarding:

- Inter-basin transfer of water;
- Cultural and Native Title implications;
- Impact on estuaries and wetlands;
- Social and economic impacts;
- Impact on commercial fisheries.

It is of particular concern that these factors are regarded as significant for the Clarence River in NSW, but are somehow irrelevant for the Mary River in Queensland.

**Recommendation** Section 2.4.2.3

**Similar impact concerns that were used to discard the northern NSW dam options** such as inter-basin transfer of water, cultural and native title implications, impacts on estuaries and wetlands, social and economic impacts and impacts on commercial fisheries **must be used as reasons to discard damming the Mary River.**

## 2.4.3 Identification of Practical Portfolio Alternatives

### 2.4.3.4 Desalination Portfolio

The EIS uses the expensive desalination plant at Tugun as the basis for costing a proposed desalination alternative. **This is fundamentally flawed on a number of counts** as follows:

- It is well known that Tugun was a less than ideal site, requiring extensive tunneling operations to install the seawater intake and discharge structures. The site was originally selected by Gold Coast City Council for a modest desalination plant for the Gold Coast region. The State Government, realising the enormity of the water supply crisis simply took advantage of planning already undertaken by Gold Coast City Council. It seems highly likely that there are better and more cost effective sites to the north which were not properly considered at the time. In a letter from the Deputy Premier's Office dated 13 November 2006, the total cost of the Tugun desalination plant was quoted at \$1.12 billion with component costs as follows:
  - "\$591m for the desalination plant;
  - \$278m for tunnelling and marine works;
  - \$257m for unspecified network integration costs".
- For comparative purposes, the cost of the Tugun plant and associated marine and tunnelling works (i.e. the sea water inlet and outlet) is \$869 m.
- By comparison, the actual cost of constructing and commissioning the 45 000 ML desalination plant at Kwinana in Perth was \$386m. The differences in costs are staggering, even allowing for the fact that the Kwinana Plant was able to take advantage of favourable purchasing conditions at the time.
- More recently, Sydney Water entered into a contract with "*The Blue Water Consortium*" for the construction of a 90 000 ML desalination plant at Kurnell in Sydney for \$960m (compared to \$869m at Tugun for a 45 000 ML plant). The actual treatment plant is expected to cost \$760m (compared with \$591m at Tugun for a plant half the size) with the salt water intake and outlets estimated to cost \$230m (compared with \$278m at Tugun). In its media release regarding the project, Sydney Water noted three reasons for the cost effectiveness of the project:
  - An advanced design that has saved money;
  - More certainty means the contingency risk allowance is lowered;
  - The costs of construction of desalination plants has stabilized.
- The EIS compares a 73 GL desalination plant (conveniently chosen because this equates to a 200 ML per day plant over 365 days per year) to a 70 GL dam. Why not compare a 70GL desalination plant with a 70 GL dam? By multiplying the Present Value Whole of Life Cost for the desalination option by 70/73, the desalination option drops by a further \$85m, reducing the difference between this option and the proposed TCD to \$125m.
- The desalination option presented in the EIS fails to take account of the modular nature of desalination. The analysis forces the desalination portfolio to come on line much earlier than it is actually required. It would make a lot more sense to implement a staged desalination option and to only bring on line additional capacity when it is actually needed. Section 4.5.1 of the

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Marsden Jacob Report “*An Economic Evaluation of the proposed TCD in South East Queensland*” dated 7 September 2007 notes that the staging of the desalination portfolio brings its cost to within \$45m of a staged TCD portfolio. The cost difference between the two staged options is insignificant - \$45m is less than 2.5% of the whole of life project cost.

- In October 2007 Mr. Rudd announced that an additional \$1 billion for desalination, water recycling, and storm-water capture projects. This would further reduce the cost of the desalination alternative.
- Taking account of the above (i.e. comparing a 70GL desalination plant with a 70GL dam, staging of the desalination portfolio and available funding from the Federal Government), a staged desalination portfolio is clearly more cost effective than the proposed TCD.
- It is common knowledge that major engineering consulting firms have undertaken a number of studies regarding desalination options for SEQ. The community has been aware of the existence of a \$512 000 report prepared by consultants, GHD, on potential desalination sites around SEQ for at least the last 12 months. A further report by consultants KBR prepared in September 2006 recommends that a major desalination facility be located on Bribie Island. The community is also aware of further detailed studies regarding other potential desalination sites on the Sunshine Coast. It is an insult to claim that these reports do not exist or to claim that these options were put forward by members of the community (EIS Section 2.4.1.5) and to therefore use the expensive Tugun plant as a guide to the cost of a second desalination plant in SEQ. To suggest that there are very limited opportunities to site such a plant because of high population density is not true; two thirds of Bribie Island is uninhabited.
- The EIS also refers to the energy-intensive nature of desalination and to unspecified issues associated with greenhouse gas emissions, disposal of brine wastes and footprint impacts (EIS Section 2.4.1.5). These problems have been faced before and have been dealt with. The Kwinana plant in Perth discharges brine waste into Cockburn Sound. For the Kwinana plant, salt concentrations have to be back to normal sea water levels within 50m of the discharge point. The plant uses 100% green energy from a remote wind farm which completely offsets greenhouse gas emissions. Surely we can achieve the exact same outcome in Queensland with either solar thermal, geothermal or wave energy. With regard to the footprint impacts of a desalination plant, there is no comparison between a football field size complex and 76 square kilometers of inundated land. This line of argument is most bizarre.
- At a public meeting on 5 June 2006, former Premier Peter Beattie said “the problem with desalination is that it is incredibly expensive ... if you were right about desalination being cheaper we would do it tomorrow. I just wish you were right and I was wrong”. This statement reflects the level of uninformed and clearly incorrect thinking that prevailed at the time of the announcement of the proposed TCD. This statement is entirely consistent with the observation by Marsden Jacob regarding the pre-censoring of non-traditional water supply options such as desalination and the triumph of perceptions over science, particularly when decision processes are rushed.
- The Australian Water Association has publicly advocated that when all factors are taken into account, desalination is the same cost as a dam with a lower risk of failure. The above information would seem to provide ample evidence that this statement is in fact correct. It seems highly likely that a staged desalination option would be considerably more cost effective than the proposed TCD.



**Recommendation** Section 2.4.3.4

**Experience elsewhere clearly indicates that desalination is a more cost effective and certainly more reliable alternative.** Proper cost estimates must be made available for the desalination option, including the deferral of costs associated with staging. The desalination case must be recalculated using data from the GHD and Kellogg Brown and Root consultants (KBR), latest reports on desalination instead of using the costings from the expensive Tugun desalination plant.

#### 2.4.4 Economic Assessment of Alternatives

The consideration of alternatives in the EIS has used the simplistic approach of considering only five basic alternatives (Traveston, Desalination, Mary River Dams, NSW Dam and Smaller Dams) – each one being considered in isolation from the other. **There has been no consideration given to using part of each Portfolio option rather than playing one off against the other.**

No consideration has been given to the following additional alternatives:

- Converting existing power stations to dry cooling technology and using the highly treated recycled water to top up existing storages rather than being evaporated out of existing power station cooling towers. Comment should at least be provided on the practicality/cost of this option;
- Expansion of indirect potable reuse schemes as proposed in the Cardno/ISF report. Again, comment should be provided on the cost of this option. We already know that it is practical. Paragraph 59 of the Marsden Jacob report ‘*securing Australia’s Urban Water Supplies*’ dated November 2006 notes that ‘*smaller opportunistic recycling schemes located on, or close to sites can be very inexpensive*’. A number of smaller indirect potable reuse schemes were noted in the Cardno/ISF report;
- Stormwater Harvesting in urban areas could make a substantial contribution to a secure and reliable water supply for SEQ. There are around 550 billion litres of stormwater falling on Brisbane every year. It would only be necessary to harvest a very small percentage of that water to provide a substantial contribution to water supplies for SEQ.

**Recommendation** Section 2.4.4

**Leading organizations have advocated the proper assessment of all viable options** including desalination, potable reuse and stormwater. **The EIS has failed to undertake such an assessment.** The State Government must revisit in a serious, independent and honest manner the findings of the Cardno/Institute for Sustainable Futures report. Options must be tested which allow for a mixture of desalination and smaller bulk water supply alternatives including dry cooling of power stations, additional potable reuse schemes and stormwater harvesting.

#### 2.5 Implications of the Project

The economic evaluation of the proposed TCD and a limited range of pre-determined alternatives has been undertaken by consultants Marsden Jacob Associated and is included as an Appendix to the EIS. **The community has a number of concerns regarding the validity of the assessment, in particular the base figures which are used to compare the alternatives.**

- It is the view of the community that the assessment has been undertaken with the very clear intention of supporting the proposed TCD, despite **credible and reliable information which**

**suggests that damming the Mary River is not the most cost effective option.** It is evident that significant direct costs associated with the proposed dam have been hidden in other projects, particularly the Northern Pipeline Interconnector project. It also seems that the cost of desalination has been deliberately maximized by using the high cost of the Tugun desalination plant as the basis for estimating the cost of a second desalination plant north of Brisbane.

- It is of concern to the community that Marsden Jacob have produced significant water reports for both state and federal governments over the past 12 months and that there is a degree of inconsistency within the findings of these reports. “*securing Australia’s Urban Water Supplies: Opportunities and Impediments*” dated November 2006, supports non-rainfall dependent solutions such as desalination as an option for Australia’s coastal cities which can potentially offer large scale supply immediately and for ensuring decades, noting that there are technical solutions to minimize the impacts associated with greenhouse gas emissions and disposal of brine waste. The report also notes significant issues associated with major new dams. Figure 13 of the report also notes the comparable cost of dams with seawater desalination in major cities around Australia.
- The report also quotes the Wentworth Group of concerned scientists that there is now a need to “*accept that desalination, potable reuse, and recycling and urban-rural trade are all legitimate options for our coastal cities and often better options than building new dams and damaging more coastal rivers.*” It is of particular concern to the community that the key findings of this report have played themselves out in the state of Queensland over the past two years, particularly in relation to the proposed TCD. Some of the key findings of the report regarding impediments and opportunities for securing Australia’s urban water supplies are detailed in Figure 2 of the Executive Summary and are listed as follows:
  - Often slow and partial recognition of climate uncertainty and risk;
  - Incorrect perceptions and pre-censoring of key non-traditional options (especially desalination, recycling and purchase of water from irrigators);
  - Triumph of perceptions over science, particularly via rushed decision processes;
  - Scope for measured consultation, consideration and education campaigns.
- Much of the commentary about desalination relates to the high energy consumption associated with desalination plants. It is of concern to the community that the facts are not being presented in a way which allows the people of Queensland to make an informed decision about the merits and cost effectiveness of desalination. In terms of energy consumption, the EIS states that the Tugun desalination plant would use 6.1 MWh/ML. This would appear to compare most unfavourably with the same size plant that has operated successfully for over 12 months in Kwinana, WA that uses 3.5MWh/ML. The apparent difference between the Tugun and Kwinana plants requires further serious investigation. It is not clear how the energy costs associated with the proposed TCD have been determined. If the proponent has adopted the same approach as for the costing of the proposed dam, then the energy costs associated with transferring water from Lake McDonald to North Pine Dam have been ignored. The total cost of pumping water to North Pine Dam must be included.
- The community is strongly of the opinion that the impact of energy costs between desalination and the proposed dam is more than offset by the reliability of a desalination plant when compared with the dam option. For example, using the following assumptions:
  - The energy figures presented in the EIS. That is, 1.9 MWh/ML for the proposed TCD and 6.1 MWh/ML for the desalination alternative;
  - Electricity costs of \$50/MWh (WEPI Electricity Futures Qld Calendar 2009);

- Consumption of 230 litres per person per day or 210 000 litres per household per year. That is 230 litres per person per day multiplied by the average household of 2.5 people multiplied by 365 days per year;
- That the proposed TCD and its desalination alternative would provide for only 15% of the current water supply demand in SEQ and 10% of the demand in the year 2050.

The relative costs of energy per household are calculated as follows:

Proposed TCD

- $15\% \times 1.9 \text{ MWh/ML} \times 0.21 \text{ ML} \times \$50 = \$3.00.$

Desalination Alternative

- $15\% \times 6.1 \text{ MWh/ML} \times 0.21 \text{ ML} \times \$50 = \$9.60.$

The difference in annual cost per household is just \$6.60. Even allowing a generous 50% premium for the production and/or purchase of green energy, the additional cost per household would be less than \$10 per year. Given the choice, in our opinion, Queenslanders would overwhelmingly support desalination over a dam.

**Recommendation** Section 2.5

The difference in annual cost per household is in the range of \$6.60 to \$10 using the EIS figures. The comparison between desalination and the proposed TCD should be presented in a way which **allows the people of Queensland (\$/household) to make an informed decision about the merits, cost effectiveness and certainty of supply.**

## 2.7 Costs and Benefits of the Project

**This EIS has not adhered to the ToR requirement for Cost Benefit Analysis (CBA) of potential impacts on regional economy (p72 of the ToR).**

- Stage 1 of the project is planned to extract 70 000 mgl per annum for interbasin transfer to the Moreton catchment. This resource is to be used for urban and or industrial application. Previous economic analysis for the Paradise Dam EIS indicated a gross marginal return of >\$2000 /mgl<sup>7</sup> was expected from this application for Paradise Dam.
- The EIS indicates that a gross marginal return of \$3485<sup>8</sup> is to be generated for application of this resource to the Brisbane region. This creates a direct annual benefit to that region of \$243,950,000, at the same time this application also creates an annual opportunity loss to the Wide Bay regional economy (via loss of ecological services) of the same order, ca \$244M .
- The Wide Bay region is currently preparing a water supply strategy to meet expected growth demand.
- The proponents rationale for the project is to ensure that Brisbane has adequate supply by 2026 in case, *“the worst-case reality of climate change eventuates, and in case of increased climatic variability, such as another significant drought.”*<sup>9</sup>
- The distribution of benefits among different sections of society and among different regions and, in particular, the local distribution of benefits must be revealed and clarified prior to project approval. **All these issues of distribution, equity and access must be explicitly treated in public presentations. Equity Impact Assessments (EqIAs) are imperative.**

<sup>7</sup> Qld Govt NECG 2000 report for Paradise Dam CBA .

<sup>8</sup> Executive summary table 1 ( \$244M / 70,000MGL )

<sup>9</sup> Executive summary 1.1. rationale.

- The Marden Jacobs Report is merely a least-costs comparison. This is in fact, not a cost-benefit study but, a "least cost" identification procedure. The benefit side is relatively undeveloped, and deliberately so.
- The consultancy firm engaged to prepare this CBA (Marsden Jacobs) has prepared a "least costs comparison analysis" for a suite of supply options including desalination. This is clearly in breach of the ToR , and a conclusion may be drawn that the Expression of Interest (EoI) on behalf of the proponent, failed to indicate that a CBA identifying the stream of costs and benefits was required "we focus on identifying the least-cost supply option, The exclusion of a benefit stream in the analysis means that standard decision metrics employed in cost benefit analyses, such as return on investment and benefit:cost ratios, are not applicable." <sup>10</sup>
- This process is in direct breach of the ToR , and is in direct conflict with the policy intent of the Wide Bay Burnett Regional Growth Plan 2007:

*POLICY 7.2 Regional Water Supply*

*Water supply is expected to be a major limiting factor for growth in many of the region's communities. This is likely to be exacerbated by projected population growth in coastal areas, coupled with predicted climate change impacts of increased temperatures and rainfall uncertainty. Potential disruption to industrial, agricultural and urban growth through drought and water shortages could adversely affect prosperity and quality of life aspirations for the region's inhabitants.*

*Objective: To provide sufficient water and related infrastructure to service the needs of the community and economic activities in the region whilst maintaining healthy ecosystems.*

*Policy Principle: 7.2.1*

*Regional and sub regional collaboration, planning and coordination of the Wide Bay Burnett water resources to ensure the efficient, cost effective and sustainable management of the region's water catchments, impoundments and distributions systems.*

- Treasury guidelines require cost-benefit analyses to assess all options on social, economic and environment grounds. The government claims that this has been done for TCD, but in the EIS, this environmental comparison of all the water options is missing. (Tabled paper: Document titled "Cost-Benefit Analysis Guidelines (Draft)—Achieving Value for Money in Public Infrastructure and Service Delivery" dated July 2006. Tabled paper: Document by Queensland Water Infrastructure Pty Ltd titled "Traveston Crossing Dam Project—Project Update Four").
- There is no calculation of potential economic loss from ecosystem impacts from reduced flows and productivity decline in all trophic systems in the RAMSAR.
- There is no lost opportunity costs calculated from yield reduction, due to 2000-5000 ha timber plantations (c/ghg offsets) infiltration and evapo-transpiration (could be >2ML/ha/yr) (2000ha x \$3000ML gross marginal return = \$600M @50 years or \$1.2B if >4ML/ha/yr ).
- No calculation of lost opportunity costs to regional economy from use of 70,000ML for Brisbane (@\$2000/ML urban use =\$140M annual loss to regional economy, @\$3000= \$210M annual opportunity loss).
- The EIS indicates that a gross marginal return of \$3485 has been applied to the yield for urban and industrial use, this equates to a an annual lost opportunity cost to the Wide Bay Region of \$243 950 000.

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<sup>10</sup> (S1.2 Appendix F11.2)

- There is no discussion of scarcity of supply for Wide Bay Burnett regional economy and potential growth restrictions or loss of revenue with impacts to the Mary River system affecting tourism or fisheries.
- A close look at the hydrological analysis of the historical flow data within the EIS using a licensed copy of the IQQM model, has revealed that the State Government claim of maintaining 85% Mean Annual Flow (MAF) is not supported. (Burgess and Wedlock, 2007). This consolidates an argument that there are likely to be potential impacts to the RAMSAR fisheries productivity, which has been highlighted in the EIS report on RAMSAR impacts (APP F 6) and other downstream communities reliant on tourism and fisheries. The following figures estimate the economic and environmental services the RAMSAR wetland contributes to the regional economy value which is at risk at \$3.814 billion.
- An estimate of the value of the Great Sandy Strait RAMSAR site to the regional economy of the Fraser Coast, has been extrapolated from data within the scientific literature (with ecosystem service based on m2 area) and is presented in Table 1. A full assessment of the impact on these economics is required in the EIS.

Table 1 Estimate of value of Great Sandy Strait RAMSAR site to regional economy of the Fraser Coast

| CODE     | ATTRIBUTE                       | SOURCE OF INFORMATION                | ECONOMIC VALUE (A\$ PER ANNUM) |
|----------|---------------------------------|--------------------------------------|--------------------------------|
| A        | Coral Reefs                     | <sup>2</sup> Blackwell (Coastal CRC) | 305 M                          |
| B        | Mangroves                       | <sup>2</sup> Blackwell (Coastal CRC) | 93 M                           |
| C        | Seagrass & Algal Beds           | <sup>2</sup> Blackwell (Coastal CRC) | 418 M                          |
| D        | Estuaries                       | <sup>2</sup> Blackwell (Coastal CRC) | 2870 M                         |
| E        | Saltmarsh & Saltpans            | <sup>2</sup> Blackwell (Coastal CRC) | 24 M                           |
| <b>1</b> | <b>Total Ecosystem Services</b> |                                      | <b>3710 M</b>                  |
| 2        | Tourism (Accommodation)         | OESR 2007                            | 30 M                           |
| 3        | Recreational Fishing            |                                      | 8 M                            |
| 4        | Commercial Fishing              | CHRISWEB 2007 (DPI&F)                | 58 M                           |
|          | <b>Total Regional Value</b>     |                                      | <b>AUS \$ 3.8 B</b>            |

- An economic analysis, including a cost-benefit analysis, should be presented from national, state, regional and local perspectives as appropriate to the scale of the project, and the general economic benefits from the project should be described.
- The economic analysis component of the EIS should consider:
  - The significance of this 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.
- 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 must be assessed. For identified impacts to social and economic values, mitigation and enhancement strategies must be included. Practical monitoring regimes should also be recommended.


- A costs comparison has been carried out which does not include the potential economic impact on the Fraser Coast Region. Accordingly the annual removal of 70 000mgl from the region will result in the following:
  - A decline in river health, fisheries productivity, RAMSAR Wetlands health and productivity, water security for existing allocations – all future costs that are not being included in the project costs;
  - A reduction in the ability for the Mary River to sustain future growth projections for the Fraser Coast Region and to stabilize or increase current economic benefits from agricultural, horticultural, tourism , commercial and recreational fishing use of the resource;
  - A direct lost opportunity cost of \$243 950 000 from the use of that water in Brisbane, based on a gross marginal return of \$3.458/ KL for urban and or industrial use;
  - A need for negotiations for a regional economy compensation pack;
  - A need for recognition in the EIS of the economic impacts to the RAMSAR from this extraction;
  - A need for recognition in the EIS of climate change impacts to the regional economy (reduced natural EFO levels and ensuing RAMSAR impacts (no mitigation flows from TCD));
  - A need for recognition in the EIS of regional tourism economy impacts from reductions in MAF well below the 85% claimed figure;
  - A need for recognition of economic analysis of fisheries productivity impacts and food-chain potentials for trophic ecosystem levels (dolphins, whales, gamefish - high order predators) within the RAMSAR.

The EIS outlines in this section the broad cost estimates for the proposed TCD. Similarly the “*Supplementary Technical Reports Volume 2, Sunwater Traveston Crossing Dam Preliminary Design Summary Report Table 15.1*”, shows capital cost estimate for Stage 1. However there is no way of ascertaining the degree of accuracy of those estimates as no detailed information is provided regarding any of this. However, there are a few glaring omissions which constitute real and direct costs that should be attributed to the proposed dam. These include:

- **The project makes no allowance for the costs of the Northern Pipeline Interconnector (NPI) from Morayfield through to Landers Shute.** As this pipeline has been deliberately sized to carry water from the proposed TCD, a portion of the capital and operating costs associated with that pipeline must be added to the proposed TCD estimates.
- **The project makes no allowance for the costs of the NPI from Landers Shute through to Lake Macdonald.** The Queensland Water Commission in QWI Fact Sheet 10 dated 3 September 2007 noted that “a second stage of the North Pipeline Inter-connector will deliver water from TCD as far as North Pine Dam. This stage is scheduled to be completed by the end of 2012, providing time for the dam to be completed and filled”. As the primary purpose of this pipeline is clearly to transfer water from the proposed TCD, a significant proportion of the capital and operating costs associated with this section of the pipeline must also be added to the proposed TCD estimates. To do otherwise is both untruthful and unethical.
- **The costing for the Bruce Highway only includes the bring-forward costs of construction.** However, it is understood that the cost of constructing the highway to the east of the proposed dam, would be significantly greater than the preferred alignment along the existing road corridor. This is due to the additional cost of extensive cut, fill and bridging operations required along an alignment that borders the proposed dam. These additional costs must be included as a direct cost against the proposed dam.

- It is extremely difficult to see how a paltry \$50m will cover all the environmental mitigation measures associated with damming the Mary River. This could only be the case if the same level of pathetic environmental mitigation measures were put in place as those which have failed for the Paradise Dam.
- The proponent for the proposed TCD, QWI, is actively acquiring land for both Stages 1 and 2 of the proposed TCD; however the costs associated with the procurement of land for Stage 2 have been completely ignored. It is acknowledged that the State Government would still own the land for Stage 2 in 30 years time; however, there will be a very low commercial return on most of that land for the next 30 years. This must surely be considered as a direct project cost.
- Uncertainties of costs associated with excavation depths being variable, dewatering especially during wet years, material suitability, flooding during construction phase, dam wall overtopping, flooding upstream where it has not occurred before, quarry material and road relocation. For example with road relocation the following shortcomings are of concern:
  - There has been inadequate geotechnical work done on the location of roads to allow a design or costings to be worked out in detail.
  - There are 10 bridges planned ... This is a significant structure work in it's own right, and many will have to sustain large floodwaters.
  - How can the proponents consider the EIS completed, when geotechnical studies for bridge work have not been conducted
 

*“Without additional geotechnical data being available, and without working through the design of the retaining structures and required treatments to cut batters any further, it is difficult to determine the accuracy of the initial cost estimate. Additional geotechnical testing is required to confirm or resolve the design assumptions above.”(Vol 3 Report 4)*
  - In ARUP's Report 2 Part 1 regarding the relocation works on the Bruce Hwy that, under Section 10 Project Cost, there is the single line statement: **“As part of the Preliminary Design phase, a cost estimate will be developed by the Department of Main Roads.”** If there are no costs yet available for the realignment of the Bruce Hwy, how can the costing for this project be available as has been touted in the press by The Premier and Deputy Premier for several months, and therefore how can this project be assumed to be cost effective? If there are cost estimates available, why are they not part of this EIS, and why are they not available for the public to scrutinise?
  - The lack of detailed geotechnical studies into the areas where the bridges will be installed reflects the fact that this EIS has been inadequately prepared. Before the document could be considered completed, detailed geotechnical studies and designs should be completed, so that accurate costing can be undertaken.
  - With the cost estimations for the roads to be obviously inaccurate, which invalidates the proponent's assertion that the proposed Traveston Crossing Dam is the most cost effective alternative.
- **Reliability of desalination is known to be high in the face of climate change.** Reliability of a dam is climate dependent: How is this factored into the cost estimate when:
  - Large floods are infrequent and may not occur for 10-12 years and with climate change, further variability is predicted;
  - The water resource plan is fundamentally flawed with inadequate allowance for climate change and over allocation in the river already;
  - Assessment of Wivenhoe/Somerset climate change effects on streamflow changes conclude that yield will continue to be a problem for that catchment. Similar picture



for the Mary catchment where over the last decade, streamflows have halved similar to the Murray Darling Catchment. Future predictions by CSIRO of a conservative reduction of 10% in rainfall will result in up to 30% further reductions in streamflow (MRCCC, 2008).

**Recommendation** Section 2.7

**The ToR requires a proper Cost Benefit Analysis to be completed.** The EIS currently only contains a cost comparison. **The cost estimates for the proposed TCD have been deliberately manipulated to exclude significant direct costs and ongoing operating costs. The cost estimates must be re-worked to indicate the true cost of damming the Mary River.** Detailed information must be provided with summary costing tables with a degree of accuracy of those estimates. Risk and reliability need to be included in comparison of alternatives.

The hydrological modeling data shows that 85% MAF is not supported and therefore there will be downstream impacts that need to be considered. The economic and environmental services the RAMSAR wetland contributes to the regional economy value which is at risk of impact is estimated at \$3.814 billion. **Costings for environmental impacts to downstream communities must be included.**



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## ***Chapter 3 Relevant Legislation and Approvals***

### **3.1 Relevant Legislation and Policy Requirements**

The EIS acknowledges the construction of TCD will have a major impact on the supply of Good Quality Agricultural Land (GQAL) (p.5-7) with over 88% of the inundation area classified as “Class A” good quality agricultural land with minor to moderate limitation to agricultural production (p.5-55). The TCD proposal is in direct conflict with State Planning Policy 1/92 for Good Quality Agricultural Land.

- The GQAL Policy Principle 1 states, “good quality agricultural land has a special importance, and should not be built on”.
- GQAL Policy Principle 2 states “the alienation of some productive agricultural land will inevitably occur as a consequence of development, but the Government will not support such alienation when equally viable alternatives exist – particularly where developments that do not have very specific location requirements are involved”.

The STMRCG contends that equally viable alternative exist for TCD, as specified in the Cardno / Institute of Sustainable Futures report on Water Security and Water Planning in SEQ. If these water supply alternatives were implemented instead of constructing TCD the loss of over 3000 hectares of “Class A” Good Quality Agricultural Land would not be destroyed forever.

To add further weight to the argument of investigating water supply alternatives, GQAL Planning Principle 4 states, “*The preparation of strategic plans should include an evaluation of alternative forms of development, and significant weight should be given to those strategies which minimise the impacts on GQAL*”.

## Chapter 4 Description of the project

### 4.3 Land Purchasing Policy

The EIS states that “*QWI’s policy in seeking to purchase voluntary land for Stage 2 is discussed in Section 4.12. Compulsory acquisition will not apply to land not within the Project Designation Area.*” We note “*that 4.12 Consequential Actions*” contains no reference to voluntarily purchasing land for Stage 2.

### 4.4 Description of Water Storage Construction and Operation

#### 4.4.2.8 Apron and Dissipator

The EIS states the “*The detailed design of this structure will be developed through discussion with expert ecologists to produce the most applicable design to reduce the risk of physical damage to fauna during large releases. It is not anticipated that bank protection works will be required downstream of the stilling basin however this will be confirmed during detailed design*”. **The STMRCG strongly recommends that mitigation details and effectiveness should be included in the EIS for the following reasons:**

- There is a extremely high risk of death for fish and turtles from going over spillways. This is documented in the literature (Hamann *et al.*, 2006). The mitigation strategies need to be published for scrutinizing of effectiveness and demonstration of where they have been used elsewhere successfully;
- Due to the alluvial nature of the streambanks downstream, it is highly likely that erosion and bank slumping will be an enormous problem downstream not just at the stilling basin but all the way to Gympie. This is well documented as occurring after floods in the Mary and to not anticipate that bank protection works will be required downstream demonstrates a lack of local knowledge and assessment capabilities.

#### **Recommendation** Section 4.4.2.8

There is a highly likely risk of death for fish and turtles from going over spillways.

**Mitigation strategies need to be published for scrutinizing of effectiveness and demonstration of where they have been used elsewhere successfully.**

Due to the alluvial nature of stream banks downstream, it is highly likely that erosion and bank slumping will be an enormous problem downstream all the way to Gympie. **Stream bank stability downstream must be assessed through to Gympie and bank protection works costed into the project.**

#### 4.4.3 Fishway

It is noted in the EIS that a fishway will be constructed to allow the movement of fish and other animals, such as turtles, over the dam wall and that this fishway, which is still in the preliminary design phase, will be based on the high-dam fishway built at Paradise Dam. The proponent admits in the EIS that the fish ladder is still in the “*conceptual stage*”.

The STMRCG strongly recommends that mitigation details and effectiveness be included in the EIS for the following reasons:

- **There is a highly likely risk that the dam will not be full enough for the fishway lift lock to work** based on evidence from the Paradise Dam and predicted climate change in stream flow for the Mary Catchment.
- **It is unsatisfactory to suggest that these fishways will be developed and untested when extinction of species is a high risk.** The mitigation strategies need to be published for scrutinizing of effectiveness and demonstration of where they have been used elsewhere successfully.
- **There are a number of fishways in place in the Mary and Burnett river systems that are not effective.** These devices should be developed and tested on existing water infrastructures before suggesting building another dam or weir.

Of great concern is that the Paradise Dam fishway has been a complete failure, as have all fishways designed, built and managed by the Queensland Government. This has been admitted in various ways on many occasions, including in Parliament in October 2006 by Hon. TS Mulherin, and in the reports where fish and turtle movements were monitored, although not at Paradise Dam due to the lack of monitoring and consequently, published results (Burghuis and Broadfoot, 2004a; Burghuis and Broadfoot, 2004b). Additionally, in January 2008, Sunwater and the Federal Minister for the Environment, Heritage and the Arts, Hon. Peter Garrett, admitted that the Federal Government Audit of Paradise Dam showed that there were problems with the Paradise dam fishway.

**Recommendations** Section 4.4.3

**Of great concern is that the Paradise Dam fishway has been a complete failure. The TCD project should be rejected on the grounds that the proponent is unable to ensure that the listed endangered animals, including Australian Lungfish and Mary River Turtle, will not be negatively impacted by the project.** The suggested mitigation method of a fish ladder for TCD is as yet undeveloped, and has been shown to be ineffective on other dams and is clearly inadequate.

**Mitigation strategies need to be published for scrutinizing of effectiveness and demonstration of where they have been used elsewhere successfully** especially turtle ways and fishways. As past experience shows ineffective fishways can be in the \$millions, **the design needs to be costed accurately into the project costs.**

#### 4.4.4 Turtle Ramp

The EIS notes that the fish ladder is not appropriate for turtles, as has also been demonstrated in research studies (Burghuis and Broadfoot, 2004a; Burghuis and Broadfoot, 2004b), and suggests the “*idea*” that a turtle ramp may be a more suitable mitigation measure. As noted in the EIS, this idea is still in the “*conceptual planning stage*” has yet to be designed, developed, built or tested anywhere in the world. **It is absurd to think that such a bizarre idea could be considered to be an acceptable mitigation measure for listed-endangered species that have been shown to be severely negatively impacted by the operation of dams** (Limpus, Hodge and Limpus, 2007). The STMRCC strongly recommends that ramp details and effectiveness be included in the EIS for the following reasons:

- There is a highly likely risk that the dam will not be full enough for the turtle ramp to work based on evidence from the Paradise Dam and predicted climate change in stream flow for the Mary Catchment.
- It is unsatisfactory to suggest that these turtle ramps will be developed and untested when extinction of species is a high risk. The mitigation strategies need to be published for scrutinizing of effectiveness and demonstration of where they have been used elsewhere successfully, else the Precautionary Principle must apply.

- There are a number of places in the Mary and Burnett river systems that are barriers for turtle movement and these devices should be developed and tested on existing water infrastructures before suggesting building another dam or weir.
- **The proposed turtle ramp is of significant concern, given its “world first” status.** It is proposed to “mimic” a stream channel, “...designed and operated so that both turtles and fish species could use it.” (p.8-81). With a dam crest height of 36m above stream bed, it is questioned how a turtle ramp can be designed to mimic a stream channel. The only natural stream feature that is mimicked by a sharp rise in water elevations is a waterfall, and they are a well known barrier to faunal movements.
- Very preliminary design concepts can be located in Technical Supplementary Report 15. The only details regarding this mitigation strategy is within; Section 13 Turtle Passage Provisions (p. 52) and a few plans. The limited details provided indicate that it is proposed to have a conduit through the wall at an elevation of 75 m (4 metres above FSL). A plan is contained within this Report (Figure 2 in this report and Figure 229908 in EIS) provides a very basic concept design. Figure 1 (Figure 229901 in EIS) shows preliminary design concepts for the turtle ramp. From the impoundment side, the ramp is proposed to come in at an elevation of 60 m AHD then rise up to an elevation of 75 m at a grade of 1 in 4 to reach the conduit. The conduit appears to be 12.5 m through the wall. From the down stream side, the ramp is proposed to start at an elevation of 50m AHD then climb at a grade of 1 in 4 to an elevation of 62 m AHD, continue along for some 130 m then climb again at a grade of 1 in 4 to the conduit at the elevation of 75 m AHD. The distance required to reach the top of the ramp from within the impoundment will vary depending on storage depth. However, the distance to the top of the ramp from downstream is some 230 m.

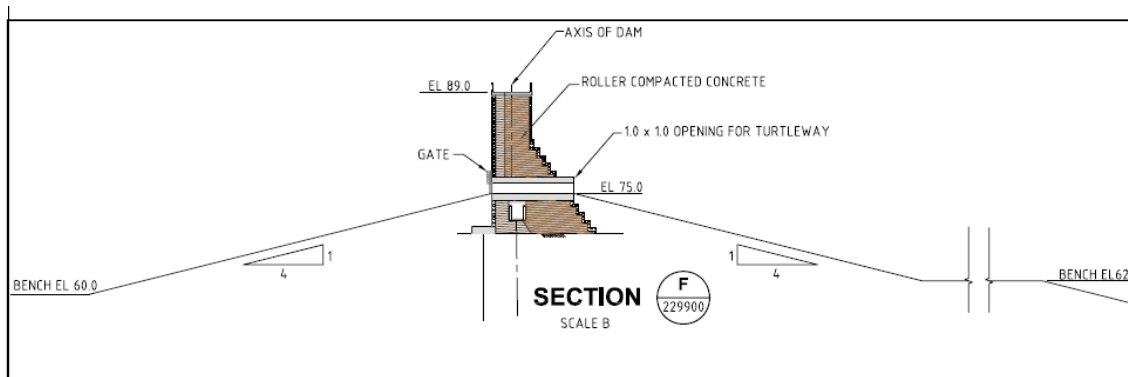


Figure 1 Design concept shown in Figure 229901 of Supplementary Technical Report 15

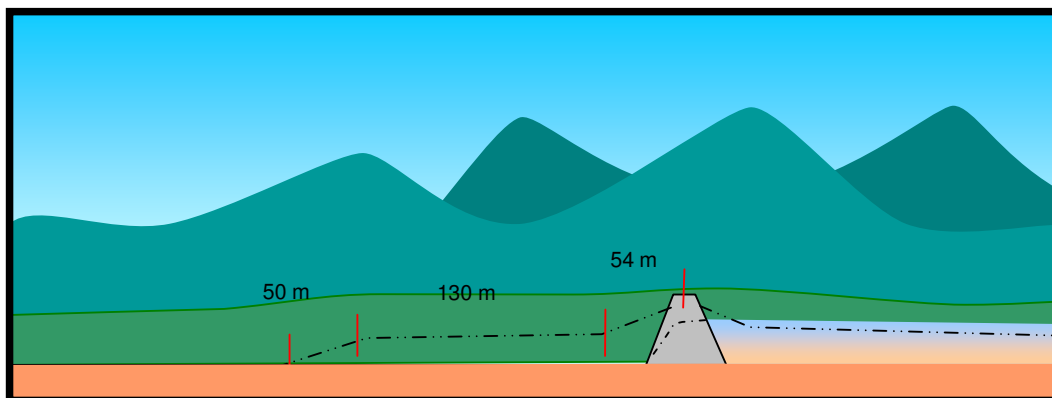


Figure 2 Design concept shown in Figure 229908 of Supplementary Technical Report 15

- The proposed ramp slope of 1 in 4 is considered very steep, and it is questioned what “*fish species*” could possibly utilise it, given the shortest distance at this gradient is some 54 m.
- It should be noted that a rough calculation of the gradient of stream beds of Yabba and Kandanga Creeks—from figures 7.3 and 7.4 of the Hydraulic Modelling summary report, (p. 37)—appear to show a gradient of 1 in 500.
- The slope of any proposed ramp will need to be intensively investigated, as flow velocity increases dramatically in relation to slope.
- Another significant issue to be addressed by such a proposed mitigation strategy is the influence the direction of flow will have on the orientation of said species. If we consider a turtle heading up stream; the turtle is encouraged to head up stream against water flowing down the ramp. When at the crest of the dam, the turtle will come across another stream flowing down hill (the ramp entering the storage). The chance of disorientation at this point is quite possible should the species orientation be influenced by direction of water flow.
- Even more confusing would be the case of a turtle in the storage looking to head up-stream. The mechanism for traversing the wall is likely to be a ramp with flowing water down it, thus mimicking an up-stream direction (when in fact it is heading in a down stream direction). Similarly, when the turtle reaches the top, it finds itself at the top of two downhill flows. This also raises the issue of down stream migrations, where down stream flows at the wall will be extremely hard to mimic.
- These flow direction factors are likely to affect fish species that are also encouraged to use this device.
- A further curious suggestion is of “*catch-and-carry*” turtles over the wall. The plan is apparently being for a team of people wait below the wall to catch turtles attempting to cross the barrier and carry them over to the other side. This idea may even be more ludicrous than the idea of a turtle ramp.
- The reliance on “*catch and carry*” and a “*captive breeding and rearing program*” as an insurance should the turtle ramp and fishway not work efficiently (as has been the experience with Paradise Dam’s fishway), highlights the potential for significant cost increases required to mitigate the impact of the dam on aquatic species. Furthermore, these “*insurances*” are not guaranteed in their success.

**Recommendations** Section 4.4.4

**The TCD project be rejected on the grounds that the proponent is unable to ensure that the listed Mary River Turtle, and other resident turtles, will not be negatively impacted by the project. The suggested mitigation method of a turtle ramp and catch-and-carry facilities are as yet undeveloped and unproven. They also need to be accurately costed into the project costs. The existing details of the turtle ramp appear to be totally impractical.**

## 4.5 Construction

### 4.5.1.1 Vegetation Clearing and Fauna Relocation

**Of grave concern is the management plan to reduce the impact of vegetation clearing on resident wildlife.** Of interest to this plan is that it is noted that vegetation clearing will be conducted so as not to disconnect patches of habitat that would limit movement of animals; that the bulk of the clearing will occur in a short time frame immediately prior to dam closure; that a fauna spotter/catcher will be present to safely catch and translocate wildlife during the vegetation clearing process; and that wildlife be allowed “*to move out of the disturbance area of their own volition*”.

If a bulldozer is working along a river bank or clearing a tract of land it is impossible not to disconnect patches of vegetation when all of the vegetation in front of the blades are destroyed. To try to keep all vegetation stands continuous is a “*pipe-dream*”, especially considering the bulk of the clearing will be conducted over a short timeframe so contractors are forced to rush and clear the area in the most efficient way by completely clearing the whole area then moving onto the next area.

It is unfeasible to consider that one fauna spotter/catcher, or even an army, will be able to catch even small numbers of wildlife that are displaced by bull-dozers and even more impractical to suggest that person could also move animals to safe areas. For example, if a tree contains a family of gliders they will scatter in all directions on impact. This is only considering one group of animals, what of the reptiles, young birds in nests, other mammals etc. Of further concern is that many wildlife species are territorial and it is out of the question to find enough empty territories in the local area to accommodate all of the displaced animals, especially considering the expanse of land that will be cleared.

To hope for wildlife to move out of the disturbance zone of “*their own volitation*” is especially laughable. As a bull-dozer approaches most animals will rush to their previously safe homes – the trees, scrubs, burrows in the ground etc. The plan sounds “*nice in theory but foolish in reality*”.

**Recommendations** Section 4.5.1.1

Of grave concern is the management plan to reduce the impact of vegetation clearing on resident wildlife. The suggested plan is clearly inadequate and should be rejected as a ‘silly pipe-dream’. That the proponent must develop a reasonable solution to protect wildlife during the vegetation clearing stage that will ensure the survival of the displaced wildlife.

#### 4.7 Decommissioning

It is noted in the EIS that “*the decommissioning date for the Project has not been determined at this stage and the likely date is too far in the future to allow effective planning for decommissioning to occur at present.*” (Page 4-59).

**Recommendations** Section 4.7

**Efficient lifespan of the dam must be predicted using sediment modelling for the catchment and this combined with decommissioning costs needs to be considered in the economic evaluation of the dam in considering comparison with alternatives.** Although this was noted in the Executive Summary of the Mary River Sediment Study Final (Appendix F 2.1 Page 1) it has been ignored in the EIS.

**An estimated total economic cost of decommissioning is crucial.** Due to safety, environment and economic reasons, there is an increase in dam decommissioning worldwide. Additionally, all dams must have time-bound licence periods. Re-licensing processes provide opportunities for participatory reviews of project performance and impacts which may lead to changes in project operation, or dam decommissioning.

Relevant quotes include:

- “Two previous sediment transport studies have been undertaken for the Mary River catchment using the CSIRO developed SedNet model to investigate sediment sources and transport processes. Comparison of the results from these studies (undertaken by NRW and CSIRO) indicates that the SedNet model is extremely sensitive to the input parameters. Neither of the previous SedNet investigations included consideration of the impact of the damming the Mary River.”

- “A spreadsheet model was developed for the current study to enable a preliminary evaluation of the potential sediment related impacts of the dam. This approach was used as it was not possible to develop a fully functioning SedNet model within the timeframes of this project. The current study utilises the SedNet approach to investigate catchment scale sediment budgets but does not investigate potential geomorphic or stream health impacts of changes to the sediment budget”.
- “It is recommended that a full SedNet model of the proposed TCD be undertaken to reduce the uncertainty around the load estimates provided by the spreadsheet model. The SedNet model would need to consider the input parameters from the two previous studies and select appropriate values relating to the current situation in the Mary River. This in itself would significantly reduce the uncertainty around the load estimates. Application of the model would also enable assessment of potential changes to bank erosion caused by the proposed dam, which was not possible using the spreadsheet model. The SedNet analysis would also need to be supported by a full geomorphic review to identify significant geomorphic changes which may be induced by the modified hydrologic regime and sediment balance. This review would also need to investigate the potential impacts associated with reduction of floodplain deposition (e.g. reduction in nutrient exchange between the rivers and floodplains).”
- Cost to decommission dam and rehabilitation provision for that cost should be set aside throughout the life of the dam (eg \$/ML surcharge).

### 4.13.3 Assessment of Current Project Components that Accommodate a Potential Stage 2

#### 4.13.3.1 World Heritage

The EIS states “*The assessment of impact on World Heritage values for the Project as proposed (both the construction and operational phases) concluded that a significant impact was not likely*” and “*As the parts relevant to Stage 2 relate only to the construction phase are a small proportion of the total Project, their potential for impact in their own right on World Heritage values is assessed as negligible*”. The STMRCG does not agree with the conclusion that significant impact is “*not likely*” for Stage 1, and “*that after assessment that risks were considered so low that mitigation measures were not proposed*”. **We believe that there will be significant impact from Stage 1 (and Stage 2 components in construction)** for the following reasons:

- Unacceptable high risk of a flood during construction causing increased sediment load in the river. Evidence is presented in section 9.6.1.1 that clearly shows that even minor floods like the one in Aug 2007 take sediments as far as Fraser Island beaches and seagrass beds.
- Figure 3 shows an analysis of 12m-flood-height-in-Gympie (moderate flood) events in the river (MRCCC, 2008). Many of the risks of adverse impacts associated with the construction of the project are closely associated with the risk of a flood event. In particular, activities associated with excavation of the flood plain below the level of the stream bed, dewatering and concrete construction in the resultant underground pit are particularly at risk from this sort of flood event.

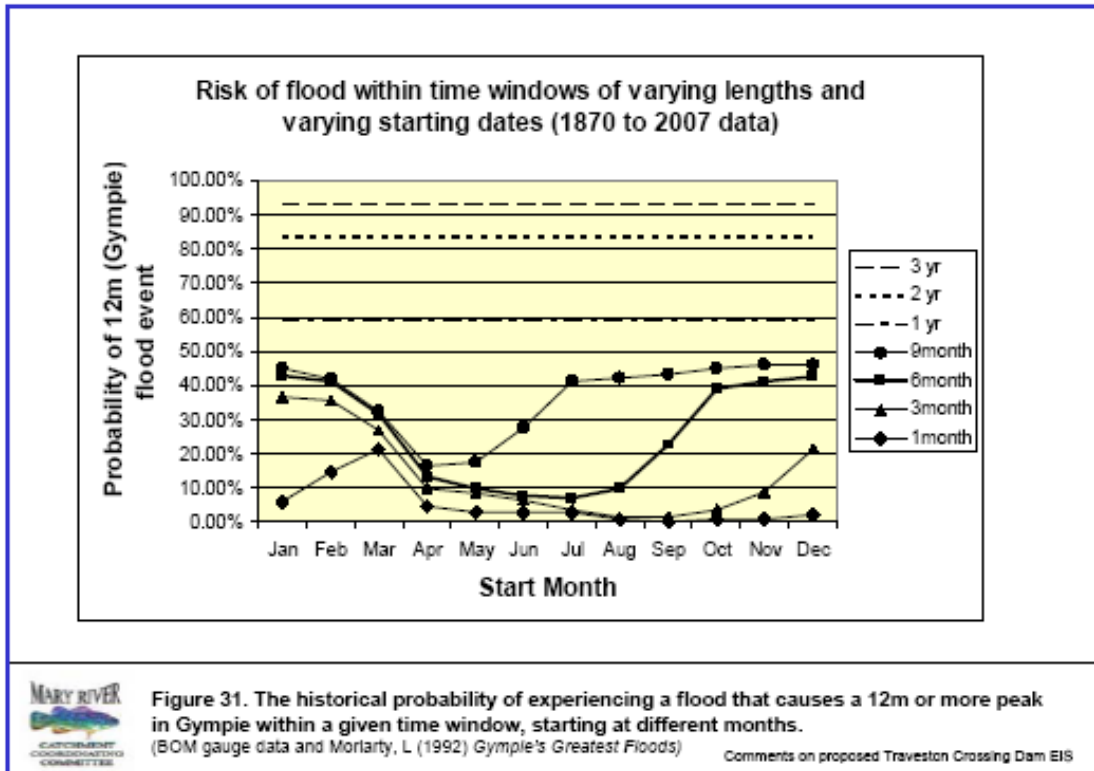


Figure 3 The historical probability of experiencing a flood that causes a 12m or more peak in Gympie within a given time window, starting at different months.

**Recommendation** Section 4.13.3.1

Evidence is present to show that the World Heritage area is highly likely to be negatively impacted by damming the Mary River. **A reassessment of the impact to World Heritage is required in light of the high risk of a flood during construction presented in this submission for both the Stage 1 and components of Stage 2.**

**4.13.3.2 RAMSAR Wetlands**

The EIS states “*The assessment of impact on the Great Sandy Strait RAMSAR Wetland for the Project as proposed (both the construction and operational phases) concluded that a significant impact was not likely*” and “*As the parts relevant to Stage 2 relate only to the construction phase are a small proportion of the total Project, their potential for impact in their own right on Great Sandy Strait RAMSAR Wetland is assessed as negligible*”. The STMRCG does not agree with the conclusion that “*the construction phase was assessed as not having any potential for significant impacts*”.

**We believe that there is likely to be significant impact from Stage 1 construction (and Stage 2 components in construction)** as there is unacceptable high risk of a flood during construction causing increased sediment load in the river. Evidence is presented in Section 9 of excessive sediment adversely affecting seagrass and dependent species such as dugong in the Great Sandy Strait RAMSAR Wetlands. This will also impact on Migratory species associated with the RAMSAR Wetlands.



**Recommendation**

Section 4.13.3.2

A reassessment of the impact to RAMSAR Wetlands and associated Migratory Species is required in light of the high risk of a flood during construction presented in this submission for both the Stage 1 and components of Stage 2.

**4.13.3.3 Listed Threatened Species and Communities**

The EIS states “*Three aquatic listed species could potentially be impacted by dam wall construction*” and “*The assessment of the Project determined that significant impact was unlikely because the footprint of the works and other activities was small, the species are mobile and mitigation strategies could be included that further reduced the potential for impact. As the Stage 2 components represent a small proportion of the total construction works and activities, the potential impacts attributable solely to them are assessed as negligible.*”

**The STMRCG does not agree with the conclusion that “significant impacts are unlikely”.** We believe that there is likely to be significant impact from Stage 1 construction (and Stage 2 components in construction) for the following reasons:

- Unacceptable high risk of a flood during construction causing increased sediment load in the river.
- Mary River Turtle nesting banks are at the proposed dam wall and depending on the timing may have laid their eggs.
- Lungfish are known to spawn in the shallow run sections in the vicinity of the proposed dam wall.
- Mary River Cod “hole” is located at the proposed dam wall.
- River flows and water quality during construction will be affected downstream.
- Analysis of bore water which is planned to be drawn down for construction shows unacceptable levels of nutrients that potentially will be discharged into the river during dewatering.

**Recommendation**

Section 4.13.3.3

There is a high risk of flood during construction and dewatering impacts. A reassessment of the **impact to Listed Threatened Species and Communities** is required in light of the **high risk of a flood to known presence of listed threatened species for both the Stage 1 and components of Stage 2.**

**4.13.6 Land Acquisition for the Possible Stage 2**

The EIS states that “*The possibility of a Stage 2 for TCD was made public as a consequence of the Queensland Government’s recognizing the need for transparent, long term planning for water supplies for the SEQ region*”. The EIS does not document the social and economic impacts that announcing the project in 2 stages has caused. **The STMRCG presents evidence that the process that this stage 1 and stage 2 has been a deliberate strategy to “divide and conquer” and the social and economic impacts have not been separately documented.**

- The social impact and associated costs that has resulted from this staged project has been unnecessary and the project should never have been suggested in that way. It has only worked in the favour of the Government buying land for a project that has not been approved and may never get approval.
- Many landholders within proposed stage 2 faced with long term lack of security have faced turmoil and pressure to sell up their land.

- There is also evidence from Figure 4 of properties being purchased outside the boundary of the Property Purchase Plan November 2006.

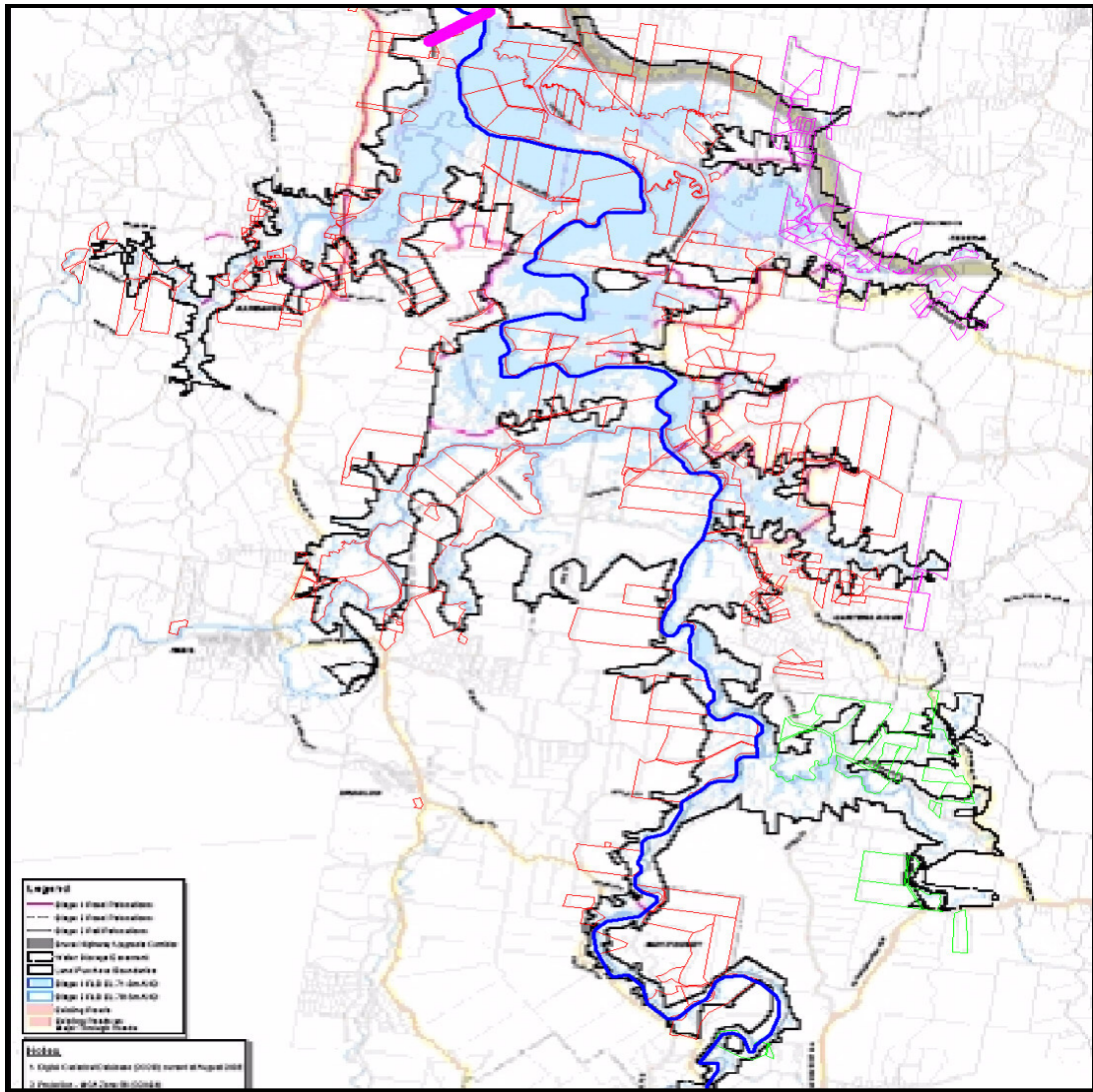


Figure 4 Property Purchase Plan November 2006

**Recommendation** Section 4.13.6

**Under the EPBC Act, the Minister must consider as well as the environmental impacts, the social and economic impacts of the project.** The social and economic impacts of announcing stage 2 and progressing parts of that stage in the stage 1 project must be separately documented. Justification for purchasing land outside the purchase plan boundary must be given in the EIS.

**4.13.7 Conclusions**

The EIS states that “QWI considers that the mitigation measures proposed for the Project in the EIS are likely to enhance the conservation of some nationally significant species substantially beyond that which would occur without the Project”.

**The STMRCG cannot find scientific evidence that supports this claim in the EIS and the evidence presented in this submission clearly shows that rather than enhancing, the project presents a real risk of extinction of a number of species.**

**Recommendation** Section 4.13.7

OWI claims that mitigation measures will likely enhance the conservation of MNES substantially beyond that which would occur without the project. Evidence is required to justify this claim and why the research centre shouldn't go ahead without the project.

#### **4.14.6 Natural Hazards and Extreme Weather Conditions**

There is no assessment for risk of landslips (see 5.4.3.1 for detailed Cooloola map)

##### **4.14.6.1 Earthquakes**

The EIS states, "The dam will be constructed in accordance with ANCOLD. Earthquake loading will not be a concern for the dam". However the STMRCG does not agree with that conclusion for the following reasons:

- The location of the dam wall shown on the Brisbane Region Earthquake Map (fig 4.35 page 4-90) shows the location of the dam wall at approximately 25° 58' South : 152° 18' East in an area where there have been no recorded earthquakes. However the location is wrongly shown. The actual planned location of the dam wall is at 26° 20' 24" South : 152°42' 57" East, approximately 60 kilometres South East and in close proximity to recorded earthquakes. (see map below)
- The Queensland Dam Safety Guidelines Checklist of Dam Technology Issues lists a "Failure impact assessment (including dam break analysis) and consequence assessment" as the first requirement in the checklist list of hydrological and hydraulic data and analyses to be conducted on a new dam. The glaring omission of the dam break analysis is unacceptable.

**Recommendation** Section 4.14.6.1

As required by the Queensland Dam Safety Guidelines, a failure impact assessment (including dam break analysis) must be conducted for the proposed TCD and included in the EIS. Impacts of earthquakes must be considered as corrected location on Fig 4.25(p 4-90) puts the proposed dam in close proximity to recorded earthquakes.

##### **4.14.6.2 Flooding**

The EIS states a number of examples of flooding with the "*largest flood peak recorded at Gympie was in 1893, where a peak height of 25.45 m was reached*". However the STMRCG is aware of evidence in historical records that there have been higher floods than the 1893 flood in Gympie and there has been massive land clearing in the catchment since the 1800's that would increase surface runoff.

- There is concern in the community that flood studies do not support local knowledge and that there is a large risk of flooding extending higher than the EIS predicts and that the risk of overtopping the dam wall is higher than has been claimed in the EIS.
- **There is no dam failure impact assessment presented in the EIS.** This is a requirement of the Qld Dam Safety Guidelines and given the EIS terms of reference all risks and hazards are required to be identified.



*Recommendation* Section 4.14.6.2

**Significant errors in the flood modelling have been identified. Three dimensional flood modelling needs to be carried** out with corrections for a number of mislabelled tributaries to reassess the flooding predictions and a dam failure impact assessment is required.

## Chapter 5 Land

### 5.3.1.2 Geomorphic features of the Mary River

Barrage backwater zone

**There are a number of inaccurate comments about the “barrage backwater zone” in the EIS.**

- No riffles are recorded in the backwater barrage zone (Table 5.16) and this zone is shown on figure 5.21 as extending almost to the location of the Home Park Gauging station. However there is at least two riffles located in the “barrage backwater zone” and these are associated with the Mary River Turtle nesting banks which are protected by Tiaro Landcare for the last six years.
- In Table 5.17, the 2007 assessment of instability of banks in the “backwater barrage zone” is recorded as low and the susceptibility to erosion as moderate. This differs from the experience of local land owners who have recorded ongoing significant erosion of their land since the barrage was put in place due to a combination of the dispersive soil type, wash created by boats, flood events and widely fluctuating barrage levels. These bank slumps occur even where banks have good riparian vegetation and where stock is fenced off.
- There are few monitoring points downstream of the proposed dam wall and it is questionable whether the methodology used to assess stream health has included sufficient sampling to provide a representative picture of the river. The failure to detect the riffles upstream of the barrage provides an indication that it is inaccurate. Also, monitoring point number 222, the only point in the “barrage backwater zone” is located in close proximity to small creek, which enters the Mary River from the west. We question whether this sampling point is representative of the area given it’s proximity to a creek
- With respect to habitat, the EIS states, “Within the backwater, most hydraulic features have been submerged, with the zone consisting of one long pool. However, near Tiaro, a range of bars, rock outcrops and riffles were observed indicating that these features would likely exist within the zone.” Therefore the text acknowledges the presence of these habitats and yet the Tables given in this section indicate that all habitats other than pools have been lost. This is misleading and enables the assumption to be made that this section of the river has low habitat value, however the Mary River Turtle has at least two significant nesting sites, which have been used by the species for at least 30 years and are still in use in 2007.

Estuarine Zone.

“Brizga (2003) found no evidence linking tidal barrage construction and estuarine aggradation for the Mary River, although sand and gravel extraction has occurred from the estuarine area.” This finding is directly contradicted by local knowledge of the river

- For example, the Titmarsh family has operated their Tandora farm at River heads for 100 years and they have observed the siltation of the mouth of the river which has accelerated since the barrage was built. At low tide there used to be sufficient water at the mouth for professional fisherman to net barramundi (ie 12-14ft of water), and now the majority of the breadth of the river is a sandbank at low tide. Maryborough is a designated port and the increasing frequency of dredging required to maintain a channel sufficient for boat passage is of great concern to the Maryborough Council given their investment in development of marinas and boat building and servicing enterprises.

*Recommendation* Section 5.3.1.2

That the geomorphology of the **backwater barrage section** and the estuarine section of the river be revisited to incorporate local knowledge and historical records of the river, particularly the river mouth.

### 5.3.1.4 Key Processes of the Estuary and Marine Zone

The EIS states, “The sediments deposited in the northern part of the Great Sandy Strait and northwards towards the Kolan River are supplied from fluvial, continental shelf and shoreline sediments (BPA 1989).” However sediments from the Mary River are supplied to the Great Sandy Strait and transported northwards by strong tidal currents. They dominate the sediments between the mouth of the Mary River and Point Vernon

### 5.3.2 Potential Impacts and Mitigation Measures

- The sediment modelling was is not a full model but a spreadsheet analysis, as according to Earth Tech consultants who undertook the sediment modelling, there was insufficient time available to develop a complete SedNET model. (Appendix F2.1). Therefore this section of the EIS is very misleading as it creates the impression that the data is sound when it is only a spreadsheet analysis, a desktop study and a preliminary assessment not taking into account the changes in flow in the river. This section of the EIS must be revisited in light of a more accurate model and a sensitivity analysis performed to show variation in the outcomes of the model based on variation in input parameters (sensitivity of SedNET models to these parameters has been highlighted in the EIS itself in Chapter 5 and in Appendix F2.1)
- The EIS states, “Within the Gympie, Barrage Backwater and Estuarine Zones, the dam is likely to have negligible impacts on navigation capabilities within Mary River. This is because under existing conditions, the Mary River Barrage already provides a substantial barrier to navigation. Sections of the Mary River above the barrage also currently become unnavigable by recreational fishing craft during low flows. This trend will continue.”
- In the assessment they have not considered changes to the geomorphologically profile of the mouth of the river and the impacts of this on the accessibility of the river to commercial fisherman, pleasure craft and craft associated with the Maryborough port.
  - Despite the suggestion in the EIS that there are very long time frames between changes on sediment loads and the coast, the mouth of the estuary has already been restricted by excessive sedimentation within the last 25 years.
  - Local people who depend on the river for their livelihood and have known the river all their life say that sedimentation has increased, particularly since the barrage was installed.
  - This indicates that the situation of sediment loads and flows and their interaction is very complex.
  - If the barrage is holding back sediments as suggested in the EIS, why is there currently increasing sedimentation at the mouth?
  - Also what role do the floods of various sizes play in removing this sediment and how would changes in the frequency and size of floods which the dam would cause impact on the river mouth and sediment downstream? These questions are not answered in the EIS and are beyond the scope of the preliminary spreadsheet prepared from a desktop study which has been used to predict sediment loads.
- Another significant omission from this aspect of the EIS is consideration of the contribution of sediment through increased erosion downstream of the dam. EarthTech explain in Appendix F1.2 that this has to been addressed and represents a significant area of uncertainty. It is also a significant area of uncertainty for local people whose land, and in many cases effort and investment to protect and rehabilitate riparian zones stands to be eroded both in the freshwater and estuarine sections of the river.

- The EIS suggests “However, considering other estuarine flow and sediment influences and variability, **it seems unlikely** that the processes of formation of banks and bars, and the distribution of size fractions would change significantly over the expected life of the dam or beyond.”
  - Basing conclusions of no impact on a statement such as “it seems unlikely” is not good enough for an analysis, which is used to determine impacts on RAMSAR wetlands, World Heritage areas and the endangered and vulnerable species, which depend on these.
- The potential impacts on change in sediment loads on Hervey Bay have not been addressed. Hervey Bay’s beaches are directly connected to the sediments of the Mary River as is illustrated by the figures in the EIS show and research on the beaches of Hervey Bay shows (BPA, 1989). It is suggested in the EIS that in the short term tidal and wave process are more important, but what about the medium and long term? There has been no analysis of impacts of Hervey Bay beaches and for that matter, the possible economic implications to Hervey City Council if they need to institute public works to retain sand, or replenish beaches as a consequence of the Traveston Crossing Dam.
- Assoc Prof Jurek Piorewicz, Faculty of Sciences, Engineering and Health, Central Queensland University, has done numerous reports on the movement of sediments in the vicinity of Hervey Bay. He recommends that a numerical model based on field sedimentation data is needed to understand what the impacts of changes in sediment flows will be on the dynamic stability of Hervey Bay beaches and the coastline of Great Sandy Strait. In the absence of such a model, impacts are difficult to quantify, but he suggests that because Hervey Bay beaches have a limited supply of sand a negative impact on beaches of Hervey Bay is likely and that further study should be undertaken (Assoc. Prof Piorewicz, pers comm., 21 Nov 2007).

*Recommendation*      Section 5.3.2

Sediment transport and geomorphology investigations have not included impacts on Hervey Bay and it’s beaches.

The methodology used to assess the sediment processes and impacts on river geomorphology are preliminary in nature and inadequate to support a conclusion that there are minimal downstream impacts.

A failure to consider potential impacts of changes in streambank and riverbed erosion introduces significant error in the calculations. More detailed field study, modelling and engagement with local people who know the river first hand is required to establish impacts of changes in sediment loading.

### 5.4.3.1 Construction Related Impacts

#### Erosion – Potential Impacts

There is no mention of landslips in this section or any other apart from mention of a risk in the left side embankment of the downstream option for the dam wall. However the Cooloola Shire Council Natural Hazard Map 2005 (Figure 5) shows a number of areas within the study area identified as very high erosion hazard areas (prone to landslip) particularly Mt Tuckekoi. There is antedotal evidence that some indigenous burial caves are present on Mt Tuckekoi and have been covered over by a landslip. The STMRCG is particularly concerned that a road is being planned on Mt Tuckekoi, that it may be used for quarrying and it is a identified as high risk erosion hazard.

**Recommendation** Section 5.4.3.1

Currently the Cooloola Shire Council Natural Hazard Map for Erosion is not referenced for identifying erosion hazards in the project area. Mt Tuchekoi is identified as one of the many very high erosion hazard areas (prone to landslip) where a road and may be a quarry is being contemplated. **This map should be referenced for information in assessing for erosion.**



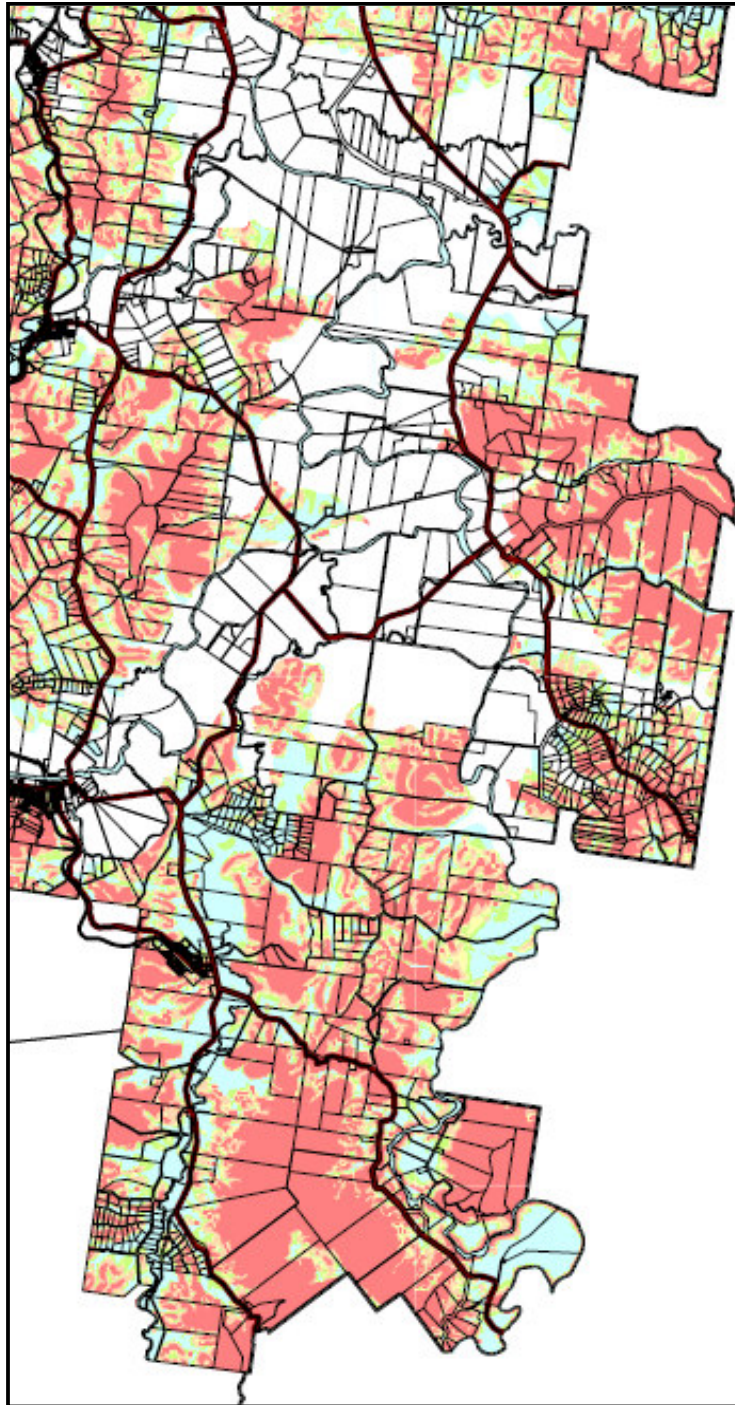
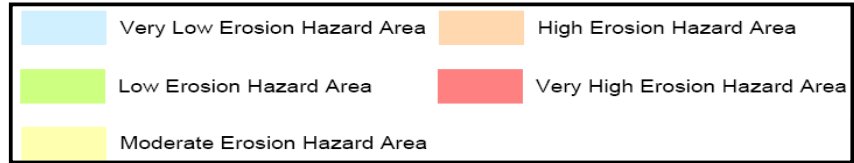


Figure 5 Cooloolo Shire Council Natural Hazard Map 2005

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## *Chapter 6 Water Resources and Water Quality*

### **6.1 Hydrology**

#### **6.1.1.1 Historic Rainfall and Evaporation**

It was very surprising to see a rainfall station from the Brisbane River catchment (Crohamhurst) being used to represent rainfall patterns in the Mary Catchment in EIS Figure 6.1. **A factual error like this in the very first piece of technical information presented in the section on water resources does not engender confidence that the information in this section was prepared by people with a thorough knowledge of the catchment.**

#### **6.1.1.2 Surface Water Flow Patterns**

**A number of factual and careless errors in this section continue to support the impression that the section on water resources was not adequately checked by people with a thorough knowledge of the surface water patterns in the catchment for the following reasons:**

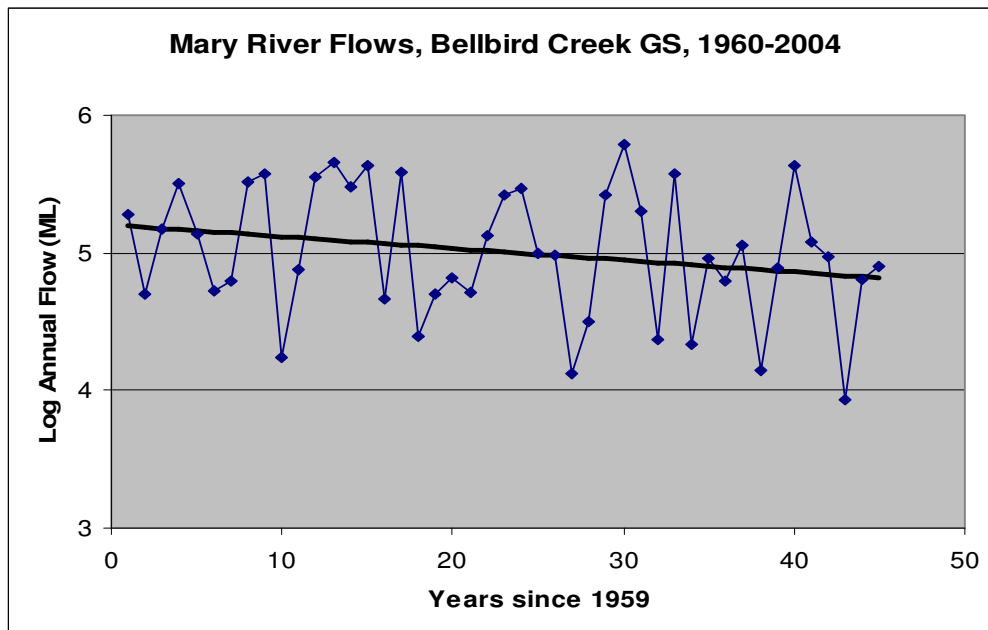
- EIS Figure 6-6 erroneously shows CooonoonGibber Creek as two different creeks, (Cooonoon Creek and Gibber Creek), and shows a 1:100 flood line that underestimates the extent of floods within living memory by more than a kilometre in some places (eg. along CooonoonGibber Creek).
- Perhaps the most distinctive feature of the surface water flow patterns in the Mary River is the extreme variability of flow rate, water depth, water quality and sediment transport. This is not adequately portrayed in the EIS, yet it is fundamental to understanding the water resource and the environmental impacts of water infrastructure development in the Mary River. A simple mathematical analysis of the flow duration curve presented in EIS Figure 6.8 (based on the data in report 17) shows that more than half the entire flow in the river between 1890 and 2007 was delivered in the top one fiftieth of the days. Most of the time the river is a relatively shallow, low-flow river, and occasionally it is an extraordinarily high flow, deep river. The mean statistics of the river in terms of flow, depth and water quality do not adequately represent either of these two states. Most of the environmental impacts in the river are determined by events at the extremes of the flow regime, and the EIS does not adequately investigate environmental impacts at these extremes of flow.
- EIS Table 6.3 does not make any sense as it stands, because the proponent miscopied flow figures from EIS Table 6.2. The true values for this analysis are shown in the table below. The important fact from this analysis is that mean annual flows over the last 7 years at the dam site have been **60% less** than those used in the Mary Basin Water Resource Plan. The figure of a 4% reduction in mean annual flows as a result of the extended simulation period needs to be put into context. If the river stopped flowing altogether for 7 years continuously, the long term mean annual flow would only be reduced by 6%.

|                    |     | Mean Annual Flow (ML) |                            |             |                            |             |
|--------------------|-----|-----------------------|----------------------------|-------------|----------------------------|-------------|
| AMTD               |     | WRP Simulation Period | Extended Simulation Period |             | Post WRP Simulation Period |             |
| Location           | km  | 1890- 1999            | 1890 -2007                 | % reduction | 1999-2007                  | % reduction |
| Yabba              | -10 | 157000                | 152000                     | 3%          | 74143                      | 53%         |
| Dam Site           | 205 | <b>606000#</b>        | 584000                     | 4%          | 241429                     | 60%         |
| Fisherman's Pocket | 170 | <b>909000</b>         | 879000                     | 3%          | 411857                     | 55%         |
| Home Park          | 89  | <b>1643000</b>        | 1583000                    | 4%          | 648714                     | 61%         |
| Estuary            | 0   | <b>2355000</b>        | 2273000                    | 3%          | 996143                     | 58%         |

#Correct figures sourced from Fig 6.2 in the EIS

**Corrected calculation of reduction of streamflows in the extended simulation period (Table 6.3 in EIS)**

- Merely incorporating the last 7 years data into the long term flow duration analysis in EIS Figure 6.8 (below) does not in any way address the issue of climate change. In fact it implicitly assumes no climate change over the past record and no climate change into the future when using these data to evaluate the performance and likely future impacts of the proposal.
- The last 40 years have seen a very significant decrease in stream flow in the catchment, as illustrated in the figure below. This important aspect of surface water flow patterns is not described at all in the EIS. Between 1959 and 2004, expected annual stream flow in the upper Mary (upstream of the impacts of Borumba and Baroon Pocket dams) decreased by 58%. Whether this trend will continue is unknown, but it is in accordance with current predictions for the impact of climate change on stream flow.



- Throughout the EIS, no account is taken at all of the likely effects of a reduced average stream flow accompanied by increased variability and increased drought that is predicted to occur with climate change in SEQ on water resources, aquatic habitats, agricultural production and biodiversity in the Mary Catchment. This is a major failing of the EIS and is in direct conflict

with both State and Federal Government policies, most notably the National Action Plans for Climate Change and Biodiversity and Climate Change and Agriculture.

**Recommendation**

Section 6.1.1.2

**The EIS needs to investigate the likely effects of climate change on water resources, aquatic habitats, agricultural production and biodiversity in the Mary Catchment to comply with current State and Federal climate change policies. Additionally, the EIS needs to look at the impact of climate change on the impacts of extreme events, rather than on long-term averages.**

**6.1.1.3 Flooding**

(also refer to comments in 4.14.6.2 and 6.1.2.4)

The STMRCG has no confidence in the flood modelling for the following reasons:

- EIS Table 6.4 (below) illustrates an immediately obvious problem with the flood modelling in the upstream areas, when compared to the data presented in Table 6.6. Because the proponent has used different reference heights in these two tables it is difficult to compare the information across the two tables. The figures from tables 6.4 and 6.6 are presented against the same datum (AHD) in the table below. There are three recent flood events presented by the proponent, which exceed the proponent’s estimated 1:100 flood height at the Imbil Town Bridge.

|                                                                                                              |               |               |               |           |                 |
|--------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------|-----------|-----------------|
| Recorded flood heights at Imbil Town Bridge compared to the pre-dam 1:100 flood height presented in the EIS: |               |               |               |           |                 |
|                                                                                                              | <b>Mar-55</b> | <b>Jan-74</b> | <b>Feb-99</b> | <b>GZ</b> | <b>1:100AEP</b> |
| <b>Gauge height (m)</b>                                                                                      | 11.73         | 9.75          | 10.7          | 75.915    |                 |
| <b>Elevation (AHD)</b>                                                                                       | 87.645        | 85.665        | 86.615        |           | 85.4            |

Following many expressions of community concern about the flood modelling predictions presented in the EIS, the Save The Mary River Coordinating Group conducted a detailed technical investigation into these concerns and we ask the Coordinator-General to consider the information presented in that report (Appendix 4). The flood impacts presented in the EIS are certainly at odds with the expectations and the observations of the local community, particularly in the vicinity of Imbil.

**Recommendation**

Section 6.1.1.3

There are significant errors in the flood modelling presented in the EIS. The flood modelling under-estimates the area that will be flooded upstream and over-estimates the downstream flood mitigation. It also under-estimates the risk of the dam overtopping during high flow events particularly if there is a blockage at the spillway. **It is recommended the flood modelling be redone taking in the account the evidence presented in Appendix 4.**

**Water Resource Development**

The impacts of existing water resource development are not adequately described in this section for the following reasons:

- Adding up the length of stream impounded by existing storages does not effectively represent the impact of these storages on the catchment. Except for Borumba Dam, the major storages affecting the Mary River upstream and downstream of the proposed dam site (i.e. Baroon Pocket, Lake Macdonald and the Barrage) do not deliver their yields via the stream channel.
- When full water allocations are taken from these storages, the stream reaches directly downstream suffer from greatly altered flow regimes, both in terms of flow patterns and total

amounts of flow. The greatest impact of this is felt in Obi Obi Creek, where the studies undertaken for the water resource plan indicate that taking the full allocation from this storage would reduce the size of the 1.5 year ARI flow events to less than 7% of the predevelopment state. This type of downstream impact of the existing storages in the catchment is not described at all in this section of the EIS.

*Recommendation Section 6.1.1.4*

Impacts of existing water resource development are not adequately described by adding up the lengths of impoundment. **Baroon Pocket, Lake Macdonald and the Barrage deliver only small amounts of their yields via the stream channel and stream flows downstream have been significantly impacted.** This impact needs to be described to be able to assess cumulative impacts in the catchment and to assess efficiency of mitigation strategies used in the past.

### 6.1.1.5 Water Resource Plan

The EIS is based on a flawed Water Resource Plan and this section further distorts the WRP as follows:

- This section does not describe the lack of community acceptance of the Mary Basin Water Resource Plan, particularly with regard to making a strategic reserve of 150 GL/year available for out-of-basin transfer. This is evident from the entire Community Reference Panel appointed to the plan withdrawing their support for the plan prior to it becoming enacted.
- This section of the EIS also absolutely misrepresents the Environmental Flow Objectives (EFO's) in the plan as 'should' and 'must'. The word 'should' does not appear in schedule 6 of the legislation for the WRP anywhere. To the contrary, the legislation specifies that the objective is to "**minimize the extent to which predicted flow statistics fall outside the values specified in schedule 6**".
  - The reason for this was that it became obvious during the formulation of the plan that if all existing allocations from the river were fully utilized, the state of the river would not comply with the desired flow regime. The legislation was drafted with that particular wording to encourage the return of the river from its currently over allocated state to a more environmentally sustainable pattern of extraction.
  - It does not, as implied by this section of the EIS, mean that these objectives can simply be ignored. The intent of the very specific wording in the legislation is to force any future changes in resource allocation in the river to move towards compliance with these objectives, rather than making future extractions that push the river further away from compliance.
  - It is very clear from the data presented by the proponent in tables 6.37, 6.38 and 6.39 that even the first stage of the proposed Traveston Crossing Dam will push the river further outside the bounds of compliance with a number of the flow objectives in the Water Resource Plan.
  - This is important with respect to the Queensland Government's commitment to the NWI, which has the clear intent of reducing the extent of environmentally unsustainable water allocations across the country.

**Recommendation**

Section 6.1.1.5

The Water Resource Plan for the Mary Basin is flawed and compliance to the Environmental Flow Objectives has also been misinterpreted through the use of “should” instead of “must”. The STMRCG requests that the Coordinator-General clarify the legal status of the environmental flow objectives in the schedule 6 of the Mary Basin Water Resource Plan, and confirm that there are no ‘should’ objectives at all in that legislation, as misleadingly implied by the proponent in the EIS. We also request that the Coordinator-General investigate the history of the water resource plan and the response of the Community Reference Panel. The Environmental Flow Objectives section needs to be rewritten taking into account the interpretation of “compliance”.

**6.1.2 Potential Impacts and Mitigation Measures**

**6.1.2.1 Construction**

The EIS states, “All construction activities will be scheduled in such a way that the impacts of flooding on the construction of the dam will be minimised. If a flood occurs during construction, there is a risk of damage to the partially built embankment, depending on the size of the flood. The critical stage of construction is the final stage where the spillway diversion is closed off. This stage will be undertaken during the driest part of the year and is likely to take four to six months”.

**Reviewing the flooding history in the Mary Valley, the STMRCG believes there is a high risk in flooding during critical times in the construction** for the following reasons:

- Historically, the Mary has experienced floods regarded as moderate or greater in every month of the year other than September (MRCCC, 2008). The graph below shows this data:

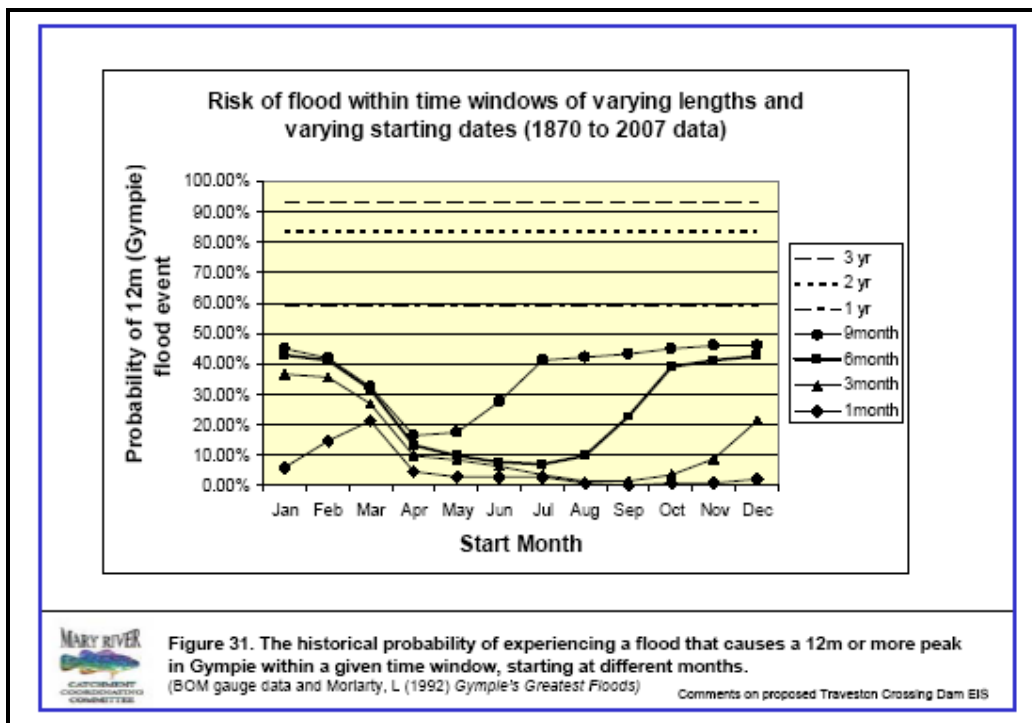


Figure 31. The historical probability of experiencing a flood that causes a 12m or more peak in Gympie within a given time window, starting at different months. (BOM gauge data and Morlarty, L (1992) Gympie's Greatest Floods) Comments on proposed Traveston Crossing Dam EIS

- This poses a huge environmental, economic and safety risk during the construction phase of the project. If this project was to proceed as outlined in the EIS, construction would involve trying

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to make an enormous excavation in the floodplain, (below the level of the stream bed) and keeping it safely dewatered for long enough to construct the largely subterranean structure of the Roller Compacted Concrete (RCC) section of the dam wall. The consequences of a flood flow event across the floodplain during this time would be catastrophic, both in terms of damage and losses in the pit itself and from the damage which would result from the loss of stockpiled materials downstream.

### 6.1.2.2 Effect of Climatic Extremes

The EIS states, “*Current climate science cannot predict climate variability and future rainfall with any degree of certainty at the scale required for use in the IQQM simulation. Due to this uncertainty, an explicit consideration of future rainfall patterns was not applied to the derivation of the yield for the dam*”. It also suggests that because the proponent was able to simulate the operation of the storage with a 70 GL/annum yield throughout previously experienced dry periods that this demonstrates the dam would be able to perform in an environmentally sustainable manner under potential modified rainfall scenarios. The STMRCG believes that this is not the case for the following reasons:

- Apart from the fact that this approach does not demonstrate a capacity to operate under conditions outside the range already experienced, to allow the model of the storage to yield 70 GL through the recent period of low flows the proponent had to make the following modelling assumptions and adjustments.
  - Evaporation and seepage losses remain unchanged from the minimal losses outlined in EIS Section 6.1.2.3.
  - The environmental flow requirement for Gympie (80 ML/day) that was built into the IQQM modelling of the catchment for the Water Resource Plan is removed.
  - The environmental flow objectives shaded in green in tables 6.36, 6.37 and 6.38 of the EIS will not be met. (To meet these objectives would require specific environmental flow releases from the storage- thus reducing the yield)
  - The storage could be drawn down below 10% of full supply capacity without compromising water quality in the storage and without causing environmental damage (eg fish and turtle kills of protected species) in and downstream of the storage.
  - No flushing flows (as modelled for the determination of the strategic reserve in the water resource plan) are released.
  - Irrigation releases fall well below allocation. (eg. total downstream flow released in the proponents modelled scenario for the 2006/2007 water year was less than 18 GL yet total allocations in the Sunwater IROL (2005) for the Mary Valley water supply scheme from the Yabba Ck confluence to upstream limit of the barrage, including Gympie’s TWS allocation but excluding Noosa Shire’s allocations are around 21.5 GL/annum.).
- Additionally, the IQQM model of the Mary River simulates seepage and evaporation losses in the river channel via a series of loss nodes in each reach of the river that are empirically calibrated against observed data. The purely numerical adjustment of these loss nodes to fit observed flow data crudely reflects a particular set of groundwater/surface water interactions along the river and floodplain.
  - The proposed dam is likely to drastically alter the surface water/groundwater interactions in the vicinity of the impounded area and in the reach immediately downstream, because of the physical sealing off of the alluvial and sub artesian aquifers under the dam wall, and because of the drastically altered and reduced pattern of surface water flows downstream.

- Both of these changes suggest that a higher proportion of the water released from the storage would be lost to downstream seepage than what is modelled by the proponent – because the downstream loss nodes in the model have not been calibrated for the changes to the surface water/groundwater regimes that are likely to result from the construction and operation of the new dam.
- The EIS states, “*CSIRO (2005) projects changes in average annual rainfall across most of Queensland, including the Mary River catchment, of between -13% and +7%.*” Considering this information, a prudent yield of 70,000ML/yr has been adopted for the dam to ensure that the dam will perform under potential modified rainfall scenarios. This includes the ability to provide environmental flows and maintain the security of existing water entitlements downstream (p6-26.)
  - There is no evidence that such modelling has been conducted and is not in the Reference section 19. Given that the EIS states that modelling is based on the WRP simulation, which doesn’t include climate change impacts, this appears to be incorrect statement.
  - According to the Queensland Government’s submission to the Senate Inquiry in Traveston Crossing Dam early in 2007 pg 88:
    - a. 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 downscaling work reveals longer embedded dry periods.
    - b. The approach of the Queensland Government to the CSIRO’s predictions was to crudely add 10% to required yields(Queensland Government 2007). This choice was not justified or validated.

**Recommendation** Section 6.1.2.2

The climatic extremes have not adequately been modelled with IQQM. The proponent should use the existing IQQM model of the proposed dam to recalculate what the performance of the storage would have been over the last 10 years if it was required to:

1. Maintain an environmental flow node with a demand of 80ML/day at Gympie (as outlined in the formulation of the WRP);
2. Provide full compliance with all the downstream environmental flow objectives outlined in schedule 6 the Mary Basin WRP (by making the necessary environmental flow releases);
3. Pass one flushing flow event of 10GL to 20GL/day per water year (at an appropriate time);
4. Release enough water to provide 100% of all downstream allocations.

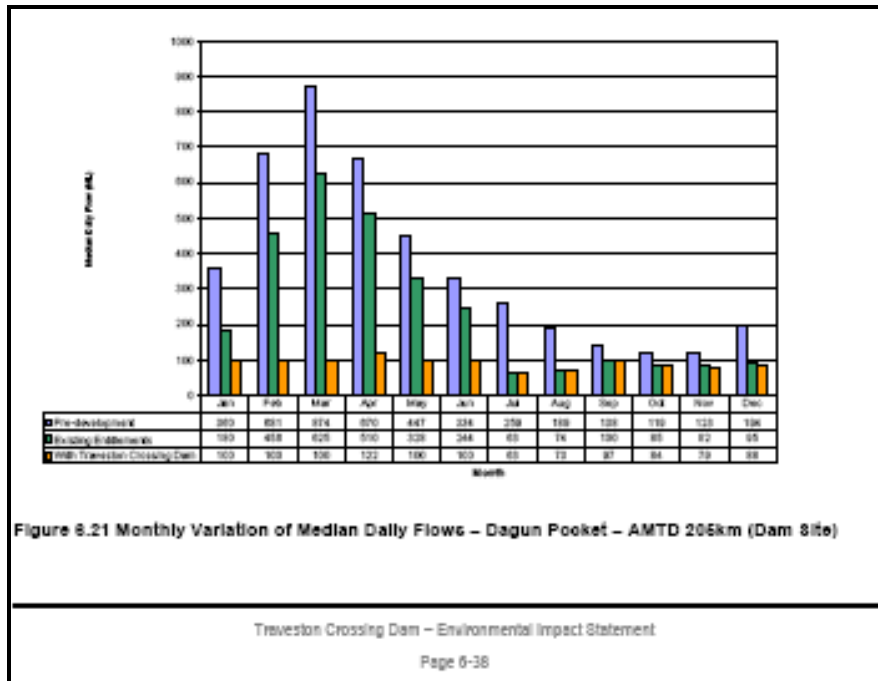
An additional sensitivity analysis should then be applied which investigates the impact of increased evaporation and seepage, (to allow a prudent margin of error in these assumptions) and a decrease of up to 16% decline in stream flow.



### 6.1.2.3 Surface Flow Patterns

Notwithstanding the concerns about the assumptions inherent in the IQQM modelling expressed above, it does constitute the proponent's best efforts at quantifying the likely impacts of the proposal on the surface water hydrology of the river. The MRCCC has published an in-depth analysis of the proponent's flow predictions presented in the EIS (MRCCC, 2008) and the Save The Mary Coordinating Group urges the Coordinator General to closely consider the implications of the 31 detailed hydrological analyses included in that report. Here are some key points relevant to the impacts from damming the Mary River:

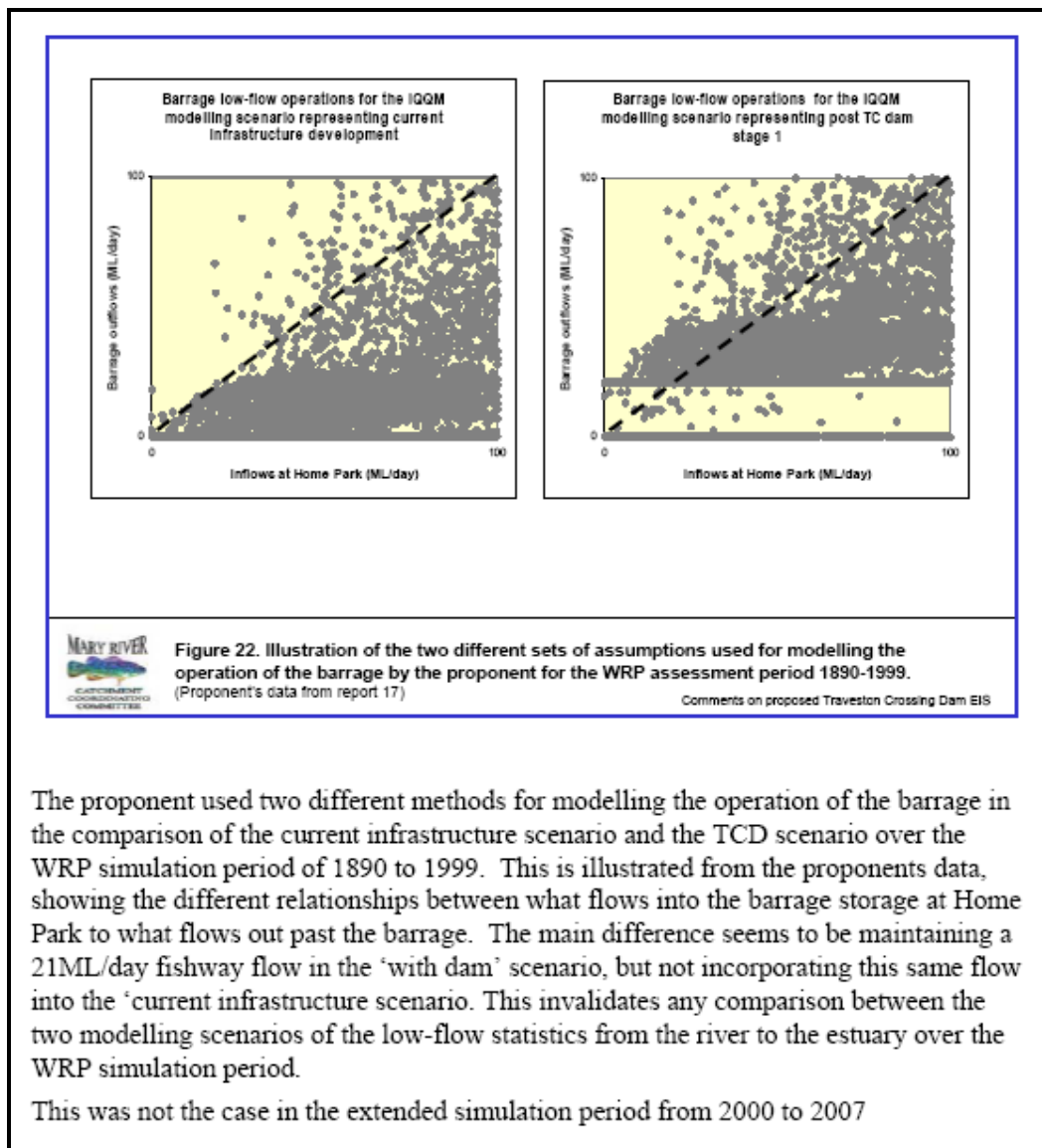
- Even the simple summary analyses of the simulated flows presented by the proponent in the EIS paint a disturbing picture for the fate of the river if this project is allowed to proceed.
- The greatest impact is shown at Dagon Pocket, as illustrated in the EIS Section 6 figures 6.20 and 6.21. Figure 6.21 (below) shows the impact on median, or typical flows in the river. This graph could be interpreted representing the sorts of daily flows that occur at different times of the year in the absence of large flood events.



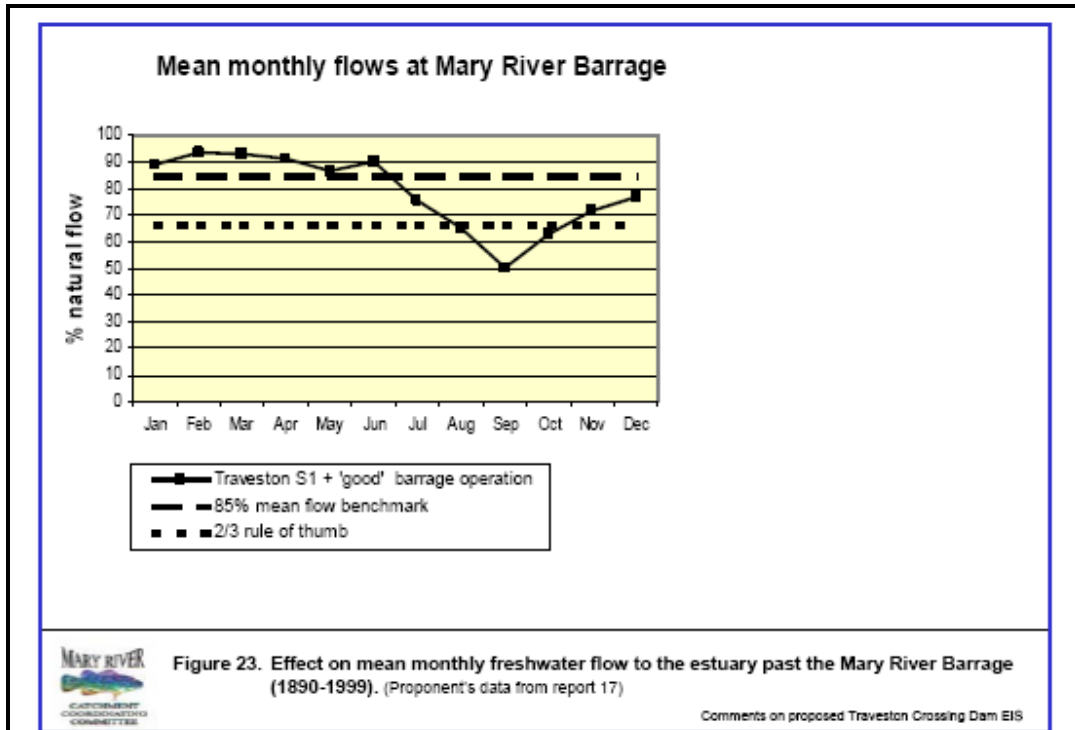
- The median flows in the river at the moment (Jan 2008) fall somewhere between the blue and green bars on EIS Figure 6.21 and the dam is predicted to reduce these flows to the levels shown in orange. This represents an enormous change to the flow regime in the reach downstream of the dam, which is currently a recognized stronghold for the iconic aquatic EPBC listed species (cod, turtles and lungfish) in the river.
- If the suitable aquatic habitat of this crucial connecting reach of the river is effectively destroyed by the project, none of the biopassage mitigation measures proposed for the dam wall, such as turtle ramps, turtle pipes through the RCC wall, fishlocks, 'catch and carry'!! etc. could be effective at all, because the many kilometre-long stretch of inhospitable habitat between the dam site and the mouth of Amamoor Creek (at least) itself forms a barrier to species movement.

- In addition to general habitat, that downstream stretch of the river provides very good specialized breeding habitat for lungfish (DEW SPRAT database), well-documented deep-hole habitat for Mary River Cod (Mary River and Tributaries Rehabilitation Plan), excellent breeding habitat for the White-Faced Snapping Turtle (AFTRA pers comm..) and the best breeding grounds for Mary River Turtle between the proposed dam site and Gympie (Ecotone report to the EIS).
  - There are no tributary inflows in this stretch of the river to attenuate the adverse flow impacts of the dam as suggested by the proponent.
  - These crucial habitats and breeding sites will experience the full effects of the drastically altered flow, water quality, and sediment regime induced by the construction and operation of the proposed dam.
- As outlined in the MRCCC (2008), the proponent's own flow modelling data clearly demonstrates that the adverse flow effects continue all the way down the main trunk of the river to the barrage, contrary to the written claims in the EIS that the downstream effects are effectively mitigated by tributary inflows.
  - The major effect evident in the proponent's flow data is the extreme reduction in flows during the low-flow months of the year (July, August, September, October and November - JASON). As shown in MRCCC (2008), the proponents estimates of average monthly flows in the dry months are **reduced to around 50%** of the pre development flows by the first stage of the dam proposal.
- This is highly significant for the EPBC listed aquatic species in the river, because these are the **crucial breeding months** for the two threatened turtle species and the Mary River Cod and the Australian lungfish. Flow, temperature and water quality conditions during these months are crucial for the successful reproduction of these species. This is also important because of the effect on freshwater flows and pulses to the Great Sandy Strait RAMSAR wetlands at those times of year and the ability of a range of aquatic species to move back and forth between the estuary and the river past the Mary River Barrage as part of their lifecycle.
- Another major ecological impact of the changed flow regime predicted by the proponent is the attenuation of beneficial freshwater flushing flows at crucial times and locations in the river.
  - These flows are essential for interrupting long periods of continuous low-flow in the river and flushing out the accumulations of aquatic weeds and poor quality water that build up in the river pools during these prolonged periods of low flow.
  - This is an essential ecosystem service provided by these flows, which are greatly reduced in frequency and magnitude by the proposal at the times when they are needed most – following long periods of low flow. This is because the proposed dam would harvest flows of this magnitude at these times.
  - As a recent example, the August 2007 flow event rescued the health of the river, from the headwaters to the estuary. In late July, the river was choked with aquatic weeds, both submerged and floating, water quality was extremely poor and the river was experiencing major fishkills from Cambroon to Fisherman's Pocket. (Some evidence of this is presented in the EIS –for example plate 8.2).
  - The August 2007 flow event saved the river. This is documented and commented on in the 2007 MRCCC Catchment Crawl Report. This is an example of a flow event which the proponent widely claimed would have been captured by the dam - as shown in the storage figures presented in the EIS instead of being able to reset the health of the entire river system downstream.

- This damaging effect of the proposal of prolonging low-flow events and attenuating flushing flows downstream in the river at crucial times is well illustrated by the proponent's own data as presented in the MRCCC (2008) hydrology report.
- EIS Figure 6.31 Monthly variation of Median Daily Flows for Home Park shows clearly the decline in flow from existing entitlements compared to the pre-development flows. It is important to note that existing entitlements are not currently fully taken up (eg the NPI stage 1 has not yet taken up the allocation from Baroon Pocket), and yet we are seeing salinity and dissolved oxygen outside of EPA guidelines during low flows already. Taking full existing entitlements will make the water quality worse and then it is proposed to impose the Traveston Crossing Dam in addition.
- EIS Figure 6.33 is not valid for the Estuary, as the modelling for the barrage was conducted differently with the Traveston Crossing Dam scenario as detailed in the figure below (MRCCC, 2008).

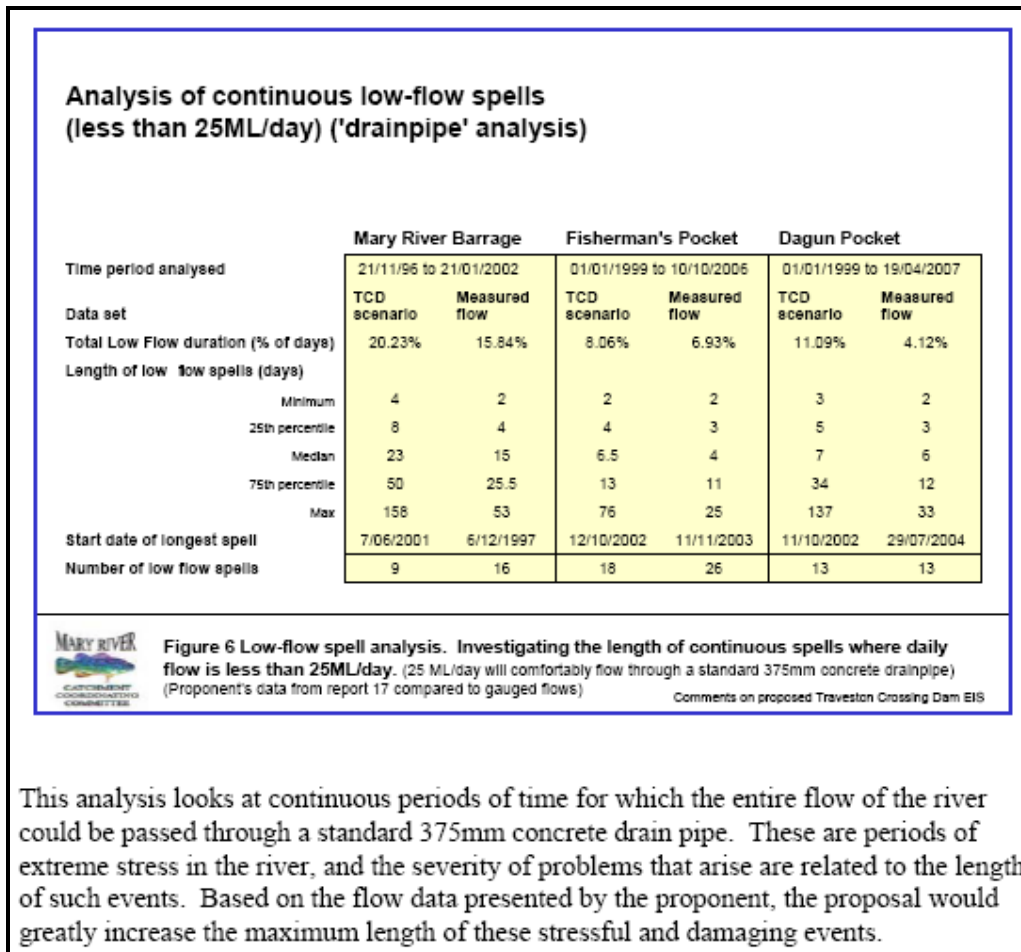


- Analysis of the EIS data shown in the figure below (MRCCC, 2008 Figure 23) highlights that there are major impacts on freshwater flows to the Estuary where September flows are half of their natural state and lower than the apparent “85%” rule (which has no scientific validity Arthington et. al., 2006) from July to December.



The proponent's data shows that, even as far downstream from the damsite as the entrance to the estuary at the barrage, the proposal is predicted to reduce September flows to about half of their natural state and generally significantly reduce flows during the JASON months.

- Extremes in dry conditions place the river under most stress. MRCCC (2008) highlights this in the figure below showing length of continuous dry spells when daily flow is less than 25ML/day and how the length of days is severely increased by the proposed Traveston Crossing Dam using real historical stream flow data.



- However the most severe ecological impact is highly likely to be from the ability of the pumping station to extract water from the base of a vertical shaft around 30 m below the water surface level (Details of the pumping station in Section 11 Noise 11.2.6 Dam operation Noise Impact under Water Treatment and Pump station p 11-47 refers to a reference KBR 2007 but this is not detailed in the Reference Section 19 of the EIS).
  - The EIS shows the Modelled Storage Curve for Dam in Figure 6.11 and states, “A full storage volume of 152 400 ML and dead storage of 3 440 ML were assumed based on available data at the time of modeling. The minimum volume necessary to allow releases was 3,940ML and the dam will have the flexibility to allow valve releases of up to 500ML/day”. Therefore the level of drawdown could be  $3940/152400 = 2.6\%$  (p6-28) which is very low for a dam and is rarely reported as possible for a dam particularly because of water quality.
  - If indeed the intent is to pump from around 30m below the water surface and surface level is 71m AHD then the intake would be about 41m AHD. The streambed level is about 55m AHD so that would make the intake about 14m below streambed level.

- This ability to tap into the groundwater would be catastrophic to downstream aquifers and the interconnected flood plain and stream base flow.

**Recommendation** Section 6.1.2.3

Notwithstanding the concerns about the assumptions inherent in the IQQM modelling, the proponent data shows there will be significant reductions in stream flow below the proposed dam in areas critical for Matters of National Environmental Significance. The STMRCG requests the Coordinator General to carefully consider the 31 hydrological analyses of the proponent's flow and storage data published by the Mary River Catchment Coordinating Committee and the implications for the project.

We also request more details of the Water Treatment Plant and Pumping Station and in particular the KBR 2007 report, which details a pump station, that is at the base of a vertical shaft around 30m below the water surface level (71m AHD. This makes it at around 41m AHD, which is about 14 m below the streambed level and able to extract surface and ground water.

#### **6.1.2.4 Flooding**

(also refer to comments in 6.1.1.3 – Flooding)

One of the aspects of the proposal that has caused great concern in the communities of the Mary Valley since the announcement of the proposal is the impact of the proposal on flood risks both downstream and upstream of the storage. These concerns have not been allayed by the information presented in the EIS, some of which is at odds with local experience of the extreme flood behaviour of the Mary River. Because of this considerable local concern, and clear errors in the flood mapping presented in the EIS pointed out by members of the public (such as the persistent mislabelling of Happy Jack Creek eg. Sunwater drawing 227923 and CoonoonGibber Creek eg. Figure 6.38) the Save The Mary River Coordinating Group conducted a detailed technical review of the flood modelling presented in the EIS.

The report from this investigation is attached to this submission (Appendix 4), and it was found that mapping errors noticed by members of the public were also reflected in the structure of the MIKE11 model of the catchment used to conduct the flood modelling. The main findings of this investigation are reproduced below.

- The summary key points from Appendix 4 are:
  - The structure of the catchment represented in the flood modelling presented in the EIS is demonstrably incorrect, as well as being inappropriately over-simplified, and as a result the modelling produces predictions that are unacceptably inaccurate when compared to historic observations. Some flow and probability calculations presented in the analysis of the risks of the dam overtopping are also demonstrably incorrect.
  - Mapping presented in the EIS with respect to the flood modelling displays an obvious lack of knowledge about even the names and locations of watercourses in the project area. These worrying observations indicate that the modelling presented in the EIS has not undergone a sufficiently rigorous process of independent checking by anyone with specific knowledge of the river and streams in the vicinity of the project area.
  - The most worrying observation is that there is no dam break analysis presented in the EIS at all. The Queensland Dam Safety Guidelines Checklist of Dam Technology Issues lists a “Failure impact assessment (including dam break analysis) and consequence assessment” as the first requirement in the checklist list of hydrological and hydraulic data and analyses to be conducted on a new dam.

- For this project, the results of the flood modelling determine the level of property purchase and infrastructure replacement needed for the project (both upstream and downstream). The proponent proposes to allow the Mary Valley to remain inhabited within the freeboard of the proposed dam and the impacts of the project during major flooding events (both downstream and upstream) constitute some of the major adverse risks and alleged benefits of the project. The demonstrated level of error and inaccuracy in the work presented in the EIS is not appropriate considering the scale of the possible consequences of the flood impacts of this proposal.
- In addition, the risk of storm surge during cyclonic winds that could overtop the dam wall if the dam were full needs to be detailed and assessed.

**Recommendation Section 6.1.2.4**

One of the aspects of the proposal that has caused great concern in the communities of the Mary Valley since the announcement of the proposal is the impact of the proposal on flood risks both downstream and upstream of the storage. The STMRCG's detailed technical review of the flood modelling in the EIS is attached in Appendix A. We request the Coordinator-General give full consideration to the report and request the flood modelling get redone.

## 6.2 Hydrogeology (Groundwater)

### 6.2.2.2/3/4 Existing Environment (Groundwater)

The EIS points out the existence of two separate aquifer systems underlying the project area, one in the basement rocks and one in the alluvial deposits of the valley floor, at elevations significantly higher than the level of excavation required for the construction of the project.- i.e.the project will definitely interact with both groundwater systems. Section 6.2.2.4 also points out that “*Due to limited monitoring of these alluvial systems*”, no long term monitoring of seasonal variation in groundwater levels has been undertaken by the proponent, and that groundwater levels in the alluvial aquifers could fluctuate up to 5 metres above those reported in the EIS. (The EIS monitoring occurred during a time of low surface and groundwater flow)

**Recommendation Section 6.2.2 2/3/4**

Due to limited monitoring of groundwater, no long-term seasonal variation data is available and it may be that the alluvial aquifers could fluctuate up to 5 m above those reported in the EIS. More monitoring both upstream and downstream is required to assess seasonal and long-term groundwater levels before any impact assessment can be carried out.

### 6.2.2.5 Groundwater Movement

The proponent points out that the degree of groundwater movement in the basement rock aquifers (ie. seepage) has not been determined, but that it likely that such movement would occur. The proponent has not quantified potential seepage losses via the basement rock aquifers. The proponents assessment of groundwater movement in the alluvial aquifer system took place during a period of low surface water and groundwater flows and is unlikely to give a representative assessment of long term patterns in groundwater flows.

**Recommendation** Section 6.2.2.5

Due to limited monitoring of groundwater during a period of low surface water and groundwater flows, the degree of groundwater movement in the basement rock aquifers (ie seepage) has not been determined but is likely to occur. More monitoring both upstream and downstream is required to assess seasonal and long-term groundwater flows before any impact assessment can be carried out.

### 6.2.2.6 Groundwater Hydraulic Parameters

The hydraulic characteristics of the basement rock aquifers have only been studied in the vicinity of the proposed wall. No quantitative investigation of the potential for water movement through aquifers in the basement rock anywhere else in the impounded area is presented by the proponent and is of concern for the following reasons:

- The proponent has indicated that there are significant faults and fracture structures in the basement rocks at many locations throughout the proposed impounded area (EIS figure 5.42).
- One of the alluvial bore holes near the dam wall site (MA05) shows a very high specific yield, an order of magnitude above the surrounding bore locations, indicating the presence of a potentially significant aquifer very close to the dam wall location. Flow from this structure may cause problems during the excavation and construction of the wall if the alluvial aquifers become recharged prior to construction.

**Recommendation** Section 6.2.2.6

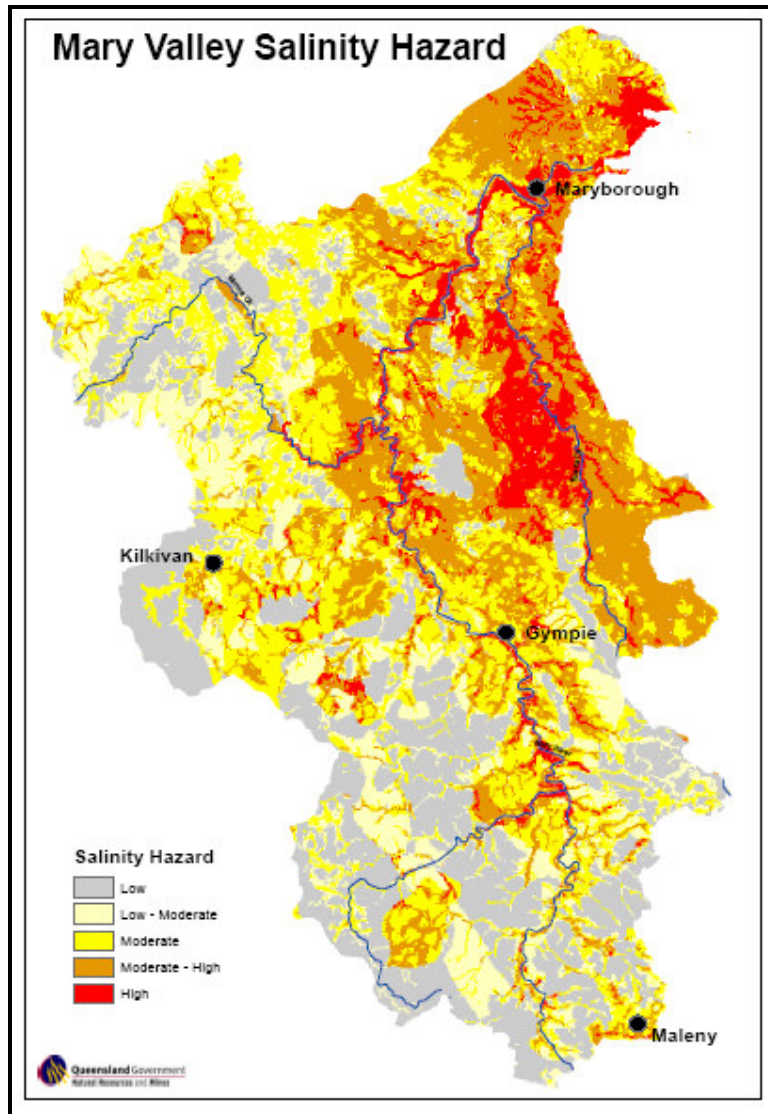
Due to limited monitoring of groundwater being only near the proposed dam wall, the degree of groundwater movement in the basement rock aquifers (ie seepage) elsewhere in the proposed inundation area has not been investigated although there are significant faults and fracture structures in the basement rocks in many locations. More monitoring both upstream and downstream is required to assess seasonal and long-term groundwater flows elsewhere in the proposed inundation area and before any impact assessment can be carried out.

### 6.2.2.7 Groundwater Quality

Because of the interconnection of surface water and groundwater and the flow on impacts downstream on water quality, the STMRCG is concerned for the following reasons:

- Salinity levels in some of the basement rock aquifers were very high, indicating a saline groundwater system in areas close to the proposed impoundment. Bore 127381 showed an electrical conductivity of 8100uS/cm at a depth of 12.2m below ground level. The proponent has not investigated the impact of what impounding a large body of water above this underlying saline groundwater is likely to do to the quality of nearby groundwater regimes.
- Salinity Hazard Mapping by DNR shows that there are high-risk sites including the proposed Traveston Crossing Dam site (see figure below). Already during low flows at the end of winter, salinity levels are above the EPA Water Quality guidelines downstream of Gympie (MRCCC, 2008).





- The water quality presented from the bores in the alluvial aquifers near the dam wall has worrying implications for water quality in the storage, if, as the proponent suggests, base flow from these aquifers makes a significant contribution to flow in the river in the vicinity of the dam site.
- The most concerning data presented is the level of mercury, in which all bores but one recorded mercury levels well over the ANZECC guidelines for freshwater and two showed levels above the NHMRC guideline level for drinking water.
  - This reinforces other information presented by the proponent to the 2007 Senate Inquiry concerning high mercury levels in the soils in the vicinity of the dam site and a recommendation to the proponent from Golder and Associates that further investigation into mercury levels at the dam site were warranted. It is astounding that the proponent has made no mention of this when presenting these groundwater data to the public in the EIS.
- Other water quality indicators are quite poor in the groundwater samples. Nitrogen and phosphorus levels were all above the Queensland water quality guidelines, and sulfate levels

were above NHMRC guideline levels in several samples. It is very surprising that manganese levels were not reported, with high manganese levels often being a very well known contributor to poor water quality in the Mary Valley.

**Recommendation** Section 6.2.2.7

Groundwater data presented in the EIS shows problems with salinity, mercury, nitrogen, phosphors, sulfate and manganese being outside the ANZECC guidelines for freshwater ecosystems. Salinity Hazard Mapping by DNR shows that there are high-risk sites including the proposed Traveston Crossing Dam site in the Mary River catchment. Already during low flows at the end of winter, salinity levels are above the EPA Water Quality guidelines downstream of Gympie. These risks need to be quantified and impacts detailed in the EIS.

### 6.2.3 Potential Impacts & Mitigation Measures

As the proponent stated in Section 6.2.2.4, no long term monitoring of the behaviour of the groundwater systems in the project area has been undertaken. The only place in which the proponent has made a specific study of the nature of potential aquifers in the basement rock and in the alluvium has been in the vicinity of the dam wall. Hence the STMRCG believes many of the predicted impacts and suggesting mitigation measures are inadequate for the following reasons:

- The interaction of the proposed dam with the groundwater regimes of the Mary Valley are little more than speculation, made in the absence of any convincing long term scientific evidence.
- The proponent has indicated the presence of highly saline groundwater in the some of the basement rock aquifers in the vicinity of the impounded area, and the presence of a highly transmissive shallow alluvial aquifer in the vicinity of the proposed dam wall. Yet no details of potential salinity impacts are presented in the EIS.
- The proponent has also convincingly demonstrated high mercury levels, and poor water quality in general in the shallow alluvial aquifers in the vicinity of the dam wall, as well as indicating that these aquifers are linked to baseflow in the river. No mitigation measures have been proposed for the implications of these features for the construction and operation of the proposed dam.

**Recommendation** Section 6.2.3.

No long term monitoring of the behaviour of the groundwater systems in the project area has been undertaken. There needs to be a detailed long term study of groundwater regimes in the Mary Valley under a range of seasonal conditions, encompassing the whole of the project area and a region downstream before the likely impacts of this proposal can be adequately quantified. It would appear highly likely that the Mary River could turn into the Murray if the Mary River is dammed at Traveston Crossing.

### 6.3.1...6.3.5 Surface Water Quality

The EIS states, “*This section describes the current quality of water within the Mary River and its tributaries that may be affected by the Project*”. The data presented is limited in usefulness for the following reasons:

- The data on surface water quality shows a snapshot of water quality of a short period of time, during a period of low flow. It clearly demonstrates that during periods of low flow, many water quality indicators in the Mary River fall outside the Queensland EPA and ANZECC guidelines, both for freshwater ecosystems and drinking water health standards.
- The EIS did not adequately describe or comment on the relationship between flow patterns and water quality or on the more complex interactions between flow, physical and chemical water

quality indicators and the trophic structure of biological activity in the ecosystem, all of which need to be considered when examining the impact of a project which greatly changes flow patterns and aquatic habitat is likely to have on water quality.

- Two figures in the EIS, 6.70 and 6.74, hint at this relationship, illustrating that in times of low flow the concentration of soluble pollutants (as indicated by Electrical Conductivity data presented) tends to increase markedly in the Mary River, and in times of high flow the amount of suspended matter tends to increase markedly (as indicated by measured turbidity levels).
- The EIS also hints at the complex interaction between water quality and biological activity by presenting population data of periodic blue-green algae blooms in nearby Lake Macdonald and Lake Borumba.
- This section of the EIS does not examine any water quality implications of the project in the lower river or estuary at all. The ToR clearly includes an investigation of likely impacts on the RAMSAR wetlands at the mouth of the river, and yet the EIS has not presented any information on these parts of the river.

**Recommendation** Sections 6.3.1...6.3.5


The data presented is limited in usefulness for describing the current variation in water quality in the Mary River except to highlight that low flows result in water quality outside the Queensland EPA and ANZECC guidelines, both for freshwater ecosystems and drinking water health standards.

The TOR clearly includes an investigation of likely impacts on the RAMSAR wetlands at the mouth of the river, and yet the EIS has not presented any information on these parts of the river. There needs to be a detailed long term study of water quality in the Mary Valley under a range of seasonal conditions, encompassing the whole of the project area and a region downstream before the likely impacts of this proposal can be adequately quantified.

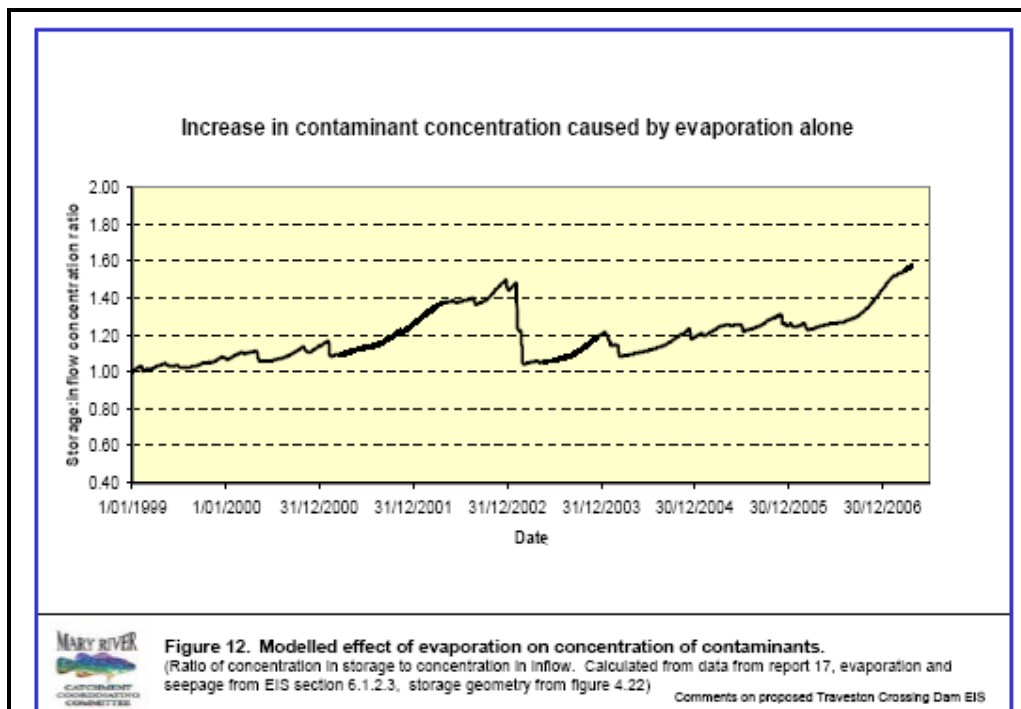
### 6.3.6 Potential Impacts and Mitigation Measures

Although this section summarizes the potential impacts and mitigation measures in general terms, it does not relate them in any quantitative way (or cost the mitigation measures) to the size or the individual site characteristics of the proposed storage. All the comments made are comments generally applicable to all new dam projects, and little attempt has been made to quantify the impacts as required by the ToR. Some suggestions include:

- For example, the analysis conducted by the MRCCC, 2008 of the projects' impacts the impounded area and downstream is an attempt to quantify the potential impacts, as should have been done by the proponent;
- One simple approach that the proponent could have used is to refer to the applicable treatment and mitigation costs from existing storages with similar sorts of water quality problems to those expected in this storage and scaled them according to the area or volume of water required to be treated in this storage;
- The most glaring omission in this section is the complete omission of any reference to the likelihood of the storage generating methylmercury from the considerable levels of inorganic mercury in the soils and groundwater of the impounded area. There are high levels of mercury in the catchment of the dam, both as a result of historic goldmining activities and from naturally occurring deposits. This is evident from the alluvial groundwater samples presented by the proponent;

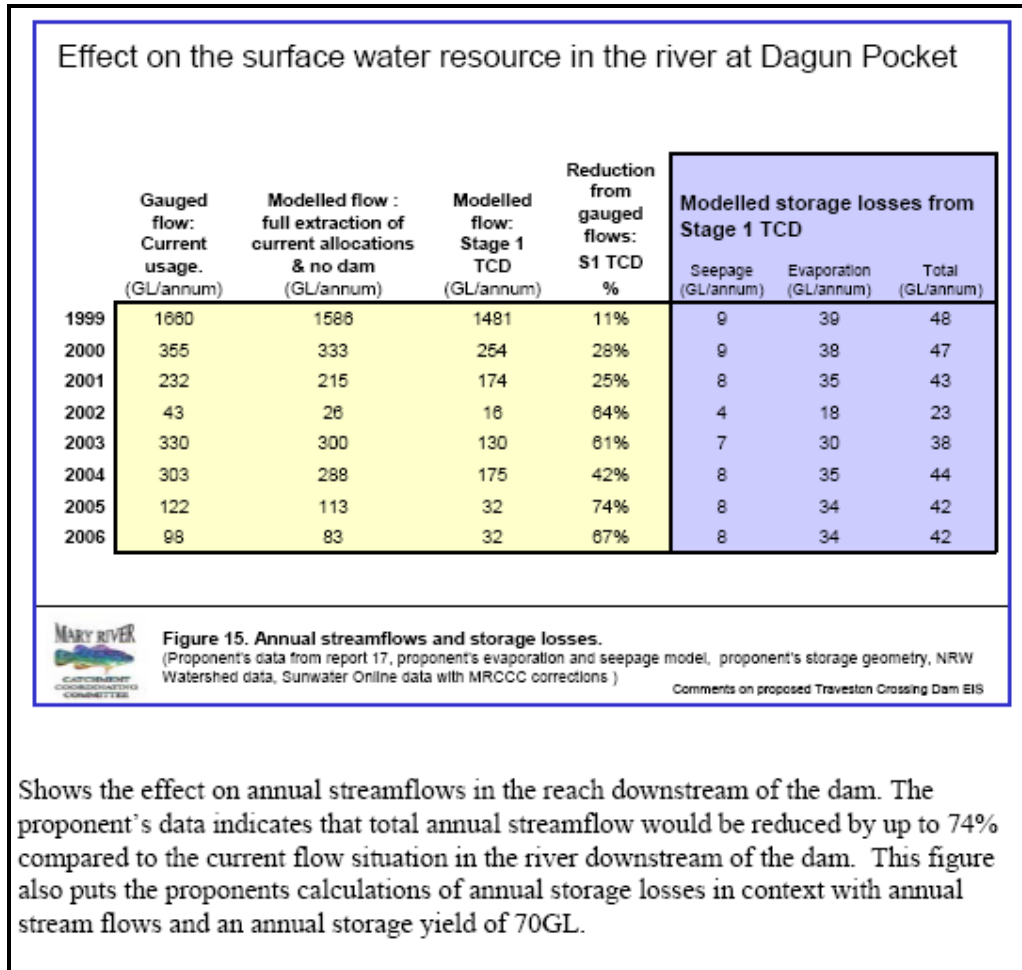
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- Methylation of mercury and consequent biomagnification in the impoundment and downstream ecosystems is a very well documented common consequence of new storages, with potential for high environmental and human health risks.
  - An appraisal of the specific risks associated with this in the Mary Catchment has been conducted by the MRCCC, and we ask the Coordinator General to carefully consider the specific scientific evidence presented in their document.
  - The Queensland Government is well aware of the risks associated with mercury in storages, with problems in the Big Reef Dam at Forsyth being of considerable concern for a number of years and Queensland Health identifying mercury accumulation in fish in Hinze Dam in 2006.
  - The Queensland Government also supported a study into mercury in the Gympie district, published in 2003, which recommended monitoring mercury levels in fish in the Mary River.
  - Golder and Associates specifically recommended further investigation of soil mercury levels near the dam site to the CEO of QWI following an investigation into cattle deaths near the dam site.
  - It is highly irregular for none of this information to be presented in the EIS for this project.

- Another impact on water quality that has not been considered is the effect of evaporation on concentration of nutrients/contaminants in the proposed impoundment. The figure below (MRCCC, 2008 Figure 12) illustrates the concentration increases up to 160% had the dam been built in 1999 and uses actual stream flow data.



This figure shows one aspect of the water quality problems that would result from long residence times in the storage. Just accounting for the concentrating effect of evaporation from the storage shows concentrations of contaminants in the storage (and downstream releases) could quickly exceed the concentration in the inflow by 60%. This is important, considering that water quality in the streamflow at the damsite already often falls outside water quality guidelines.

- Evaporative losses are significant losses to the river system that would have flowed down the river if the dam were not built. No consideration of impact of this has been included in the EIS. The figure below (MRCCC, 2008 Figure 15) illustrates how evaporation and seepage would exceed stream flow during drought.



**Recommendation**      Section 6.3.6

Comments made are generally applicable to all new dam projects, and little attempt has been made to quantify the impacts (or cost the mitigation measures) as required by the TOR. The STMRCG requests the Coordinator General to conduct a careful analysis quantifying the impacts of the project in the impounded area and downstream conducted by the MRCCC. In particular there is specific scientific evidence presented in their document on methylation of mercury and consequent biomagnification in the impoundment and downstream ecosystems with potential for high environmental and human health risks.

**6.3.7 Construction**

This section does not adequately address the risk of a major flood event during construction (see 6.1.2.1 for review of monthly occurrence of flooding). This risk needs to be quantified on the basis of past flood frequencies and heights to ensure that the mitigation measures proposed will be sufficient. The

impacts include release of stockpiled materials into the river, particularly the point source release of a large volume of cement, as well as scouring of bare soils in the wider project area by floodwaters.

**Recommendation** Section 6.3.7

The risk of a major flood event during construction is not adequately addressed. The proponent must statistically quantify the risk of a flood event during construction, and model the extent of the downstream distribution of water quality impacts should this occur.

### 6.3.8 Filling

This section does not adequately address the full impact on water quality during filling for the following reasons:

- Large dam filling inflow events are likely to be of very low quality water, carrying a large amount of particulate matter and debris, as is typical of high flow events in the Mary. This is not quantified in the EIS.
  - In particular, all of the plant matter that is mobilized from any aquatic macrophyte infestations throughout the entire catchment upstream of the dam wall will be trapped in the impoundment until the dam reaches a level that flushing flows can be passed through the dam.
  - Even then, because of the low flow velocities in the impoundment, most of this particulate organic matter from the upstream catchment is likely to settle in the storage, rather than being flushed downstream.
- The EIS states, “*QWI has held initial discussions with SunWater with respect to the option of using water released from Borumba Dam, which flows down Yabba Creek and into the Mary River, to assist with water quality management*”. This section also claims that higher quality water from Borumba Dam could be used to dilute the low quality water in the proposed Traveston Crossing Dam during filling. The STMRCG has concerns that this mitigation strategy will not work for the following reasons:
  - Even if the entire 46 GL capacity of Borumba dam was released and it was as pure as distilled water, it could have little effect on the water quality in the 152.4 GL Traveston storage, considering that the major inflows would be deposited in the storage upstream from the Yabba Creek confluence, and
  - It would not be improbable to have inflow events in the order of 20 GL/day of very low quality ‘first flush’ water which are not likely to be passed through the storage during the filling phase.
  - There is no supporting evidence of the likely effectiveness of this proposed mitigation strategy.

**Recommendation** Section 6.3.8

Large dam filling inflow events are likely to be of very low quality water, carrying a large amount of particulate matter and debris, as is typical of high flow events in the Mary. The proponent must quantify the likely inflow of organic matter into the storage from the upstream sources in the catchment during the filling and non-flushing stage.

The proponent needs to quantify the likely effectiveness and impacts of using water released from Borumba Dam to mitigate poor water quality in the proposed Traveston Crossing storage during filling.

### 6.3.9 Operation

The EIS states, “ *There are no modelling data available to accurately predict the extent of stratification in the dam*”. The STMRCG is concerned for the following reasons:

- The major operational impacts on water quality in the storage are the result of stratification and eutrophication. However, no attempt is made to quantify the likely impacts or the likely effectiveness of the mitigation measures proposed with respect to the particular geometry and site characteristics of the storage, instead relying on very generalized descriptions of possible mitigation measures.
- This section does not take into account the specific operation characteristics of the storage (surface areas, depths, areas of exposed soil, location of inflow zones etc) as predicted by the proponent when investigating likely water quality impacts. An example of this sort of analysis has been presented by the MRCCC, both in their submission and in their published technical reports relating to the proposal.
- In particular the proponent does not demonstrate the likely effectiveness of the specific multi-level off take proposed for the storage under the operational conditions predicted by the proponent. The proponent does not demonstrate that there will be a zone of higher quality water that can be effectively identified and isolated at the off take during critical periods of the operation of the storage (eg the 2002 draw-down event illustrated in the proponent’s storage data) to mitigate the impact of the release of low quality water downstream.
- More surprisingly, the proponent completely ignores the risk of production of methyl mercury in the storage. The omission of an investigation into the risks of methyl mercury production in the storage in the EIS, when this is a well-recognized consequence of stratification in the presence of a source of mercury, is inexcusable, particularly when the proponent has been specifically advised that further investigation into mercury at the dam site is required.
- The proponent does not quantify the likely impact or ongoing mitigation costs of the predicted water quality problems associated with manganese or blue-green algae, which could be based on good existing data and mitigation costs from nearby storages with similar geological and climatic conditions, such as North Pine Dam, Lake Borumba, Lake Baroon and Lake Macdonald.
- The proponent does not investigate the effect of changing water levels on water quality, particularly with regard to locating the regions where inflows from the tributaries meet the impounded body of water. These are regions of low water quality, which will move upstream and downstream with changing water levels, and the extent and locations of these zones could have easily been calculated from the modelled storage date presented by the proponent.

#### **Recommendations** Section 6.3.9

There are no modelling data available to accurately predict the extent of stratification in the dam. This needs to be done before impacts on water quality (and impacts on Matters of National Environmental Significance) can be assessed. Impacts then need to be identified. Mitigations proposed must be supported with evidence of effectiveness (where else it has been successful) and costed into the project. This can be done by appropriately relating full costs of these mitigation measures as applied to other storages with similar problems.

The STMRCG requests that the Coordinator-general commission a fully independent investigation into the likelihood of and risks associated with the production of methyl mercury by this project, ideally conducted by experts in this matter such as CSIRO Centre for Environmental Contaminants Research.



The likely effectiveness of the proposed multi-level off take in maintaining water quality in downstream release from the storage, during periods of extreme draw down in the storage, similar to what would have been experienced in 2002, needs to be demonstrated.

### 6.3.10 Monitoring Program

Many of the comments applied to the proponent's arguments about water quality effects in the impounded area apply to the impacts and mitigation measures downstream. The STMRCG is concerned that the monitoring program will be ineffective for the following reasons:

- Water quality in the water released downstream will be dependent on water quality in the storage. However, the proponent does not adequately address the strong added interaction between downstream flow regime and downstream water quality.
- Any long term observer of the Mary River is aware of the link between flows and water quality in the river, as described in the MRCCC's analysis of the flow impacts of the proposal.
- As demonstrated in figures 6.21 to 6.28, the proposed dam is predicted to have a significant impact on reducing flows between 100 and 1000 ML/day from the dam site to downstream of Fishermans Pocket. This region of the river already has significant water quality problems in times of low and high flow. The flows between about 100 and 1000ML/day (1.16 to 115.7 cumecs) are the high quality flows in the river. During times of flow lower than this, the concentration of soluble contaminants in the river tends to rise above acceptable levels, as indicated in figure 6.74. When flows are higher than this, the level of suspended contaminants tends to rise above guideline levels, as indicated in figure 6.70.
- The proponent's predicted impact on flow regimes is therefore also predicted to have a consequent major downstream effect on water quality, which is not addressed at all in the EIS. Similarly, the proponent has not investigated any impacts of the predicted changes to the flow regime at the Mary River on the water quality in the estuary and the Great Sandy Strait. This is a significant omission.
- Major changes to river height, flood duration and flow velocities are expected to occur in the river downstream of the storage. The sediment budgeting conducted by the proponent has not adequately assessed the effect of this on increasing bank and bed erosion and related water quality impacts.

#### **Recommendation** Section 6.3.10

Many of the comments applied to the proponent's arguments about water quality effects in the impounded area apply to the impacts and mitigation measures downstream. Water quality in the water released downstream will be dependent on water quality in the storage. However, the proponent does not adequately address the strong added interaction between downstream flow regime and downstream water quality.

The proponent must present an investigation that specifically quantifies the likely impact of altered flow regime downstream on water quality in the river and in the receiving estuary. This should specifically include re-running the SedNet model of the catchment to account for the effect of altered flow rates, flood heights and flow velocities on stream bank erosion downstream of the storage, as well as sediment entrapment by the proposed storage.

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## ***Chapter 7 Terrestrial Environments***

### **7.2 Legislative Context**

This section is missing reference to the Environmental Protection Policy (water) Schedule 1 Mary Basin/Great Sandy Region.

- Water quality must reference to High Ecological Value waterways scheduled under the EPP (*water*). The information supplied in the EIS relating to water quality objectives is not consistent with EPA ambient water quality data and inaccurately represents water quality of the lower Mary River and Great Sandy Strait.
- There is a legislative requirement under the Water Act 2000 (QLD), that ecological values and water quality of High Ecological Value (*HEV*) waters scheduled under EPP(*water*) maintained.
- There is insufficient information is provided to identify impacts on HEV waterways scheduled under EPP(*water*). Management intent for HEV waterways is to maintain their values and their existing water quality.
- Maps showing ambient water quality sampling sites and their compliance with the Queensland Water Quality Guidelines should be provided to illustrate water quality within the lower mary and great Sandy Strait.
- Given the lessening frequency of medium-sized flows due to Traveston Dam, flow events are likely to be accompanied by substantial water hyacinth outflows of a presently unknown mass. The impacts of decaying water hyacinth on water quality of the Ramsar area are not known.

*Recommendation*      Section 7.2

The Environmental Protection Policy (water) Schedule 1 Mary Basin/Great Sandy Region must be referenced.

## Chapter 8 Aquatic Environments

### 8.5.2.5 Changes in Water Quality in the Inundation Area during the Filling Phase

The EIS states that there will be impact on water quality, which cannot be mitigated. Water quality is expected to degrade within the inundation area during the filling phase, which is predicted to be two years. Water is predicted to “*become enriched with nutrients as submerged terrestrial vegetation rots. These degradation processes will also lead to oxygen depletion, particularly if filling is slow.*” Together with this, it is expected that turbidity levels will be high until particulates settle.

- This is acknowledgement that water quality within the impoundment will be less than ideal for some time, potentially causing major impacts on the adapting ecology of the storage, including listed EPBC species.
- Fish kills in Paradise Dam in 2006 extended for about 17 km (EPA 2006) due to poor water quality.
- Prediction of filling is weather dependent and if Paradise Dam is used as an example (Built in 200? and still only 15% at Jan 2007) could take years with associated impacts,
- This section does not adequately examine the impact of this on downstream flows, water quality or aquatic ecosystems suggesting only “Release of poor quality water during first filling is likely to result in reduced macrophyte growth downstream as a result of turbidity levels.” No consideration is made of other water quality parameters such as DO, salinity and heavy metals.

#### **Recommendation:** Section 8.5.2.5

The risk of adverse changes in water quality in the inundation area during the filling phase is high resulting in aquatic ecosystem death and extensive fish kills both within the inundation area and downstream. This needs to be documented in detail, mitigation strategies proposed and documented evidence of where these have been successful in other dam building projects.

As floating macrophytes present in the inundation area during filling are likely to survive (p8-25), it is recommended in the report that “**Removal (for drying and perhaps burial) of noxious or exotic species from the existing environments, including on farm dams, prior to filling should be undertaken.**” This recommendation fails to get a mention in the Environmental Management for the construction phase (S.18.3.9—Aquatic Flora & Fauna), and is downgraded to “**consider the removal**” where mentioned in S 18.3.5—Water Quality.

- It also fails to recognise that the survey work as not assessed the aquatic weed risk in the catchment above the proposed inundation area.
- Although it acknowledges the aquatic weed problem downstream at the barrage “*Generally it is believed that these species can now be adequately controlled and they are no longer a serious threat to dam operation or human safety. This is unfortunately not the case at the Mary River barrage where it appears to be not a question of how to control but who should do it.*” It fails to acknowledge the impact that decreasing flushing floods will cause enormous costs in controlling these weeds and that the issue of ownership of the problem is not unique and in the past, the government has tried to put this cost back onto landholders when it is there because of the impoundment and lack of flushing floods.

**Recommendation** Section 8.5

Removal of noxious or exotic species from the existing environment must be included in the Environmental Management for the construction phase (S.18.3.9 – Aquatic Flora & Fauna) and reworded in S 18.3.5 – water quality to include “must be removed”. As it makes no sense to remove noxious or exotic species only in the middle of the catchment at the dam location, the plans and costing needs to include from the top of the catchment to the Mary River Barrage. It must be an ongoing cost as there is no way that there will be 100% eradication.

### 8.3 Methodology

It is stated that “*sampling was conducted during an unusually prolonged drought, so the results may not be typical.*” It is further stated that “*however, the data is robust, comparable with previous studies and therefore suited to impact assessment purposes.*” This methodology fails to acknowledge or quantify the natural seasonal variability or the cyclic nature of flooding in the Mary River.

- Flooding disturbance plays an important role in changing aquatic ecosystems. In the Mary River there will often be at least a minor flood each year with a major flood about 9-12 year cycle. Water quality and macrophyte abundance can vary greatly depending on the time since a flood and the severity of the flood.
- Detailed sampling is required downstream of the proposed dam location to gather environmental baseline data to be able to make any predictions of impact of downstream loss of daily flow and flooding events. As the hydrological data clearly shows, there will be potential changes in daily flows and flooding down to the mouth of the river, the survey area needs to be extended downstream to the RAMSAR Wetlands Great Sandy Straits.
- It should be noted, that ‘previous studies’ in the Mary River at the project’s location have been limited in most investigated parameters.
- The statement “*that the data is robust*” is not supported by S.8.4.2 where a previous study (Mackay 2003) of the Mary River identified 182 aquatic macrophyte species, where the EIS survey only managed to record 38 species. Although the point raised regarding Mackay’s results representing a larger geographic area remains valid, it is also stated that the “*time span covered by the EIS sampling*” was a limiting factor.

**Recommendation** Section 8.3

Aquatic environment sampling was conducted over 6 months during a drought. Sampling must be continued over a number of seasons and to include before and after a major flooding event to assess ecosystem resilience and dependence on flooding both within the inundation area and downstream to the Great Sandy Strait.

### 8.4 Existing Environment Aquatic Flora

#### 8.4.1 Significance of Aquatic Plants

It is stated in the EIS that “*Macrophyte abundance and community structure is influenced to a degree by water quality, particularly nutrient concentrations (Mackay,2003)*”.

- However local observations of stream aquatic plants after flooding indicate that the flooding regime plays an important role in determining macrophyte abundance and community structure also. This is particularly relevant in assessing impact of changing flow regimes on aquatic plants.

**Recommendation** Section 8.4.1

Scouring from floods plays an important part in determining aquatic flora abundance and community structure. More detailed seasonal and yearly variation in macrophyte abundance and community structure is required before assessments of impact from changing flow regimes can be carried out.

#### 8.4.2 Aquatic Flora within Study Area.

It is stated “Ten of the 38 species recorded accounted for around 90% of the mean macrophyte cover over all quantitative survey sites (Table 8.2). However, the detailed habitat mapping surveys showed that site specific results could be quite different to the mean percent cover results for quantitative survey sites presented below”. No measure of variability is given.

As many of these aquatic plants are submerged, it is questionable that these results are accurate or could be used to predict impact.

**Recommendation** Section 8.4.2

**No estimation of variability in aquatic flora is given.** As many of the aquatic plants were submergents and difficult to map accurately, more detailed site investigation is required before assessments of impact from changing flow regimes can be assessed.

##### 8.4.2.2 Exotic and Noxious Species:

The EIS does not adequately address aquatic weed distribution, variation with season and floods and associated control issues.

- It is noted that exotic species were found at nearly all study sites, representing 10-40% of species encountered at a given site. Upstream of the Full Supply Level (FSL) to Kenilworth, the highest cover of exotic macrophyte was encountered, some pools and runs almost 100% coverage. It is acknowledged by the report that the conditions favouring this growth is “**slow flowing conditions, reduced vegetation cover**”— these conditions would appear similar to that encountered in a large impoundment, like the one proposed.
- The report does recognise the potential for extensive exotic macrophyte growth in the proposed storage, and highlights the rapid growth rate of water hyacinth (*Eichhorina crassipes*) (doubling in size within a few weeks) and salvinia (*Salvinia molesta*) (doubling in size every 2-3 days)— two species listed as Class 2 Pest Plants under the *Land Protection (Pest and Stock Route Management) Regulation 2003*.
- Water hyacinth and salvinia are recorded as “*generally in low abundance*” However, an aerial survey conducted in July 2006 by MRCCC, mapped rafts of these 2 weed species completely covering the river for about 18km between Gympie and the Mary River Barrage (Burgess 2007). It was known at that time that aquatic weed rafts existed throughout the catchment including through the proposed Traveston Crossing Dam area. This rapid change in aquatic plant cover from when the EIS survey was conducted highlights the risk and the need for survey work to be extended over seasons and years.
- However there is little mention about the Class Two Pest Plant, Cabomba (*Cabomba caroliniana*), another Weed of National Significance. The EIS states “Cabomba has not been reported within the Mary River catchment other than at Lake Macdonald. It was not recorded in the EIS survey(EIS p8-35)”. The STMRCG believes that the risk of Cabomba becoming a serious problem resulting in high costs to manage is highly likely for the following reasons:
  - Cabomba has been recorded in 14 sites in Noosa Shire, apart from Lake Macdonald. 13 of these are in the Mary Catchment, and 1 in the Noosa catchment. These locations have been sent to the National Aquatic Weeds Coordinator, Andrew Petroeschovsky

- who uses the data in compiling the National maps. (Phil Moran Natural Resource Manager, Noosa and District Landcare Group pers. comm.).
- It should also be noted that Lake Macdonald is 20 kilometers from the proposed Traveston Dam site. Lake Macdonald currently has 36% of *all* Australia's Cabomba. It is acknowledged in the EIS that Cabomba is a 'major problem in Lake Macdonald'. It further acknowledges that this and other aquatic weeds 'may be spread by waterfowl or human translocation'. As it is intended to allow recreational activities on the proposed TCD, including boating and fishing, the likelihood of the introduction of Cabomba into this water body is very high.
  - There are currently no methods of control for Cabomba apart from mechanical removal and it may be spread by either waterfowl or human translocation. It is highly likely to be introduced from Lake Macdonald (only about 20 km away). Cabomba is a serious safety issue and puts at risk any recreational activity such as swimming, diving and canoeing.
  - *Cabomba caroliniana* [Fanwort or Cabomba] is a Weed of National Significance [WoNS], and is listed as a Class 2 Pest Plant in Queensland. Under the Land Protection [Pest and Stock Route Management Act] 2002, this means that "Landowners must take reasonable steps to keep land free of Class 2 pests. It is a serious offence to introduce, keep or supply a class 2 pest without a permit issued by the Department of Natural Resources and Water. Penalties of up to \$30,000 apply." Should Cabomba get established in the proposed Traveston Crossing dam, who will pay to control it?
  - Currently a project being run by Dr. Shon Schooler [CSIRO] is underway looking into possible biological control options for the control of this weed. Whilst host specificity testing is currently underway, release of potential biological control agents is years away. In any case, biological control is NOT a 'silver bullet', and is part of a control programme. "Eradication" as stated in the EIS is not possible and has not been achieved with any aquatic weed in Australia.
  - In the Northern Territory, an off label permit for the use of 24D ester was issued for use in aquatic situations in 2007 and has now expired, and will not be renewed. This means that there are no herbicide options available for Cabomba currently available.
  - In Ewen Maddock Dam they use underwater divers and a vacuum device to manually remove Cabomba from a swimming enclosure. In Lake Macdonald, Noosa Council uses a purpose built Aquatic Weed harvester to cut and remove the bulk of the weed. It has the capacity to remove up to 10 tonnes of Cabomba per day. Currently this operation costs Noosa Council approximately \$130,000 per year. The proposed TCD is 82 times the size of Lake Macdonald. **This equates to approximately \$10.6 million per year, for limited control.**
  - Under the Federal Government Defeating the Weeds Menace Programme, Noosa & District Landcare in conjunction with the Benalla Shire Council [Victoria], have been trialling using black plastic to cover outlying infestations of Cabomba. As you can imagine this is only suitable for very small infestations, and is still underway. Even if successful in dealing with small outlying infestations of Cabomba, this method would be of no use in a large water body.
  - In summary, there are no control measures currently available to deal with Cabomba. Cabomba occurs from Darwin in the NT to Victoria along the eastern seaboard. There will be more infestations, as early detection protocols are introduced, and training of Weeds' Officers is conducted in NSW, Qld, Victoria, and SA.
- Similarly there is little mention Dense Water Weed (*Egeria densa*) which is very similar in habit to Cabomba but has not been declared at all in Queensland. In fact Egeria is sold by most

aquarium shops in Queensland and accounts for approximately 30–40% of all aquarium plant sales. Discussions by the National Aquatic Weed Management Group are being held with the State Government with a view to listing Egeria as a Class 3 Pest Plant in Queensland. This would mean that it would be illegal to sell Egeria. Discussions are also being held with the aquarium industry, as declaration of Egeria may create a ‘vacuum’ in the market and with it the risk of introducing another potential weed. Egeria was declared in New South Wales earlier this year. It is now a Control Class 5 noxious weed, which means that it cannot be sold in that State. As with most aquatic weeds however, Egeria is very difficult, if not impossible, to control. Currently there is no way to deal with Egeria apart from mechanical removal. Given that it reproduces readily from segments, mechanical removal may spread the weed further. Egeria is already established in many of our creeks and the river and its only control is **frequent flushing by floods**.

- There is also no mention of Glush Weed (*Hygophila costata*), a Class 1 Pest plant Queensland, and the risk it will pose if it spreads to the proposed Traveston Crossing Dam. A major infestation exists around Lake Macdonald, 20 kilometres from the proposed Dam site.

**Recommendations** Section 8.4.2.2

Potential aquatic weed problems need to be seriously addressed and risks and associated long term costs incorporated in the decision making process when comparing alternatives to damming the Mary River.

Water hyacinth and salvinia are already a problem in the Mary catchment. More detailed seasonal and yearly variation in aquatic weed abundance and distribution in the Mary Catchment is required before assessments of impact from changing flow regimes can be made and costs control estimated.

Risks of introducing Cabomba and Glush Weed need to be quantified and included in the decision making process. Mitigation strategies need to include controls for the likely outbreak of Cabomba and Glush Weed.

**8.4.3.2 Effects of Unnatural Flow Variation**

The EIS states “*Mackay and Thompson (2000) report that scouring flows in streams are essential for maintaining local-scale habitat diversity through the creation of a scouring mosaic effect. Scouring effects such as these do not occur within dams or wetlands due to their low energy conditions but the disturbance causes by rapid water level fluctuations or by strong wave action may have a similar effect.*”

Evidence from the operation of Ned Churchward Weir and Paradise Dam show how difficult it is to manage water levels to specifically stabilize water levels. In these case operations have failed to establish macrophyte beds in the first place to allow lungfish to spawn (QEPA, 2007).

**Recommendation** Section 8.4.3.2

Provide evidence for a mitigation strategy where rapid water level fluctuations or strong wave action has been effective to maintain local-scale macrophyte habitat diversity (to replace loss of scouring flows in the proposed dam).

#### 8.4.3.6 Effects of Cattle Grazing

The EIS states “where cattle had access to waterways they preferentially consumed the para grass.” The STMRCG are concerned that now large tracts of land along the river have been purchased by QWIPL and there are plans to plant 2000-5000 ha of timber plantations, what mitigation plans are there to control the para grass (*Brachiaria mutica*), who will be responsible and who will pay.

**Recommendation** Section 8.4.3.6

The change from 2000-5000 ha of mostly grazing land to timber plantations around the edge of the proposed dam and upstream is highly likely to result in a para grass problem. A mitigation strategy is required to control para grass in the Environmental Management Plan for weed control and costs to control estimated.

#### 8.7 Existing Environment – Macroinvertebrates

The EIS fails to describe the high biodiversity of macroinvertebrates and the central role these communities play in freshwater ecosystems, their natural processes and ‘ecosystem services’ for the following reasons:

- Aquatic macroinvertebrates are organisms without backbones that are large enough to see with the naked eye. They play a vital role in aquatic food webs and are essentially the first of secondary production in aquatic ecosystems. Examples are round worms, snails, shrimps, yabbies, mites, mayfly and dragonfly nymphs, mussels, etc.
- This central role is based on the immense species richness of macroinvertebrates constituting easily over 90% of fauna diversity. Their abundance is even more impressive with well over 99% of all animals living in a river or dam.
- A potential environmental impact of damming the Mary River on macroinvertebrate communities, can only be measured on species level, not on family-level or even order- and class-level (as is used in Tables 8.17, 8.18, Figure 8.19).
  - Interestingly, all other biota (fish, turtles, platypus, macrophytes, riparian vegetation) are treated to species-level (and rightly so) and even the proposed Research Centre bears the word ‘species’ in its name.
  - Hydropsychid caddisflies, leptophlebiid mayflies, simuliid blackflies and pyralid moths, along with other gastropod hatchings, were only recorded in riffle habitat samples (p.8-68).
- Why are freshwater macroinvertebrates treated to family-level only? Often family level is used in a rapid assessment technique for assessing the health of a stream, however it does not produce biodiversity data that can be used as baseline data for assessing environmental impact such as building a dam.
- Many macroinvertebrate families include tens of species in a single catchment, with each species occupying a specific ecological niche and micro-habitat. Using family data, species with distinct habitat requirements are pooled and vital ecological information becomes invisible. This fundamental methodological mistake has serious consequences for the quality of the EIS, critically limiting the information obtained and, consequently, limiting the conclusions that can be drawn.
- Yet, the EIS tries to draw conclusions beyond the information available from family data, and these conclusions are incorrect. Here is one example (of which there are many in section 8.7 and 8.8 ).



- Section 8.7.2.3 “*Only one macroinvertebrate species of conservation significance occurs within the catchment: the Queensland spiny mountain crayfish ...*”. Because the EIS fails to conduct species-level analysis, no statement about the number of macroinvertebrate species present in the Mary River is possible, let alone about rare or locally significant species of high biodiversity value.
- Furthermore, referring simply to “*species of conservation significance*” in the context of the biodiversity value of macroinvertebrate communities is inconsistent with the EPBC Act because:

It is well known that the scientific task to describe, name and map Australia’s invertebrate fauna is still in its infancy, and that the identification of all significant species (high biodiversity value) is even further down the track, as is the designation process of a much needed conservation status under the EPBC Act (1999) and the IUCN (Red List) for many species (e.g. Clarke & Spier-Ashcroft 2001).

As a consequence, aquatic macroinvertebrates are practically absent from the EPBC list ([www.environment.gov.au/epbc/index.html](http://www.environment.gov.au/epbc/index.html)).  
[www.ento.csiro.au/conservation/actionplan.html](http://www.ento.csiro.au/conservation/actionplan.html)).

- Our current lack of knowledge must not be mistaken as a licence to destroy ecosystems that cannot go back to their former state (should we become wiser one day and try to rehabilitate) and will be forever lost. The Mary River catchment in its current (though impacted) state is one of SEQ’s most valuable stream ecosystems.
- In addition to its unique catchment characteristics – as the evolution of such amazing species like the lungfish and the Mary River Turtle that can live to be over 100 years old show – it lies in one of Australia’s regions of highest biodiversity. This setting makes it highly likely that the Mary River is home to several, still unknown, endemic macroinvertebrate species. To discover these species, certainly much more detailed studies of the Mary River system are required than were undertaken in this EIS.
- In suggesting Queensland spiny mountain crayfish (*Euastacus hystricosus*) is the only macroinvertebrate species of concern sharply contradicts core objectives and guiding principles of the ESD Strategy, which the EIS explicitly claims to observe (Executive Summary 3.).
- The ESD core objective, disregarded in chapter 8, is to “protect biological diversity and maintain essential ecological processes and life support systems.” This can only be achieved by using the guiding principle that “where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”.
- In using family-level analysis, the EIS does not even attempt to obtain scientific certainty nor to assess the biodiversity of the macroinvertebrate communities.

**Recommendation**      Section 8.7

In using family-level analysis, the EIS does not even attempt to obtain scientific certainty nor to assess the biodiversity of the macroinvertebrate communities. Macroinvertebrate surveying must go down to species level and cover more than one season of data collection both in the proposed inundation area and downstream to assess environmental impact from damming the Mary River.

## Chapter 9 Matters of National Environmental Significance

### 9.1 Introduction

#### Water Treatment Plant (WTP) and Connecting Pipes

The STMRCG note that each of these components will be subject to separate approvals processes and QWI is not the proponent of these activities. Details of these have not been put up on the Coordinator General's website or referred to the Federal Government even though this is part of the action of building and operating TCD. As such, **the project details must be described, the environmental hazards be identified and assessed in the Traveston Crossing EIS.**

#### Quarrying and sand and gravel extraction

Development of the Meadvale Quarry site will reduce the width of the locally significant koala corridor (fringing notophyll/microphyll vine forest – listed as endangered under the Vegetation Management Act 1999). It is stated in the EIS that “*potential impacts on MNES associated with the expansion of the Meadvale Quarry as a consequence of the needs of the Project are the results are included within this assessment*” and “*there is unlikely to be significant effect on faunal movement due to the recommencement of extraction operations at Meadvale Quarry (Buckley Vann, pers. comm.)*”.

The STMRCG notes that there is no further reference to potential impacts and that the following MNES issues need to be considered:

- Meadvale Quarry site is situated close to Six Mile Creek, an important Mary River Cod habitat area and **no assessment of likely impacts was considered in the EIS;**
- No analysis of rock material is presented in the EIS. **There are concerns that there may be acid generating materials within the Meadvale Quarry deposit.** This would also be of concern for drainage into Six Mile Creek and anywhere this material is quarried and used;
- **Similarly there are no studies presented that support the claim that it is unlikely to have significant effect on faunal movement.**

#### **Recommendation** Section 9.1

**The water treatment plant and connecting pipes being part of the action of building and operating the proposed TCD, must be described and the environmental hazards be identified and assessed in the Traveston Crossing EIS.** This must include details of a proposed pumping intake that will be 30m below the surface water level.

**Research studies need to support the assessment of impact that faunal movement will not be affected by recommencement of extraction at Meadvale Quarry.**

**Potential drainage impacts into Six Mile Creek from Meadvale Quarry need to be assessed considering the significance of the Mary River Cod in that location.**

**Rock material from Meadvale Quarry needs to be assessed for potential contaminants particularly acid generating rock.**

## 9.2 Relevant Matters of National Environmental Significance

### 9.2.1 World Heritage

The Project, being on the Mary River, is also in the catchment for the Great Barrier Reef (Figure 6 from the Reef Water Quality Protection Plan fact sheet at [www.reefplan.qld.gov.au](http://www.reefplan.qld.gov.au)).

**Recommendation** Section 9.2.1

The Mary River has been identified as part of the catchment for the Great Barrier Reef by the State Government in catchment protection plans. **Impacts on the Great Barrier Reef must be considered in the EIS.**



Figure 6 Reef Water Quality Protection Plan fact sheet at [www.reefplan.qld.gov.au](http://www.reefplan.qld.gov.au)

### 9.2.3 Listed Threatened Species and Communities within the Study Area

The following errors and omissions were found:

- **In Table 9.1** (EPBC Act listed threatened species identified potentially within the study area) **there are a number of missing species**. These include the Over Flight Marine Areas (OFMA) species from Table 4.1 of the Supplementary Technical Reports Vol 1 chapter 3 TCD Ecology Program Terrestrial- Fauna and Turtle Component Gap Analysis. Table 4.1 also shows the species that are likely to be breeding within the area, an important consideration when considering the possible impacts on species populations, particularly migratory bird species but which has not been considered in the EIS assessment.
- It is also noted in the report by Ecotone Environmental Services that the information in Appendix E is the “*proposed*” fauna field survey approach and not the “*actual*” survey methods with no details on standard survey techniques used and missing Section 1 and references.
- There is also an incorrect name for the endangered insect *Phyllodes imperialis* (southern subspecies) listed with a common name “Imperial Fruit Sucking Moth”. This is incorrect according to CSIRO scientists and is known to them commonly as ‘southern pink underwing

moth". These moths are not readily attracted to light and they are only on the wing for short periods during the warmer wetter months. The only reliable way to get evidence of the moth breeding in an area is presence of larvae on the food plant (*Carnia multisepealea*) of which some have been identified in the proposed inundation area.

**Recommendation** Section 9.2.3

**Overflight marine area bird species listed under EPBC Act and important breeding details are missing from the EIS. These birds must be included in the listed threatened species.** Survey methods and references used for fauna surveys need to be documented in the supplementary technical reports.

### 9.3 Methodology

It is acknowledged that “*DEW has prepared significant Impact Guidelines*” to assist in self-assessing whether an action is likely to have a significant impact on any MNES” (DEW, 2006). However, there still **needs to be scientific data rigorously collected to support the assessment**. The STMRCG can not find evidence of this supporting data for the following reasons:

- **Presence/absence of data provides no basis for assessing impacts on population numbers.** There is no quantitative methodology specified for assessing the risks that the project poses to populations of threatened species and their habitats. The impact on threatened species must consider loss of habitat, connectivity and fragmentation.
- No formal Population Viability Analyses or Population and Habitat Viability Assessment studies were conducted. These are “*industry-standard*” analyses, ideally suited to assess:
  - Likelihood of future population viability and increase in risks of extinction of nationally listed threatened species;
  - Likelihood of significant increase in risks of habitat damage / loss to RAMSAR wetland.
- It is unclear why these risks have not been properly assessed, but it may be because of:
  - Lack of time for thorough environmental assessment in the EIS (draft produced 2 months following release of Final ToR) leading to a lack of necessary data;
  - Lack of necessary technical skills to conduct the analyses.
- “*Population viability analysis*”(PVA) and “*Population and Habitat Viability Analysis or Assessment*” (PHVA) **are very useful tools** (indeed the only widely-used such analytical tools (Burgman, M. & Possingham, H. P. 2000 and Possingham et al. 2002) **in evaluating risks, particularly to small populations and threatened species.**
  - PVA is a modelling tool that estimates the future size and risk of extinction for populations of organisms. It can be used to estimate the probability of a population going extinct over a given time under different scenarios. A PVA is often only one step of a PHVA.
  - PHVA is a tool to compile, evaluate, and synthesize data and build a framework for conservation actions. It provides an in-depth examination and synthesis of what is known of a species’ life history, ecology, management, and other factors to determine courses of action to manage for viable populations. Assessments include consideration of model analysis, habitat management, captive breeding (if appropriate), genetic factors (if appropriate), life history, status, threats, geographic distribution, education and information, other conservation efforts, human demography, research and any other component deemed necessary.

- In any event, without such analyses (PVA or PVHA), reviewers of the EIS are left with a totally unsatisfactory approach to assessment of risks to MNES, and are thence reliant on the EIS report's "trust me I'm a scientist" approach and "wishful thinking" in respect of recommended mitigation measures.

**Recommendation** Section 9.3

**No Population Viability Analyses or Population and Habitat Viability Assessment studies were conducted.** These are "industry-standard" analyses, ideally suited to assess:

Likelihood of future population viability and increase in risks of extinction of nationally listed threatened species; and

Likelihood of significant increase in risks of habitat damage and loss to RAMSAR wetland.

These tools are required for assessing risk of extinction of MNES.

### 9.3.2 Terrestrial Ecology

The EIS states that "field surveys were conducted for terrestrial flora and fauna by 3D Environmental and Ecotone at numerous sites across the study area in accordance with standard methodologies and with appropriate permits between November 2006 and March 2007". **The STMRCG has concern that the survey time was completely inadequate and the surveys provide inadequate information for decision makers to assess impacts on biodiversity and ecosystems** for the following reasons:

- "The field surveys were conducted within a ten month window between September 2006 and June 2007, with the comprehensive fauna surveys conducted during November 2006 to March 2007 (5 months)" <sup>11</sup> **does not cover a winter period let alone give any information on seasonal variability or yearly variability. The time chosen also was very dry period.**
- The reports failed to employ sufficient trapping effort at both the biotope and landscape scales to adequately assess terrestrial vertebrate fauna. <sup>12</sup>
- Only one EPBC listed flora species (out of potentially 17 species) and only 3 fauna species (out of potentially 17 plus species) were found in the surveying, which can give no indication of population abundance or distribution of endangered, vulnerable and rare species under relevant legislation.
- From Table 9.5, only one EPBC listed flora species, Slender Milkvine (*Marsdenia coronata*), was recorded in the study area. However, **it is known that the following two EPBC listed flora species do occur at Frayne Rd and Hynes Estate Rd within the study area** and were assessed in Table 9.5 as "low likelihood" of occurrence in study area:
  - Ball Nut (*Floydia praealta*)
  - Macadamia sps.
- From Table 9.6, only 3 fauna species were recorded in the study area. However Table 9.6 appears to be missing some of the EPBC listed OFMA species from Table 4.1 of the Supplementary Technical Reports Vol 1 Chapter 3 Traveston Crossing Dam Ecology Program Terrestrial- Fauna and Turtle component Gap Analysis. Similarly it is known that the following 5 EPBC listed fauna

<sup>11</sup> Appendix F-4.3 Traveston Crossing Dam Project Ecological Study: Terrestrial Fauna and Freshwater Turtles

<sup>12</sup> Jason L. Fraser, Graham G. Thompson, Dorian Moro 2003. Adequacy of terrestrial fauna surveys for the preparation of Environmental Impact Assessments in the mining industry of Western Australia Ecological Management Restoration Vol. 4 Issue 3 Page 187 December 2003

species do occur in the study area but were assessed as “*low likelihood*” or “*not likely*” or “*moderately likely*” with no particular data supporting that occurrence rating in the EIS:

In Table 9.6 (and known to be in the study area) are:

- Endangered insect southern pink underwing moth/imperial fruit sucking moth (*Phyllodes imperialis* (southern subspecies)) – Happy Jack Creek area;
- Three-toed Snake-tooth Skink – Frayne Road and Sanders Road area;
- Black breasted Button Quail – Frayne Road area;
- Spotted-tailed Quoll – Chinaman’s Creek area;
- Grey-headed Flying Fox – Estimated 7000 strong flying fox maternal colony in the Hynes Estate Road area.

EPBC listed bird species not in Table 9.6 (but known to be in the study area <sup>13</sup>):

- Cattle Egret (breeds here) – OFMA;
- Great Egret (breeds here) – OFMA;
- Magpie Goose (breeds here) – OFMA;
- Rainbow Bee-eater (breeds here) – OFMA;
- Spectacled Monarch (breeds here ) – OFMA.

**Recommendation** Section 9.3.2

**The field data is insufficient for impact assessment. Field surveys to be continued over a number of seasons and years to gather reliable information on population abundance and distribution so that Population Viability Analyses or Population and Habitat Viability Assessment studies can be conducted.** These are industry-standard analyses.

**EPBC listed Over Flight Marine Areas (OFMA) species need to be assessed and the importance of breeding in the area for these and the migratory birds.**

## 9.4 Results of the Ecology Studies

### 9.4.1 Listed Threatened Terrestrial Flora

*Phyllodes imperialis* (Southern Pink Underwing Moth/Imperial Fruit Sucking Moth) was assessed as not likely to occur in EIS Table 9.6 even though *Carronia multiseppalea*, the host plant, was recorded in two places.

**Recommendation** Section 9.4.1

**The Ecology Study was found to be inaccurate and a more extensive study is necessary before conclusions can be drawn.** An example is that the presence of the host plant should have triggered further surveys to investigate larvae presence of the moth and to predict population density.

### 9.4.3 Listed Threatened Aquatic Fauna and Freshwater Turtles

**There is no assessment of species which may be so adversely impacted by the project that they are pushed into the threatened category.**

<sup>13</sup> Data collected through “Twitching the Mary” bird watching survey conducted in Oct 2007

- An example is the Southern Snapping Turtle (*Elseya albagula*). This species has only recently been described and has not yet been considered for listing under the NCA or EPBC Act but has been identified as a species of conservation concern (EPA, 2007). The Ecotone Fauna Report Appendix F-4.3 p 135 reported that the proposed inundation area supports a significant population of this species both in terms of overall density of individuals and the presence of appreciable numbers of juvenile individuals. The inundation reach is regarded by Ecotone as highly significant for the Southern Snapping Turtle given the threats to the lower Mary River population due to the ageing population structure and a low number of juveniles.

**Recommendation** Section 9.4.3

**Impacts in the EIS have focused only on Matters of National Environmental Significance.** However because of the large extent of the clearing it is highly likely that there will be impacts on other species not yet listed. The Southern Snapping Turtle **is just one example of a species that may be significantly impacted by the project and could lead to pushing the species to being listed as threatened. This wider assessment needs to consider also the displacement of wildlife into already occupied habitats**

#### 9.4.5 Listed Migratory and Marine Species within the Great Sandy Strait Region

The EIS states “An assessment of the likelihood of each species being present within the Mary River and Great Sandy Strait has been undertaken, based on the habitat preferences for that species”. The STMRCG finds the data presented inadequate for the following reasons:

- There is data that has been collected over the years by the Hervey Bay Birdwatchers that shows that Table 9.8 is missing numerous bird species and lacking in local knowledge of occurrences for some species. Table 2 highlights the differences.

Table 2 Bird species not considered in EIS

| Migratory Bird Species in EPBC Act | Identified by Hervey Bay Birdwatchers | EIS Table 9.8 by SKM | Common Name           |
|------------------------------------|---------------------------------------|----------------------|-----------------------|
| <b>Family Accipitridae</b>         |                                       |                      |                       |
| <i>Accipiter fasciatus</i>         | Occasional                            | Not included         | Brown Goshawk:        |
| <i>Accipiter novaehollandiae</i>   | Rare                                  | Not included         | Grey Goshawk          |
| <i>Aquila audax</i>                | Occasional                            | Not included         | Wedge-tailed Eagle    |
| <i>Elanus notatus</i>              | Occasional                            | Not included         | Black-shouldered Kite |
| <i>Elanus scriptus</i>             | Rare                                  | Not included         | Letter-winged Kite    |
| <i>Haliastur Indus</i>             | Common                                | Not included         | Brahminy Kite         |
| <i>Haliastur sphenurus</i>         | Common                                | Not included         | Whistling Kite        |
| <i>Lophoictinia isura</i>          | Occasional                            | Not included         | Square-tailed Kite    |
| <i>Milvus migrans</i>              | Occasional                            | Not included         | Black Kite            |
| <b>Family Charadriidae</b>         |                                       |                      |                       |
| <i>Charadrius bicinctus</i>        | Rare                                  | Not included         | Double-banded Plover  |
| <i>Charadrius ruficapillus</i>     | Common                                | Not included         | Red-capped Plover     |
| <i>Erythrogonys cinctus</i>        | Occasional                            | Not included         | Red-kneed Dotterel    |
| <i>Pluvialis dominic</i>           | Occasional                            | Not included         | Golden Plover         |
| <i>Pluvialis squatarola</i>        | Rare                                  | High Likelihood      | Grey Plover           |
| <i>Vanellus miles</i>              | Common                                | Not included         | Masked Lapwing        |
| <b>Family Falconidae</b>           |                                       |                      |                       |
| <i>Faico berigora</i>              | Occasional                            | Not included         | Brown Falcon          |
| <i>Falco cenchroides</i>           | Rare                                  | Not included         | Australian Kestrel    |
| <i>Falco hypoleucus</i>            | Rare                                  | Not included         | Grey Falcon           |
| <i>Falco longipennis</i>           | Occasional                            | Not included         | Australian Hobby      |
| <i>Falco peregrinus</i>            | Common                                | Not included         | Peregrine Falcon      |

|                                      |            |                     |                                           |
|--------------------------------------|------------|---------------------|-------------------------------------------|
| <i>Falco subniger</i>                | Rare       | Not included        | Black Falcon                              |
| <b>Family Recurvirostridae</b>       |            |                     |                                           |
| <i>Himantopus leucocephalus</i>      | Occasional | Not included        | Black-winged Stilt                        |
| <i>Recurvirostra novaehollandiae</i> | Rare       | Not included        | Red-necked Avocet                         |
| <b>Family Scolopacidae</b>           |            |                     |                                           |
| <i>Arenaria interpres</i>            | Common     | Not included        | Ruddy Turnstone                           |
| <i>Calidris acuminata</i>            | Common     | Not included        | Sharp-tailed Sandpiper                    |
| Sandening : ( <i>Calidris alba</i> ) | Rare       | Not included        | Sandening                                 |
| <i>Calidris canutus</i>              | Common     | Not included        | Red Knot                                  |
| <i>Calidris femiginea</i>            | Occasional | Not included        | Curlew Sandpiper                          |
| <i>Calidris ruficollis</i>           | Common     | Not included        | Red-necked Stint                          |
| <i>Calidris subminuta</i>            | Rare       | Not included        | Long-toed Stint                           |
| <i>Calidris tenuirostris</i>         | Common     | Not included        | Great Knot                                |
|                                      |            | Moderate likelihood |                                           |
| <i>Gallinago hardwickii</i>          | Occasional |                     | Latham's Snipe                            |
| <i>Limicola falcinellus</i>          | Occasional | Not included        | Broad-billed Sandpiper                    |
| <i>Limosa lapponica</i>              | Common     | High likelihood     | Bar-tailed Godwit                         |
| <i>Limosa limosa</i>                 | Occasional | Not included        | Black-tailed Godwit                       |
| <i>Numenius madagascariensis</i>     | Common     | High likelihood     | Eastern Curlew                            |
| <i>Numenius minutus</i>              | Rare       | Not included        | Little Curlew                             |
|                                      |            | Moderate likelihood |                                           |
| <i>Numenius phaeopus</i>             | Common     |                     | Whimbrel                                  |
| <i>Tringa brevipes</i>               | Common     | High likelihood     | Grey-tailed Tattler                       |
| <i>Tringa glareola</i>               | Rare       | Not included        | Wood Sandpiper                            |
| <i>Tringa hypoleucos</i>             | Rare       | Not included        | Common Sandpiper                          |
| <i>Tringa incana</i>                 | Rare       | Not included        | Wandering Tattler                         |
| <i>Tringa nebularia</i>              | Common     | High likelihood     | Greenshank                                |
| <i>Tringa stagnatilis</i>            | Occasional | Not included        | Marsh Sandpiper                           |
|                                      |            |                     | Terek Sandpiper: ( <i>Tringa terek</i> ?? |
| <i>Tringa terek</i>                  | Common     | High likelihood     | <i>Xenus cinereus</i> ???)                |
| <b>Family Grus</b>                   |            |                     |                                           |
| <i>Grus rubicundus</i>               | Occasional | Not included        | Brolga                                    |
| <b>Unspecified Families</b>          |            |                     |                                           |
| <i>Glareola maldivarum</i>           | Rare       | Not included        | Oriental Pratincole                       |
|                                      |            | Moderate likelihood |                                           |
| <i>Sterna albifrons</i>              | Occasional |                     | Little Tern                               |

**There has been no on-ground survey work carried out on the listed Migratory and Marine Species within the Great Sandy Strait Region.** This is a significant flaw in the EIS considering the direct impacts that building a dam will have on the downstream RAMSAR listed Great Sandy Strait Region as a result of:

- Hydrology (change in total flows, change in seasonal timing of flows, short term fluctuations in flows and change in extreme high and low flows);
- Changes in downstream morphology of riverbed and banks, delta, estuary and coastline due to altered sediment load;
- Changes in downstream water quality, effects on river temperature, nutrient load, turbidity, dissolved gases, concentration of heavy metals and minerals;
- Changes in downstream morphology caused by altered flow patterns;
- Changes in downstream water quality caused by altered flow patterns;



- Reductions in riverine/riparian/floodplain habitat diversity, especially because of elimination of floods.

**Recommendation** Section 9.4.5

**Data that has been collected over the years by the Hervey Bay Birdwatchers shows that Table 9.8 in the EIS is missing numerous bird species and lacking in local knowledge of occurrence for some species. A comprehensive study, including on-ground survey work, and consultation with local community groups, must be carried out to collect species distribution and population densities on the listed Migratory and Marine Species within the Great Sandy Strait Region.**

### 9.5.1 Status of Fraser Island World Heritage Area

Error – Figure 9-9 “*Great Sandy Straight*” should be “*Great Sandy Strait*”

### 9.5.2 Status of the Great Sandy Strait RAMSAR Wetland

- Error – Table 9.2 should read 9.10.
- The EIS states “The average annual discharge of the Mary River into the system is 2300 GL. Large inputs of fresh water and sediment occur during flooding on a more or less annual basis (ANCA, 1996).” The EIS hydrological data shows that these are more or less annual flows (1.5 ARI – minor floods) would be largely reduced by building the proposed TCD. The STMRCG is concerned about the likely impacts for the following reason:
  - There is a high likelihood of a significant negative impacts on mangrove vegetation and fisheries dependent on variable salinity to trigger marine species lifecycles.
- The EIS states “*Water quality is generally good, although inputs of sewage, stormwater and agricultural runoff, particularly from the Mary River, may cause a decline in quality (ANCA 1996)*”. The STMRCG has presented data in the hydrology section that other contributing factors to decline in quality include over-allocation of water resources affecting flow, increasing salinity levels with low flows and low dissolved oxygen from excessive aquatic plant growth particularly from Hyacinth and Salvinia.
- The EIS states “*The composition of the sediments in the Great Sandy Strait particularly south of the Mary River, has altered over the last 20 years with a significant increase in the amount of fine mobile sand (FRC, 1994)*”. The following changes in the catchment over that time period include:
  - The installation of the Barrage which has no environmental flow requirements written to the ROP or licence;
  - The last decade has seen flows in the Mary River down to about half of what we have become accustomed to due to climate shift and changes in land use in the catchment such as clearing, forestry, and mismanagement of groundwater (Burgess and Edwards, 2007). This decline in stream flow is the same trend that is occurring in the Murray Darling Basin (Peter Cullen- Wentworth Group *pers. comm.* 2007).

**Recommendation** Section 9.5.2

**The EIS hydrological data shows that these more or less annual flows (1.5 ARI – minor floods) would be largely reduced by building the proposed Traveston Crossing Dam. This is highly likely to have significant impacts on mangrove vegetation and fisheries dependent on variable salinity to trigger marine species lifecycles. More detail is required in this section to describe the interconnectivity of the Great Sandy Strait with the flows of freshwater coming from the Mary River and impacts that exist on it already.**

### 9.5.3 Status of Listed Threatened Species known from the Study Area

#### 9.5.3.2 Southern Barred Frog (*Mixophyes iterates*)

The EIS states 'it does not appear that the Southern Barred Frog occurs along the entire length of the Mary River within the inundation area'. The information presented on the Southern Barred Frog (*Mixophyes iterates*) is incomplete for the following reasons:

- Conclusions about the distribution of *M. iteratus* along the Mary River and tributaries should not be based on the 2006/07 survey effort as this was a time of particularly poor breeding conditions and males were not very vocal compared to other years. More effort along the Mary River is required before the following conclusion can be made. Further survey effort along Yabba and Kandanga Creeks is also required under better breeding conditions.
- The MRCCC have been conducting recent surveys and this shows the main tributaries carrying significant populations of Giant Barred Frog throughout the whole Mary catchment, and consequently also within the inundation area (with the exception of Six Mile Creek), are the Belli/Cedar/Blackfellow, Happy Jack, Skyring, Coonoon Gibber and Six Mile Creek systems.
- The Mary River is currently one of the main strongholds for the Giant Barred Frog (Harry Hines *pers. comm.*, 2007; EPA 2007) following frog declines and disappearances in the 1970s and 80s in upland areas in SEQ and throughout its range in NSW in more recent times. In the Mary River catchment declines were experienced in the Conondale and Blackall Ranges (headwaters of the Mary River Catchment). The Chytrid fungus deemed responsible for the declines (which is the major given reason for the Giant Barred Frog being listed as Endangered under the EPBC Act) operates more effectively at high altitudes where temperatures are lower than lowland areas. Therefore the populations remaining at higher altitudes continue to be at risk and population levels have still not returned to 'pre-frog decline' levels. With upland genetic mixing thus compromised it is even more essential to maintain pathways for downstream genetic mixing.
- Giant Barred Frogs show a preference for 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> order streams (Hughes, 2005) and rarely if ever venture into areas where the stream becomes ephemeral.
- Blackfellow, Happy Jack and Skyring Creeks all rise from the Black Mountain region; an area that is relatively dry and supports drier Eucalypt dominated vegetation. MRCCC searches in the headwaters of these systems have not located Giant Barred Frogs in the past. Belli and Cedar Creeks rise in the Mapleton National Park, which is a moister area, but the creek styles do not provide habitat for Giant Barred Frogs.
- Streams are dry for much of the year in these locations, canopy cover can be sparse and of a composition that is not similar to their preferred habitat of vine forest and gallery rainforest. Traversing from one sub-catchment to another is therefore very unlikely.
- The upper reaches of the Coonoon Gibber lie along the northern extent of the Blackall Range and genetic mixing via this route may be more likely however has not been investigated through surveys.
- MRCCC have concluded that during pre-European times in the project area, genetic mixing was more likely to occur along the main trunk of the Mary River via gradual movement along vegetation corridors and via minor and major flood events. Upland mixing in the upland areas of moist habitat found in the Conondale and Blackall Ranges would have complemented lowland interactions (Eva Ford *pers comm.* 2007)

- Further investigation of the sub-catchment sources for suitable habitat and suitability for frog passage is essential before this means of genetic mixing is relied upon. Revegetation of the main trunk of the Mary River should be supported to enhance its function as a conduit for genetic material.
- There are major knowledge gaps in the Mary River catchment north of Gympie to Doongul Creek in the Burrum River system. There are no known Giant Barred Frog records in this area. Tinana Creek to the east, which joins the Mary River in the tidal section near Maryborough, has Giant Barred Frogs in the mid reaches east of Gympie. Habitat preference would make it unlikely that Giant Barred Frogs would occur in the drier sub-catchments to the west of the Mary River north of Gympie. **This makes the populations within the inundation area even more significant.**
- **There is no evidence to support the postulation on Page 9-42, namely “it is expected that any contemporary movements between tributaries are likely to occur by traversing upper catchment areas where larger continuous tracts of forest persist, rather than via the Mary River riparian corridor”.** It is more logical that the Mary River riparian corridor would be utilised during flooding events.

**Recommendation** Section 9.5.3.2

**Insufficient data is prevented on the distribution and population numbers of the Southern Barred Frog to assess impacts from damming the Mary River at Traveston Crossing.** More survey work is required in determining distribution of catchment wide and seasonal variability.

### 9.5.3.3 Mary River Cod (*Maccullochella peeli mariensis*)

**Information provided in the EIS on the effect of the proposed action on the Mary River Cod populations is incorrect.**

Reasons being:

- It is stated “*The Obi Obi Creek population is on a tributary upstream of the dam and will also not be directly affected by any construction or operational works but may be impacted by population isolation.*” It is likely that this impact would be cumulative because of the likely influence from over-extraction that is planned for Baroon Pocket dam via the Northern Pipeline Interconnector (NPI) Stage 1, proposed to be completed by 2008.
- Similarly there will be a cumulative impact on the Mary River Cod populations from the increased extraction from the Six Mile catchment when Lake Macdonald/Mary River via Coles Crossing pumping station (existing connection where water is pumped from the Mary River to Lake Macdonald treatment plant) supplies water to SEQ via the NPI Stage 2 proposed to be completed by 2009.
- The continuing drought over the western tributaries, particularly Widgee and Munna Creeks, has already had a high impact on survival of remnant Mary River Cod populations.
- The main stream of the Mary River is playing a vital role for the resilience of the Mary River Cod to the climate changes where we are seeing longer periods of drought and increased pressures from over-allocation in the Mary catchment.
- Although Mary River Cod may survive in impoundments, if water quality conditions are met, there is no proof that Mary River Cod will breed in impoundments. Hatchery ponds are an exception where food source and habitat requirements are carefully monitored.

**Recommendations** Section 9.5.3

**The Research and Recovery Plan is overdue for review and this proposal should not be considered until the review is completed.**

Noted as one of the existing controls is to “*restore degraded Mary River Cod habitats.*” **The proposal to rehabilitate riparian areas in the Mary Catchment is supported and should be carried out using government funding even if the dam does not go ahead.**

**9.5.3.4 Australian Lungfish (*Neoceratodus forsteri*)**

Ecology

The information provided in this section is inadequate to satisfactorily determine the effect of the proposed dam on the Australian Lungfish. For example, as noted in the EIS:

“*One individual in an impounded section traversed 48 km at least four times between 1998 and 2001*” and “*evidence that lungfish in the impounded section between Ned Churchward Weir and the Ben Anderson Barrage moved more than those in flowing sections of that system*” would seem to suggest that the conditions in impoundments were less than ideal.

This could mean:

- Problems with feeding or spawning;
- Water quality not suitable; or
- Competition between individuals for habitat.

Hence the lungfish were searching for better conditions.

**Recommendation** Section 9.5.3.4

**The Australian Lungfish’s survival is so little understood that more research is required before any more water infrastructure is built that would destroy existing habitat for this endangered species.**

Populations within the study area affected by the proposed action

**It is noted that only adult lungfish were observed despite other gear types being deployed in habitats preferred by juveniles. This is particularly concerning for any species and especially so for an endangered species.**

**Recommendation** Section 9.5.3.4

**Any action that will destroy key spawning grounds of the Australian Lungfish, such as flooding riffle zones, by building a dam, should be stopped and the “precautionary” principle applied.**

**9.5.4.4 Coxen’s Fig Parrot (*Cyclopsitta diophthalma coxeni*)**

Populations within the study area will be affected by the proposed action. Unfortunately, the field survey period did not coincide with the seasonal fruiting period of local *Ficus spp.* and very few mature fig fruits were present during the surveys.

This is yet another example of insufficient time to adequately survey the fauna of the area.

**Recommendations** Section 9.5.4.4

**Field surveys into the Coxen’s Fig Parrot continue for an adequate length of time to coincide with all seasons so an accurate picture can be drawn on this endangered species.**

Pertinent information provided in the EIS included:

- It is noted in the EIS that there were “no confirmed records from the study area, but potential occurrence based on the presence of food trees, *Ficus spp.*, in the study area” and “there are no records of the species from within the inundation area or nearby area”. This is wrong. There are many confirmed sightings nearby to the study areas: Kin Kin (1999-2000), Eumundi (1997-1998), Mount Borumba (1997), Kenilworth (1997), Maleny (1997-2001), Mapleton Falls and empty nest sites were found in the Kenilworth State Forest and the Conondale Range National Park.
- It is noted from Part 4.3 – 9.2.13 that, “significantly, due to the very cryptic nature and high mobility of this species specific survey effort was not directed to detection of the species as the probability of successfully detecting the species even if present was regarded as too low to warrant survey effort.”
- “As a substitute for this, searches beneath fig trees that were encountered during the surveys were conducted for chewed fruit that could be attributed to the species, and mapping of native fig trees. (*Ficus spp*) within the inundation area was undertaken.”
- “During the February-March 2007 survey some fig trees were carrying early mature fruits. Searches beneath these trees revealed only a couple of chewed fruits that were attributed to larger fruit eating birds that were present (e.g. Figbird).”

**9.5.6.3 Dugong (*Dugong dugong*)**

Some of the information provided in the EIS is incorrect. Note that all references in this section are listed in the EIS document.

On the basis of the following information, **it is unreasonable to assume that dugongs have evolved to cope with changes in seagrass by moving to alternative areas, as there have not been enough studies to accurately determine this, and the recent gene study would appear to refute this assertion.** They appear NOT to be migratory.

**Recommendations** Section 9.5.6.3

The dugong section contains many false statements and flawed postulations. **Consequently, the whole section must be reviewed, new research conducted, assumptions reconsidered and hypothesis re-assessed.**

Where are the studies to check if there has been any decline associated with the recent drought? **Population viability analysis must be used to determine accurately what reduced flow patterns may cause.**

Proof that the information provided in the EIS is incorrect includes:

- The authors draw the conclusion that “it is reasonable to assume that dugongs have evolved to cope with the inherently unpredictable and patchy nature of seagrass meadows by moving to alternative areas known to support seagrass in the past (Sheppard et al., 2006). For example, following a large-scale loss of seagrass in Hervey Bay associated with two floods and a cyclone in quick succession, some animals appeared to survive by relocating to localities such as Moreton Bay, 400 km to the south.”
- In contrast Preen & Marsh (1995) found that dugongs remaining in the region stopped breeding and many died of starvation 6 – 8 months later.

- Recent studies would suggest that “*migratory*” is not a correct description for the behaviour of the dugongs in the Great Sandy Straits. There has been probable low gene flow between populations based in Moreton, Hervey Bay and Shoalwater Bay, based on a genetic study recently conducted. **Dugongs in the region do not necessarily move around much, if at all, so that moving to other foraging areas may not be a realistic option (Lanyon, unpublished data) if significant impacts result from damming the Mary River.**
- The above assertion that “*some animals appeared to survive by relocating*” sounds vague and uncertain. **What method was used to determine if animals relocated or not?**
- Dugongs, are frustratingly difficult to do accurate studies on. Satellite tracking devices have a drawback that the dugong, as a species, spends the least time on the surface on average of any marine mammal. Therefore, satellite tracking has the problem of inconsistent detection ability.
- In surveying dugongs, tide status at the time of a survey greatly influences the result. At low tide, most dugongs are in deep water, so if a survey is taken then, it would seem as if none are present. In the same area, at a different tide level, there may be large numbers of dugongs present. Hence, large scale dugong surveys may have an inherent inaccuracy if these factors are not taken into account (Lanyon, 2007 pers. comm.).
- It is apparent, therefore, from the more recent studies, that the dugong is reliant on local seagrass meadows for its survival. As stated in Appendix F6, only 10% of the seagrass in the Great Sandy Strait is a species that the dugong will feed on, being *Halophila sp.* and *Halodule sp.* The most recent studies that have been done to ascertain the populations and the health of the seagrass in the Great Sandy Straits is from 2001 (see figures 2.10 and 2.11 in Appendix F6 for the most recent study of seagrass health) and 2002 (see figures 2.7 and 2.8 for maps of the seagrass meadows, adapted from McKenzie and Campbell, 2003). There needs to be more recent studies conducted as part of this EIS to determine both the distribution and health of the seagrass as a consequence of the most recent drought. **There has been very little freshwater flow from the mouth of the Mary River in the last 18 months. A study of the seagrass NOW would be more relevant than those done in 2002**, especially since it was noted that:
  - “By February 2002 the total area of seagrass throughout the Great Sandy Strait had increased to levels greater than the pre-flood survey conducted in December 1998” (see figure 2.9, p27 of Appendix F6) It would appear from this information that;
    1. The seagrass in the Great Sandy Strait benefits from a Mary River flood, and
    2. The most recent study of seagrass in the Great Sandy Strait doesn’t include the last 5 years, during the “worst drought in 100 years”.

Proof that population viability analysis is necessary to determine accurately what reduced flow patterns may cause includes:

- According to research conducted by the Marine Vertebrate Ecology Research Group, “significant populations of dugong are found in the Burrum Heads area, and in the Great Sandy Straits, south of the mouth of the Mary River, around Kauri Creek. It is known that flow from local rivers affects both the seagrass beds, and the dugongs that feed there. It would be very difficult to predict what changed flow patterns might do” (Lanyon, 2007 pers. comm.).
- On page 43 of Appendix F6 is section 3.4: Dugong Protection Areas (DPAs) - Dugong Protection Areas are declared in legislation under the Queensland Nature Conservation and Fisheries Acts. The Hervey Bay – Great Sandy Strait Dugong Sanctuary (Figure 3.5) was gazetted as a Zone A Dugong Protected Area in August 1997. It is the largest DPA on the Queensland coast, extending from north of Woodgate to the southern tip of Fraser Island. It includes the Great Sandy Strait adjacent to the Mary River. Zone A DPAs include significant dugong habitats that consistently contain over 50% of the total number of dugong found within the southern Great Barrier Reef region.

- On p71 of Appendix F6: The reasons behind dugong movements are “*poorly understood*” but it appears that they may be in response to environmental variables such as temperature, water levels, salinity (Sheppard et al., 2006), water quality (Schaffelke et al., 2001) and foraging for seagrass (Marsh et al., 1995; Marsh & Penrose, 2001; Sheppard et al., 2006). “*Little is known about the mating of dugongs and it is not known whether mating occurs only in specific areas involving large movements*” (Marsh, 1989). Calving is likely to occur in shallow, specialised areas that are not associated with seagrass beds, and typically occurs between September – November inclusive (Marsh, 1989). **The effect that changes in seagrass have on the mating of dugongs is unknown.**
- On page 69 of Appendix F6 the text states: “*The number of dugong estimated to depend on the seagrass in the Hervey Bay Sandy Strait region is estimated to be 1,708 ±392 in 2001 (McKenzie & Campbell 2003).*”

## 9.6 Assessment of Impacts of National Environmental Significance

### 9.6.1 Impacts on Fraser Island World Heritage Area

#### 9.6.1.1 Sediment Supply

The EIS states “*Sediment output from the Mary River does not drive sediment processes on the west coast of Fraser Island.*”(9-66). However evidence from flood plumes do not support this conclusion. Even the minor flood recorded in August 2007 showed proof of sediment deposited on the west coast of Fraser Island from the Mary River as demonstrated by the following information:

- A recent observation of where the outflow from the Mary River during the recent August flood carried material onto the west coast of Fraser Island, in particular, a carcass of a bovine (cow).
- Whilst visiting Fraser Island on the weekend of 20th/21st October, 2007, Dr Steve Dennis observed the skeleton of a bovine approx 100m north of Mackenzie's Jetty, approximately 5kms south of the Kingfisher Bay Resort. As a Veterinarian of 22 years experience in large animal practice, he had no trouble identifying the skeleton as that of a bovine animal.
- On seeking further information regarding this, he spoke to one of the Kingfisher Bay Resort Rangers, Linda. She confirmed that the carcass had been carried onto the beach by the “huge” wave action that developed and battered the west coast of Fraser Island during the flood event on the Mary River in late August 2007.
- The ranger reported that the carcasses provided some much needed nutrition for some local dingoes, as the dingoes have a limited supply of available meat due to lack of prey animals (Dr Steve Dennis per comm..., 2007).

#### **Recommendation** Section 9.6.1.1

Claims by the EIS that sediment output from the Mary River does not drive sediment processes on the west coast of Fraser Island are incorrect. Flood plumes and even minor floods such as the one in August 2007 have left evidence of sediments from the Mary River.

### 9.6.2 Impacts on the Great Sandy Strait RAMSAR Wetland

The EIS states, “Overall, the dam will not have a substantial impact upon the values of the Great Sandy Strait Ramsar wetland. The impact is expected to be negligible.” The STMRCG do not believe the evidence presented in the EIS is adequate to support that conclusion for the following reasons:

- There is no science presented on surface and groundwater base flows that is required to demonstrate protection of state significance wetlands in the RAMSAR.

- The EIS does not adequately address identified potential fisheries productivity impacts as the Mary Basin WRP flow schedules design process did not include contemporary research on fisheries and estuarine productivity requirements. This lack of knowledge is backed up by the following comments from the FRC Marine Ecology Report Appendix F-6.1 p98 suggesting more research to understand the impacts and freshwater flows.
  - “The only likely risk of an impact to the ecology of the Mary River estuary and Great Sandy Strait is related to a reduction in freshwater flows, which could potentially adversely affect invertebrate and fish productivity. This risk is rated as low” and
  - “This could impact the commercial and recreational fisheries of the region, and there is a small risk that it could have flow-on effects to a group of indo-pacific humpbacked dolphins in the northern Great Sandy Strait.”
  - Mitigation measures for the estuarine and marine receiving waters should therefore focus on gaining a better understanding of the nature of any potential impacts to fisheries productivity, so that any impacts can be minimised.” and
  - “We recommend a scoping study to correlate historical and present flow regimes with fisheries productivity, in order to determine past and present impacts of water extraction from the catchment on fisheries, and to determine the relationship between flow and productivity for the Mary River estuary.”
  - “This could be done based on correlative analysis of commercial catch data and freshwater flow, as has been done for a number of estuaries in Queensland (Robins et al 2005). ... The study may help to determine likely thresholds for reductions in freshwater flow magnitudes that result in negative impacts to fisheries.”
  - “The results of such a study would provide a more accurate assessment of the likely impacts of the dam to fisheries productivity, and whether additional environmental flows from the dam are likely to be required. Once the dam is operational, the monitoring should be undertaken to inform adaptive management of environmental flow releases from the dam.”
- The EIS has not shown how the project will not impact highly protected areas (Marine parks) and existing values within the RAMSAR.
- The EIS fails to identify and list the use (economic and non economic) values of these areas, which may be effected by the project, as required by the RAMSAR Convention BMP.
- The EIS fails to identify ecological processes within highly protected areas, which maybe freshwater flow dependent and how proposed environmental flow objectives (EFO’s) will adequately mitigate for these ecological processes.
- The EIS fails to adequately identify the environmental, social and cultural relationships linking the RAMSAR values and how the WRP EFOS recognize these relationships.
- The EIS raises the issue of water quality and the requirements of migratory Cetaceans (humpback whales) but assumes that EFOS will adequately mitigate despite no current understanding of the levels of freshwater flows for maintaining suitable water quality, for interim residences of the species.
- The EIS fails to demonstrate how project is consistent with the purposes and objects of the *Marine Parks Act 2004*, *Marine Parks Regulation 2006* and , the *Marine Parks ( Great Sandy) Zoning Plan 2006*.
- No adequate discussion of flow modification impacts on JAMBA and CAMBA (international migratory bird agreements).



- No linkage to *State Coastal Management Plan (SCMP) and Draft Widebay Coastal Management Plan (DWBCMP) policies for ‘Areas of Natural Significance’ (Natural Resources)*.
- EIS fails to adequately deal with the legislated requirement of the Water Act 2000 for ecological and environmental values of the RAMSAR to be maintained under the Environmental Protection Policy (water) for scheduled waters of the GREAT Sandy Region.
- EIS fails to adequately address SCMP policy 2.8.3; b (iii) “retaining the current extent and quality of migratory and resident shorebird roosting and feeding habitat. (iv) maintaining the values and integrity of fish habitats and fish migratory pathways through suitable management measures including buffers for those habitats;
- (v) Protecting the values and integrity of soft bottom (benthic) communities; “
- EIS fails to adequately address DWBCMP policy 2.8.3 Coastal Biodiversity; Marine *and Estuarine Biodiversity* (including intertidal habitats)
  - “protection of intertidal communities, including significant mangrove and shorebird habitats such as salt flats”
- EIS has paucity of information sufficient to determine if there will be impacts to macrobenthic communities and reductions in productivity for shorebird feeding areas within both the RAMSAR and Maroom Fish Habitat area A
- The FRC consultants paper fails to recognize that suitable EFOS for macrobenthic and resulting trophic layering within the RAMSAR, are currently unknown.
  - Macrobenthic productivity is a vital ecosystem process as described below.
    - Macrobenthic productivity is linked to fisheries value (Currie and Small 2005): *“Species richness and abundance were highly correlated (positively) with turbidity measurements observed 4 months previously. This finding suggests that high levels of turbidity promote recruitment and growth of benthic organisms in Port Curtis. Strong correlations between regional rainfall, freshwater inflow, nutrient and chlorophyll a concentrations, further support the hypothesis that recent changes in benthic productivity (as defined by total infaunal abundance) within the estuary are principally the result of long-term climatic cycles including El Nino events.”*
  - An example of dependence of subsequent trophic layers on benthic productivity is that of Platten (2007), who found there was a positive correlation between recreational whiting catches and macrobenthos. Platten (2007) and Robins et al 2007 demonstrated that a freshwater flow threshold may be required before a defined flow/catch correlation exists between recreational whiting catches and freshwater flow
- There is a need to demonstrate EFOs, trophic modelling and species life cycle conceptual models within the Mary estuary/Northern Great Sandy Strait and Harvey Bay for:
  - Seagrass and subsequent trophic layers eg dugong and green turtles
  - Macrobenthos and subsequent trophic layers eg whiting, shorebirds in the RAMSAR area, hawksbill and loggerhead turtles, dolphins including Indo-Pacific humpback dolphins
- Detritus and subsequent trophic layers eg prawns, bass, barramundi, threadfin salmon, catfish, dolphins including Indo-Pacific humpback dolphin Wetlands and wetland- dependent species such as water mouse.

- EFOs need to be developed to determine **migration cues** in estuarine waters of the Mary River and Great Sandy Strait
- EFOs determining **habitat connectivity** (Robins et al) need to be developed.
- Trophic modelling between various benthic habitats and higher trophic layers needs to be taken into account when devising EFOs.
- Robins et al 2007 recommend that "*Conceptual models of each species of interest should be used to determining at which stages of a species life-cycle freshwater flows were most likely to influence. This may be achieved using quantitative data for the biology of a species or hydrological data*".
- Recommended procedures for assessing the changes in Queensland's estuarine fisheries production within the Mary River Basin and Great Sandy RAMSAR Wetland, that result from water abstraction and regulation are outlined by Robins et al 2002 (p182).
- Research is required to determine these requirements before project commencement (Application of precautionary principle).
- The EIS states, "Fluvial geomorphology predicts that the dam will reduce the amount of fine sediment reaching the Mary River mouth by 13-20% and the amount of coarse sediment reaching the mouth by 3-6%" (F-6 p 84). However, it also states, "*these estimates do not account for changes to bank erosion rates associated with a changed hydrological regime post dam construction.*" The extensive bank erosion downstream of the dam wall has not been taken into account and is highly likely to be very significant. Therefore any conclusions drawn from the sediment load is inconclusive and more detailed modelling such as SedNet must be carried out to assess the impact. **There is a legislative requirement under the Water Act 2000 (QLD), that ecological values and WQ of HEV waters scheduled under EPP(water) be maintained.**
- Quantities of both fine and coarse sediment and hydraulic processes for their movement within the lower Mary estuary and Great Sandy Strait need to be maintained to ensure current sandbank, seagrass and macrobenthos distribution is maintained within the intertidal meadows.
- Conclusions in the Executive Summary conflict with F-6 and the scientific literature, Impacts on benthic macroinvertebrate communities are unable to be substantiated by current knowledge.
- Impacts on listed migratory species are inadequately assessed, because EVR and CAMBA and JAMBA shore bird species are omitted from section 8.4, Include listed migratory shorebird species under the JAMBA, CAMBA and Bonn convention and assess impacts eg possible alteration of macrobenthos productivity on Sandbanks (feeding habitat for shorebirds) due to inadequate EFOs; possible alteration of sandbank sediment/ nutrient composition.
- Harding et al (2005) note the Ramsar area has internationally significant numbers of nine species of shorebird including: Eastern Curlew, Grey-tailed Tattler, Lesser Sand Plover, Terek Sandpiper, Wimbrel, Bar-tailed Godwit, Pied Oystercatcher, Greenshank and Grey Plover, many of which listed as JAMBA, CAMBA or migratory species.
- Islands in the Great Sandy Strait (Woody, Picnic, Duck and Little Woody Islands) are habitat for nesting resident shorebirds, which utilise feeding habitat on sandbanks and rocky shores of the strait (Milton and Harding 2007). Reduction in flows from the Mary River proposed if the Traveston Dam were built will impact on the macrobenthos productivity of this area.
- **Counts at high tide roosts** are considered the standard way of monitoring migratory shorebird numbers (Rogers et al 2007). There are 51 roost sites in the Great Sandy Strait, 34 of which are considered of National Significance (Harding et al 2005). Shorebird roosts within the Maaroom Fish Habitat Area A north to Point Vernon could be monitored to detect whether any decline in shorebird populations correlates with a decline in macrobenthos productivity linked to modification of environmental flows from the Mary River. Surveys by Qld Wader Study Group



since the 1980s provide baseline survey data for roosts for the Great Sandy Strait (Milton and Harding 2007).

- Information is insufficient to demonstrate that the dam “is not likely to affect the resting, breeding or foraging habitat of any species”(F-6 p94 Table 8.3). Information provided is not sufficient to address impacts (3), (4), (5) or (6) on Listed Threatened Species. Information provided are not sufficient to conclude that there are no significant impacts on any State or federally listed threatened species. For these conclusions to be reached, environmental flow objectives for macrobenthos need to be determined.
- Information is insufficient to demonstrate that “no important habitats to migratory species will be modified or destroyed”(F-6 pp 95-96 Table 8.4). Migratory shorebird feeding habitat on sandbanks, and core feeding habitat for Indo-Pacific Humpback Dolphin depend on macrobenthos productivity which is linked to environmental flows.
- EFOs have not been determined using contemporary fisheries productivity research findings (Halliday & Robbins 2007) .
- FRC consultants have recommended a scoping study to correlate historical and present flow regimes with fisheries productivity (F-6 p98). It is recommended that this study be expanded to include macrobenthic productivity and likely flows under climate change, (*SCMP Policy 2.4.1 Water quality management/ EPP (water)/ As for Item 16 and Item 7*) , Environmental flows relating to fisheries, macrobenthos and values of Highly Protected Areas of the Great Sandy Marine Park need to be determined.
- The EIS states, “*the dam will cause a very minor shift in the ratio of sediment types currently present in the Mary estuary and Great Sandy Strait, It is therefore expected that changes in geomorphology due to the dam would not result in a major shift in Benthic macro-invertebrate structure*”. This is not substantiated within the FRC consultant’s report, Information is required on likely changes to extent and composition of sandbanks and benthic substrates in the Great Sandy Strait and Hervey Bay.
- Changes in sediment types (ie replacement of mud with sand were shown to affect seagrass recovery from flooding and species composition post-flooding (Campbell and McKenzie 2004). It is not known whether altered sediment composition, flood frequency and magnitude will modify sediment and nutrient delivery to deepwater seagrass communities in Hervey Bay.
- Conceptual models of water temperatures predicted under climate change and impacts on corals and seagrass in the Great Sandy Strait and Hervey Bay, need to be provided . Recent bleaching events at Hervey Bay coral reefs were reported in F-6, who suggested that rising water temperatures in Hervey Bay were a contributing factor. Water temperatures greater than 31 were recorded during 2006. Productivity of tropical seagrass species also starts to decline above 30C (Fong and Harwell in Waycott et al 2007) and increased temperature may also alter seagrass distribution and abundance through direct effects on flowering and seed germination. A rise of 5C will result significant loss of seagrass in shallow or “*Decreases in turbidity may occur at certain time of the year and could lead to changes in macro- Invertebrate community structure.*” Consequences of this change in structure are not discussed.
- Currie and Small (2005) found that turbidity and suspended sediment led to an increase in productivity of macrobenthos, which conflicts with the following conclusion in the EIS:
- “*Decreases in the concentration of suspended solids may increase the distribution of macro-invertebrate taxa, which may lead to an increased abundance of organisms that prey upon these organisms, such as wader birds and fish species.*”
- Environmental Values for the lower Mary estuary and the Great Sandy Strait are not listed or considered in the EIS. No auditable conditions are developed for Scheduled High Ecological Value aquatic ecosystems in the lower Mary estuary, the Great Sandy Strait and Hervey Bay



- Current information does not demonstrate adequate mitigation for High Ecological Value waterways scheduled in the lower Mary estuary, the Great Sandy Strait and Hervey Bay. Issues which need to be addressed include:
  - Identification of valuable features of scheduled HEV areas and processes which are linked to these features and trigger thresholds of freshwater flows required to maintain key life-history requirements of these features. These life-history requirements may include quantities, timing and hydraulic characteristics of freshwater flows for: estuarine and marine species migration, Spawning success, advection of eggs and larvae, species competition and distribution, productivity and food supply and likely reductions in water quality (Drink water and Frank 1994 in Halliday & Robins 2007);
  - Ecosystem processes likely to be impacted by flow modification eg macrobenthic productivity and timing requirements for life history stages of valuable feature; modification to natural cyclical processes eg disturbance and recovery; currents; benthic-pelagic coupling;
  - Extent of modification to lateral freshwater- estuarine linkages in the lower Mary floodplain as required by species such as burramundi and mullet (Halliday and Robins 2007);
  - Impacts of freshwater flow modification and timing on thermohaline circulation in hypersaline Hervey Bay and related current modifications (see Ribbe 2007);
  - Modifications to fish growth eg mullet (Cardona 2000 in Halliday Robins 2007).
- There is potential for modifications of water table of the lower Mary/Great Sandy Strait to exacerbate conditions suitable for *Lyngbaea* blooms eg through mobilisation of iron into surface waters of the Great Sandy Strait and Hervey Bay.
- Mary River Water Resource Plan does not currently allow for flushing flows to wash aquatic weeds such as water hyacinth downstream. Flushing out of significant beds of aquatic weeds may exacerbate eutrophication in the Great Sandy Strait.
  - FRC paper fails to link potential flow reduction impacts on fisheries productivity and *Sousa chinensis* ( Migratory species under the BONN Agreement);
  - FRC paper recognizes that flow regime related impacts are possible, but postulates that impacts would be minimal despite the absence of knowledge of likely impacts to fisheries productivity. The paper predicates on there being no impact to the species , despite a possibility of a ‘substantial impact’ on productivity , ie a failure to adopt the precautionary principal;
  - FRC paper fails to identify significant coastal wetlands which may be groundwater dependent and the likely hood of base flow disruption;
  - Current extent of sea grass wetlands which are influenced by aquifers from mainland base flows in unknown EIS fails to acknowledge this;
  - No baseline data for prediction of minimal impacts to RAMSAR .
- FRC paper fails to identify potential climate change impacts and the likelihood of reduced EFO’s ( SCMP Policy 2.2.1 requires that an assessment be made of the potential impacts; saltwater intrusion of estuaries and aquifers; changes in the characteristics of near-coastal surface and groundwater due to the predicted long-term changes to rainfall patterns; changes to coastal and estuarine processes resulting in altered sediment deposition patterns in near shore areas; alteration of marine biodiversity and displacement of coastal wetlands (also refer to policies 2.8.1, 2.8.2 and 2.8.3); possible reduction in water quality in coastal rivers;

- EIS fails to respond to *SCMP policy 2.8.1*. (vi) “retaining and protecting the existing extent, quality and functionality of seagrass beds, particularly in dugong protection areas or known areas of turtle habitat.”
- EIS fails to respond to *Draft Widebay Coastal Management Plan policy 2.8.3 (Marine and Estuarine Biodiversity)* (including intertidal habitats):
  - ‘Establishment of environmental values and implementation of water quality objectives for coastal estuarine and marine waters, including consideration of downstream discharges and environmental flows ( refer to policy 2.4.1 *Water quality management*, 2.4.2 *Wastewater discharges to coastal waters*, 2.4.4. *Stormwater management* and 2.4.5 *Groundwater quality*);
  - Protection of marine species of special conservation significance, including dugong, whales and dolphins, turtles (refer to policy 2.8.6 *Marine turtles*) and grey nurse shark;
  - Protection of significant benthic communities, including seagrass beds and inshore and offshore coral and other reefs;
  - Protection of intertidal communities, including significant mangrove and shorebird habitats such as salt flats.
  - In respect of the above, the maintenance of habitat condition is as important as the absolute protection of habitat from immediate loss or fragmentation. Establishing best management practice across a broad range of natural resource management issues is essential for the maintenance of habitat condition.”
- EIS fails to provide adequate information to allow an audit regime to be initiated for seagrass communities and potential impacts to be monitored and identified.
- EIS fails to discuss hypersalinity issues researched by Ribbe et al 2006 and linkages to water extraction and/or climate change , and dugong population (sea grass) limitations as identified in Holley 2006 (portal.ecu.edu.au/adt-public ).
- EIS fails to provide sufficient information on the potential impacts to sea grass beds which this species rely on .
- EIS fails to provide sufficient information on aggregation of *Chelonia mydas* within the RAMSAR.
- EIS fails to provide sufficient information on distributions of *Chelonia mydas* within the RAMSAR.
- EIS fails to provide adequate information to determine potential impacts to *Xeromys myoides*.
- Further information should be provided on the relationship between freshwater wetlands with aquifers/base flows of the lower Mary floodplain and specific groundwater- related requirements of false water rat.
- Further information should be provided on the likely impacts of Traveston Dam on water quality in the lower Mary floodplain. Further information should be provided on likelihood of saline groundwater intrusion and extent thereof.
- “Maintenance of high quality mangrove system and adjacent native vegetation communities, high water quality and natural hydrology are important factors in the long-term protection of the species... Any reduction in estuarine health has the potential to impact upon *X. myoides* populations but to what extent is an unknown factor” (Burnham unpubl.2002) Water mice typically live on the ecotone between supralittoral habitats often containing freshwater wetlands; and saltpan or mangrove estuarine habitat, often adjacent to ground water soaks. (Burnham, pers. Comm.).”

- Information on estuarine water quality is inaccurate or incomplete. EPA ambient water quality information shows that water quality is good within the Ramsar area in the lower Mary estuary, the Great Sandy Strait and Hervey Bay.

**Recommendation**

Section 9.6.2

There is insufficient evidence presented in the EIS to adequately support the conclusion that the dam will not have a substantial impact upon the values of the Great Sandy Strait RAMSAR wetland. Extensive recommendations are listed in this section and the submission by the Greater Mary Association.

Recommended procedures for assessing the changes in Queensland's estuarine fisheries production within the Mary River Basin and Great Sandy RAMSAR Wetland, which result from water abstraction and regulation, are outlined by Robins et al (2005).

**9.6.3 Impacts on Listed Threatened Species known from the Study Area**

The STMRCG do not believe the evidence presented in the EIS is adequate support the conclusions on impacts outlined in Table 9.14, 9.15, 9.16, 9.17, 9.18 for the following reasons:

- The data collection and predictive studies have not met the General EIS Guidelines (ToR p11) Dot points 9 and 10.
  - 9. Rigorous assessment ... The extent of baseline and predictive studies should be commensurate to risks. ... An estimate of the reliability of predictions should also be provided.
  - 10. Consideration ... undertaking baseline and predictive studies to address all controlling provisions triggered by the proposal.
- Industry-standard' analyses such as formal Population Viability Analyses (PVA) or Population and Habitat Viability Assessment (PVHA) studies are ideally suited to assess:
  - Likelihood of future population viability and increase in risks of extinction of nationally listed threatened species; and
  - Likelihood of significant increase in risks of habitat damage / loss to Ramsar wetland.
- In any event, without such analyses, reviewers of the EIS are left with a totally unsatisfactory approach to assessment of risks to MNES. Failure to conduct such analyses leaves the fate of the threatened species and habitats very much to 'hearsay' type evidence, rather than a rigorous mathematical assessment based on biological, ecological and demographic data for the species concerned.
- An independent assessment has been conducted and results presented (DeVantier 2008) A summary of significant impacts to threatened species based on the criteria as per EIS Table 9.3 is shown in the Table below. Each question was evaluated, based on the evidence presented in the EIS, publications and expert opinion, on a 4 point range of answers: No, Possibly, Probably, Yes. Answers other than 'No' raise serious cause for concern as to the risks posed to the threatened species by the proposed dam.

Summary table of Questions in respect of significant impact criteria, MNES and selected threatened Species

\* - in absence of Population Viability Analysis.

| <b>An action is likely to have a significant impact on a (sic.) endangered species if there is a real chance or possibility that it will:</b> | <b>S. Barred Frog</b> | <b>Mary R. Cod</b>                             | <b>Lungfish</b>                                     | <b>Mary R. Turtle</b>                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------|
| 1. lead to long term decrease in size of population?                                                                                          | Probably *            | Possibly *                                     | Probably *                                          | Probably *                                              |
| 2. reduce the area of occupancy of the species?                                                                                               | Yes                   | Probably                                       | No<br>(decadal)                                     | Yes                                                     |
| 3. fragment an existing population into two or more populations?                                                                              | Probably              | Yes                                            | Yes                                                 | Yes                                                     |
| 4. adversely affect habitat critical to the survival of the species?                                                                          | Yes                   | Possibly                                       | Yes                                                 | Yes                                                     |
| 5. disrupt the breeding cycle of a population?                                                                                                | Probably              | Probably                                       | Yes                                                 | Yes                                                     |
| 6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?   | Yes                   | Possibly                                       | Yes                                                 | Yes                                                     |
| 7. result in invasive species that are harmful to the species becoming established?                                                           | Probably              | Probably                                       | Probably                                            | Probably                                                |
| 8. introduce disease that may cause species decline?                                                                                          | Possibly              | Possibly                                       | Possibly                                            | Possibly                                                |
| 9. interfere with the recovery of the species?                                                                                                | Yes                   | Probably                                       | Probably                                            | Yes                                                     |
| Total of answers other than definitive 'No'                                                                                                   | 9 / 9                 | 9 / 9                                          | 8 / 9                                               | 9 / 9                                                   |
| Proposed mitigation strategies                                                                                                                | Untried               | Untried or<br>tried with<br>limited<br>success | Untried or<br>tried with<br>very limited<br>success | Untried,<br>potentially<br>cause increased<br>mortality |

Results of this summary analysis demonstrate that the dam does pose significant negative risks to these species, based on the EPBC criteria in the EIS, and in many instances as evidenced by statements in the EIS itself. Importantly, an explicit consideration of the predicted impacts of climate change in respect of most of the above criteria only adds further weight to the conclusion that the dam poses significant risk to these MNES.

Table 9.18 Mary River Turtle - Point 6. Will the proposed works modify, destroy, remove or decrease the availability or quality of habitat to the extent that the species is likely to decline?

**A key issue is the impact of reduced sediment transport and increased vegetation encroachment on the sand banks that provide critical habitat for turtle nesting**, including the endangered Mary River Turtle. Loss of exposed sand is critical as loose sandy substrate (rather than finer material such as silt) is specifically required by the turtles.

- In Appendix F 2.1 Executive Summary it is stated that “Two previous sediment transport studies have been undertaken for the Mary River catchment using the CSIRO developed SedNet model to investigate sediment sources and transport processes.” Comparison of the results from these studies (undertaken by NRW and CSIRO) indicates that the SedNet model is extremely sensitive to the input parameters. Neither of the previous SedNet investigations included consideration of the impact of the proposed TCD.
- A spreadsheet model was developed for the current study to enable a preliminary evaluation of the potential sediment-related impacts of the dam. This approach was used as it was not possible to develop a fully functioning SedNet model within the timeframes of this project. The current study utilises the SedNet approach to investigate catchment-scale sediment budgets but does not investigate potential geomorphic or stream health impacts or changes to the sediment budget.

**Recommendations** Section 9.6.3

**It is recommended that a full SedNet model of the proposed TCD be undertaken to reduce the uncertainty around the load estimates provided by the spreadsheet model investigating sediment sources and transport processes.** This is particularly relevant to the Mary River Turtle. The SedNet analysis would also need to be supported by a full geomorphic review to identify significant geomorphic changes which may be induced by the modified hydrologic regime and sediment balance. This review would also need to investigate the potential impacts associated with reduction of floodplain deposition (e.g. reduction in nutrient exchange between the rivers and floodplains).

- The SedNet model would need to consider the input parameters from the two previous studies and select appropriate values relating to the current situation in the Mary River. This in itself would significantly reduce the uncertainty around the load estimates. Application of the model would also enable assessment of potential changes to bank erosion caused by the proposed dam, which was not possible using the spreadsheet model.
- These points highlight that the sediment studies have not been done that would assist in assessing the impact on downstream turtle habitat and nesting sites. Turtle population ecology should also be investigated in relation to changes in habitat, food supplies and nesting areas.

### 9.7.2.1 Freshwater Species Conservation Centre

The EIS states “*QWI proposes the establishment of a Freshwater Species Research Centre to be constructed by QWI and to be operated by the University of Queensland for an initial period of ten years*”. **The STMRCG have concerns that the construction of a Freshwater Species Research Centre is not a mitigation measure to remove or reduce the impacts of the proposed dam project on threatened species and ecosystems** for the following reasons:



- The strategies of the Centre, i.e. research and management, education, and status evaluation, are all very important, but the results from the implementation of these strategies will come too late to mitigate the impacts of the proposed project if it is to go ahead.
- Indeed, many of the proposed outcomes of the Centre should have been part of the EIS and pre-requisites for making an informed decision on the proposed project. These include:
  - “Determine lungfish, cod and turtle movement requirements and design the most effective transfer device/s”;
  - “Determine the key habitat requirements for the species”;
  - “Develop a sound model of population dynamics and recruitment; Determine and monitor the status of lungfish, Mary River cod and Mary River Turtle populations throughout their range...”, (EIS p.9-89),
- The following EIS cumulative impact assessment conclusions do not conform to the Precautionary Principal:
  - “Ensuring the survival and improving the status of these iconic species would be a very significant achievement of the Project and research outcomes could be used at other dams” by “Key research to improve the status of species and retro-fit outcomes to existing infrastructure” and
  - “Via the interpretative centre, foster school visits...”(EIS p.17-58)
- **To build a dam that destroys threatened species’ habitats to initiate research and education programs to ensure or improve survival chance of the species does not meet the objectives of the Precautionary Principle defined as follows “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”**

**Recommendation** Section 9.7.2.1

**The construction of a Freshwater Species Research Centre is not a mitigation measure to remove or reduce the impacts of the proposed dam project on threatened species and ecosystems.** Many of the proposed outcomes of the Centre must have been part of the EIS and pre-requisites for making an informed decision on the proposed project including:

1. Determine lungfish, cod and turtle movement requirements and design the most effective transfer device/s;
2. Determine the key habitat requirements for the species;
3. Develop a sound model of population dynamics and recruitment;
4. Determine and monitor the status of lungfish, Mary River cod and Mary River Turtle populations throughout their range

## Chapter 10 Air

### 10.2 Potential Impacts and Mitigation Measures

#### 10.2.5.2 Construction

##### Energy Consumption

It is stated that “*the electricity consumed in construction materials embodied in the dam wall would be reported by the cement manufacturers and have therefore not been reported here as an indirect emission*”.

- However, in the guidelines, a group of indirect emissions that occur as a result of the project are considered as Scope 3 emissions. The guidelines say that they should be included where they are considered to be significant when compared to direct (Scope 1) and indirect emissions (Scope 2). The EIS shows in chapter 20 pages 8-81, that there are to be 652,000 cubic meters of roller compacted concrete in the wall. Assuming 10 bags of cement to the cubic metre, then it will take 6.52M bags @ 40kgs =250M kilograms of cement or 250 000 tonnes.
- Current estimates for CO<sub>2</sub> emissions from cement manufacture are ca .990 grams per kg.
- **The main greenhouse gas emitted by the cement industry is CO<sub>2</sub>. Consequently, approximately 247,000 tonnes of CO<sub>2</sub> will be produced by the cement required for the wall.** This has to be significant when compared to:
  - Direct (Scope 1) 36,699t CO<sub>2</sub> -e over the 2.5-year construction period calculated from Table 10.8 Direct Annual Greenhouse Gas Emissions During Construction (Diesel and Explosives); and
  - Indirect emissions (Scope 2) of 9,061 t CO<sub>2</sub> -e over the 2.5-year construction period calculated from Table 10.9 Indirect Annual Greenhouse Gas Emissions during Construction;
- Scope 3 emissions during construction include embodied carbon in materials; transport of materials from the point of manufacture to the project site, transport of staff to and from the project site, emissions associated with the design and documentation works (i.e., emissions associated with the engineers, etc doing the design work), emissions associated with waste and the transport of waste, extraction of the raw materials and processing into steel etc.
- The authors have referenced the National Greenhouse and Energy Reporting Bill (which is now an Act) and have used the processes outlined in that document to justify excluding some Scope 3 emissions. It is perplexing why they are counting transport Scope 3 emissions from truck movements but nothing else. The NGER Act was designed for a specific purpose of reporting emissions from polluters - not for EISs where the objective is to assess total emissions from a project and compare it to alternatives.
- During operations, the Scope 3 emissions include embodied carbon in maintenance materials (eg, replacement light bulbs, new paint coverings) water treatment and pumping/distribution (including sewage pumping and treatment, emissions from employees moving to and from the site, and controversially - it could also include emissions associated with the downstream use of a resource. In the case of water, if this water was used downstream to provide cooling to a power station or used in a steel manufacturing process, it could be argued that the emissions from those processes should also be considered a Scope 3 emission. Similarly, if this water reduces demand on another regional water source so that the other source could supply water to a power station, then the emissions from the power station could also be a Scope 3 emission.

It is stated that estimates following the methodology outlined in the Intergovernmental Panel on Climate Change (IPCC) Guidelines for *National Greenhouse Gas Inventories: Volume 4* (IPCC, 2006) have been

used to provide a general indication of the possible annual rate of emission. Using the IPCC default assumptions for a 3039 ha. dam within a dry warm temperate environment annual CO<sub>2</sub> -e emissions of around 5 770 tonnes/yr could occur. **It is important to note the high uncertainty in this default emission estimate which is a result of the variability in site-specific conditions.” Using the guiding principle from Ecological Sustainable Development**, 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. **We suggest that 5 770 tonnes/yr is a gross underestimating based on the following information:**

- The climate within the proposed inundation area would more likely be classed as a “moist warm sub-tropical” environment than “dry warm temperate” which would mean that a far greater diffusive emissions factor should be used from Table 2A.2 of the Vol 4 IPCC guidelines. Very little research in the area of greenhouse gas emissions from dams have been done in Australian conditions and this requires more research before any greenhouse gas predictions have any accuracy.
- The most recent International Rivers Network publication on Greenhouse Gas Emissions from Dams (IRN, 2007) states, “The thermal, chemical and biological conditions in tropical reservoirs mean that their methane emissions are one or more orders of magnitude higher than those from reservoirs elsewhere. Large, shallow tropical reservoirs have the highest emissions.”
- **The impact on CO<sub>2</sub> absorption from trapping sediment in the dam has not been included.** Rivers play an important, although still poorly quantified, role in the global cycles of carbon and nutrients such as nitrogen, iron and silicon. These cycles help regulate the concentration of CO<sub>2</sub> in the atmosphere. By interrupting these cycles, dams could have a significant climate impact above and beyond that from their reservoir emissions. When a river is dammed, much of the sediments and nutrients that it carries – in many cases more than 90% – will be trapped behind the dam wall.
- The sediments that build up in reservoirs and gradually reduce their useful lives contain large amounts of carbon. The loss of nutrients to inshore waters because of dams may have a significant climate impact. Nutrients from rivers are important in fertilizing oceanic plankton. Plankton in turn plays a major role in absorbing CO<sub>2</sub> from the atmosphere. (The IPCC estimates that in the absence of oceanic plankton, atmospheric CO<sub>2</sub> concentrations would be 55% higher than present levels). Silicates stimulate the production of silica-shelled plankton known as diatoms. Diatoms are more efficient at carbon sequestration than non-siliceous plankton and, accordingly play a crucial role in the biological uptake of carbon dioxide by the ocean. Floodwaters also accelerate the rate at which diatoms and the organic carbon they contain fall to the sea floor. The sediments stick to the diatoms and act as tiny ballasts, dragging the diatoms downward. Decrease in CO<sub>2</sub> absorption through loss of sediment to the diatoms to inshore waters needs to be assessed and quantified (IRN, 2006).

This EIS requires a more accurate assessment of greenhouse gas emissions from inundating land, and the impacts of loss of sediment to inshore waters, such as the Great Sandy Strait. Estimations that are expected from warm subtropical conditions in Australian conditions must be used and the decrease in CO<sub>2</sub> absorption through loss of sediment to diatoms in inshore waters needs to be assessed and quantified.

**Recommendation** Section 10.2.5.2

**The calculation of the greenhouse gas emissions has not included scope 3 emissions or used accurate assumptions to calculate emissions from inundation of prime agricultural land in warm tropical conditions. Scope 3 emissions, include CO<sub>2</sub> emissions from using cement in the construction of the roller compacted concrete in the wall, are significant. The decrease in CO<sub>2</sub> absorption from trapping sediment in the dam instead of through loss of sediment to the diatoms in inshore waters needs to be assessed and quantified.**

## 10.2.7 Mitigation and Management

### 10.2.7.2 Operational Air Quality and Greenhouse

The EIS proposes a mitigation method to “invest in revegetation and replanting programs. In this respect, QWI has undertaken investigations with Timber Queensland regarding native hardwood forestry plantations. The target to contribute to the offsetting of the Project’s greenhouse gas emissions;” is not appropriate due to tree planting problems with **time, permanence** and **additionality**:

- The time problem with tree offsets is that the offsets occur "down the track" well after the emissions have occurred. **We have a problem RIGHT NOW with CO<sub>2</sub>** concentrations in the atmosphere and the notion that adding to the problem now and **expecting nature to fix it up over the next 100 years is irresponsible.**
- **The permanence issue with trees is that they can die** (due to pest infection, lack of rain, or a whole range of other problems) **and they can release their stored carbon very quickly if they are burnt.** One of the key findings of the recent IPCC 4AR Report and CSIRO modelling is that climate changes in our region are expected to include temperature increases and reductions in precipitations which create problems for tree plantations. These two key findings suggest that the likelihood of increased fire events is growing. So even if the tree plantation is established, it is quite likely that it will burn down.
- There is no detail provided in the EIS about how the carbon emissions and sequestration are modelled. The emissions appear to be grossly underestimated and the sequestration potential grossly over-estimated.
- Then there is additionality - there is no information provided to validate that the tree plantation project is additional – i.e., it would not have occurred in any case if the Traveston Dam project had not occurred. **If it’s not additional, it shouldn’t be counted and the carbon neutral claim is baseless.**

**Recommendation** Section 10.2.7

**Given the risks with climate change, it would be better to look to alternative water supplies with lower greenhouse gas emissions than to propose existing vegetated farming land be revegetated with plantation timber. There should be an independent verification audit of the GHG calculations by an Australian government certified verifier (Greenhouse Friendly or Greenhouse Challenge Plus provide lists).**

## Chapter 14 Cultural Heritage

### 14.1 Introduction

**Indigenous groups being forced to sign off on an ILULA before the project is approved is grossly unjust and contravenes the Akwé: Kon Voluntary guidelines** for the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities.

Additionally many groups have been excluded and these indigenous people may hold important cultural knowledge which pertains to the cultural heritage of the area. **It is misleading to suggest that “a process for undertaking a comprehensive and systematic cultural heritage assessment of the Project area” has been conducted.**

**Recommendations** Section 14.1

**More research is required to meet the ToR for the EIS and needs to include downstream indigenous groups.**

Information supporting this recommendation includes:

- The ToR states that “*the EIS should describe the existing environment values for cultural heritage that may be affected by the dam*” and that this includes “*liaison with representatives of relevant indigenous community/communities.*” This is in breach of the ToR which do not restrict the consideration of cultural heritage to only the dam footprint area.
- Neither the report prepared by Godwin and L’Oste-Brown nor Chapter 14 of the EIS refer to consultation with the Batjala/Butchulla people whose country is along the Mary River north from Bauple and includes the Great Sandy Straits and Fraser Island.
- It includes only those indigenous people “who assert a native title interest for the Project area”.
- It excludes anyone whose contact with their traditional country has not been continuous since before white settlement.

Other matters that require review and changes include:

- **The section includes no account of the limitations explicitly outlined by the authors of the Cultural Heritage study**, especially the limited knowledge of material culture due to limited research so far conducted and the lack of information about non-material cultural heritage such as stories.
- Consultation was supposed to occur concerning:
  - Places of significance (including archaeological sites, natural sites, story sites etc).
  - Little effort has been made to consider indigenous stories of the Mary Valley, let alone of the entire length of the Mary which should have been covered by this aspect of the ToR.
- There is a focus on acquiring from local indigenous peoples, their native title rights so that the dam can be constructed; the only alternative presented is compulsory acquisition of the land. This process fails to objectively and properly consider the issue of cultural heritage. **It ignores the importance of cultural heritage to future generations, and ignores the rights of non-indigenous and indigenous people other than those signatory to the ILUA QWI is trying to negotiate, to retain the cultural heritage which exists or may exist in the Project area.**
- The ILUA process under the Native Title Act (Cth) (NTA) as amended in 1998, gives the native title parties the right to be represented by the native title representative body for the area. **There is**

**no indication that Queensland South Native Title Services have been included in negotiations.** Assistance from such bodies is made available under the ILUA provisions of the NTA because it ‘should help to remove or reduce the perceived or actual imbalances in the respective bargaining powers of some parties to an agreement’ (Neate 1999). **If the indigenous parties to the ILUA have not availed themselves of this assistance it would raise the question as to why not and what other measures have been taken to redress the imbalance of power between QWI and the indigenous parties.**

- Management of cultural heritage in future will be in the hands of “those indigenous communities who hold an interest in the Project area... through the life of the Project”. This raises questions:
  - **What does “hold an interest” mean?** Is this confined to a recognised property interest i.e., native title or an ILUA as would seem to be the case from QWI’s narrow interpretation of who constitutes a party with whom they must consult.
  - **What does “through the life of the Project” mean?** This seems to imply that there will be a future time when the cultural heritage of the dam area will no longer be managed.

### 14.3 Existing Environment – Indigenous Cultural Heritage

- Re Appendix F-10 prepared by Dr Luke Godwin and Scott L’Oste-Brown of Central Queensland Cultural Heritage Management Pty Ltd.
  - The background of both authors includes time working for the Queensland State Government which calls into question their objectivity, an issue which is also raised by the content of some of the document which appears to cite QWI uncritically (see especially p141, paragraph beginning “QWI recognises” and following two sections to p147).
  - It is noted that “*Luke has worked as a cultural heritage consultant and in State Government agencies in New South Wales and Queensland as a cultural heritage officer. He has published widely on cultural heritage management issues in Queensland. Currently, he is providing technical advice on cultural heritage management issues to many Aboriginal organisations and development proponents throughout Queensland. Scott also worked in Queensland state government agencies before joining CQCHM. He has published widely on Queensland cultural heritage issues, including two major contributions on the Taroom Aboriginal Reserve and Bowen Basin Aboriginal Cultural Heritage Project published in the Queensland Environmental Protection Agency’s Cultural Heritage Monograph Series. (<http://www.aacai.com.au/register/index.html>)*”
  - **The authors point out a number of times that there is limited information available about cultural heritage in the Mary Valley,** and in fact state that “*there is no definitive body of data available on the cultural heritage places, objects and values of the Project area*” (p30, para 2). They admit that the desktop study (p30, para 2) results in questioning the use of some of the information they have relied on because it has been collected with a geographical not a cultural focus (p33, last para). They state succinctly that “*absence of evidence cannot necessarily be interpreted to mean evidence of absence*” (p35) and “*the low incidence of archeological research has played a role in the low incidence of recorded sites of certain kinds*” (p132). **Thus on their own admission there are serious limitations to the cultural heritage study.**
  - These limitations are compounded by the failure of the study authors to take proper account of:
    1. Aboriginal pathways, which are referred to by Kabi Kabi #3 (p137); an anecdote included in Pedley’s work on pp228-29 about Aborigines passing through the area to Bunya festivals is not mentioned despite that work being

otherwise cited. However a number of references are made to travel routes used by early settlers (p52, p105, p108, p124, p127) and in some cases to their probable Aboriginal origin, but this is not followed up and **no attempt is made to consider the cultural significance of Aboriginal pathways.**

2. Aboriginal stories which are a crucial aspect of ongoing indigenous cultural heritage. No effort seems to have been made to find evidence through any means of the stories of the Gubbi Gubbi which relate to the Mary Valley or of the Batjala relating to the downstream area which will be affected by the dam. Even where they list the types of cultural heritage not included in site registers (see p101) they do not specifically refer to story sites, even though this type of site is specifically referred to in the terms of reference.
3. The fact that cultural knowledge is not the exclusive preserve of those who believe they may have a native title claim in the Mary Valley region and that cultural heritage is more than “*an element of native title*” (p142). Although this is partially acknowledged early in the report (p33, where reference is made to the information being of limited utility because it was collected from a geographical not a cultural focus), **the authors of the report do not address this limitation by seeking or considering information from a broader range of indigenous people than those who have submitted a native title claim.** Nor have they sought information which would indicate a focus on cultural heritage in a broad sense.
4. Although the need for further research is mentioned at a number of points (eg., pp 94, 128, 130) the authors do not acknowledge the fact **that if the dam goes ahead, then it is impossible to further investigate or manage cultural heritage which is still to be researched.**
5. **The EIS does not address the possibility that the dam will not be approved.** The final pages in particular appear to be predicated on the assumption that the dam will proceed and in fact references to compensation and offsets are not appropriate in what is supposed to be an objective non-partisan study of the cultural heritage of the dam project area.

#### 14.3.1 Constraint Statements – Native Title Parties

- The indigenous parties were given an opportunity “to describe any places and values about which they had concerns” and “of which they are presently aware”. However given the limited research so far done on cultural heritage in the Mary Valley and the restricted time available to the indigenous parties to prepare constraints statements, **QWI has taken a disrespectful attitude towards Indigenous Cultural Heritage, viz:**
  1. Reference to “the limited incidence of the Bunya pine in uncultivated habitats” dismisses the cultural significance of *each and every* Bunya pine to the indigenous people for whom this tree is “an integral part of their cultural heritage” (p14.6).
  2. This constraints section, contains no conclusion or indication of any kind that these issues have been properly and respectfully considered by QWI, or even that they raise questions which need to be considered before approval can be given to building the dam.
  3. The Batjala/Butchulla have not been given an opportunity to provide constraints statements.
  4. A two-day field survey is cited as a “noteworthy” data source (p14.12) when by any measure this is totally inadequate for a comprehensive and thorough

investigation of cultural heritage in the Project area and does not include a study of the downstream areas.

5. The significance of the dam Project area to the Gubbi Gubbi/Kabi Kabi people is downplayed by focusing on management of the cultural heritage of the area after the dam is built rather than on its preservation for future generations.
6. The application of the concept of “acceptable limits of change” implies that there is some reasonable compensation or offset which would be acceptable to indigenous people for loss of their cultural heritage. This betrays an inadequate understanding of the importance of land to indigenous people. There is no just compensation for submerging indigenous people’s country, which remains their spiritual centre and contains story sites of significance to them whether or not they have a legal property claim on that land.
7. It seems that all indigenous rights will be overridden if the terms of the ILUA cannot be met within a timeframe set by QWI and/or the State Government (first Contingency Principle, Section 14.4.2.1 p14.31).

#### 4.14.6.4 Summary of Non-Indigenous Heritage Places and their Relationship to the Project

- **The non-indigenous cultural heritage section of the EIS is totally inadequate.** The sources used do not include those many people in the Gympie and Mary Valley regions with substantial knowledge of local history. It seems that local respected professional and amateur historians and most local history groups have not been consulted.
- Liaison was also supposed to occur with “*relevant community groups/organisations* (eg., local historical societies)” concerning places of non-indigenous cultural significance and “*opinion regarding significance of any cultural heritage places located or identified*”. **There is no evidence that any local history group or person has been contacted apart from the Historical Society which runs the Gold Mining Museum.** This society does not focus on broader history, but other groups including the Family History Society and the local history section of the Gympie Library contain a mass of post-contact historical information which does not seem to have been accessed, nor do the opinions of Gympie’s and the Mary Valley’s amateur and professional historians appear to have been sought.
- No constraints analysis appears to have been conducted in regard to non-indigenous heritage places, although the ToR requires this.
- Points omitted include:
  - The history of food production in the Mary Valley which includes influxes of people from a range of parts of Europe bringing agricultural innovations to the whole of Australia, (eg., arsenic baths for tick management, developments in the dairy industry, etc.) Much of this history has not been consolidated as yet.
  - The history of Chinese occupation, eg the remnants of a Chinese market garden at Chinaman’s Creek which is not listed on any heritage register as yet.
  - The fact that the oral history project for the Mary Valley is only now beginning.
- As with indigenous cultural heritage, non-indigenous cultural heritage is under-researched at this stage but even that history which has been written has not been consulted properly.



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## ***Chapter 15 Social Impacts Assessment and Economics***

The Save the Mary Coordinating Committee (STMRCG) has drawn extensively on the research and analysis of Robert Hales, Griffith Business School, Griffith University.

The proposed TCD affects large communities of people in South East Queensland. There are the people of Greater Brisbane who require safe and reliable drinking water supplies; people in the coastal regions from Caloundra to Hervey Bay who regard the Mary River as their region and recreation ground; the rural-based communities along the river and fishing communities at the mouth of the river; and the residents who are affected directly by the proposed inundation caused by a dam at Traveston Crossing on the Mary River, and those that would be affected by decreased or limited flows downstream of the dam.

### **Downstream communities**

The EIS SIA is inadequate in its treatment of the impact that the project has had and the mitigation measures needed. For example:

#### **15.1.2.1 Study Area**

*“Potential impacts and benefits may extend to other LGAs upstream and downstream of the proposed dam. The LGAs of Caloundra, Maroochy, Noosa, Woocoo, Tiaro, Kilkivan, Maryborough and Hervey Bay have been considered as part of the potential “catchment” for social impacts and benefits, with broad detail for relevant characteristics provided. Reference is also made to effects likely to be experienced in the SEQ Region.”*

*(EIS, p 15 – 5)*

- Many statements within the Draft dismiss the present and future social impact or risks on downstream and upstream affected communities. The STMRCG finds this consistent with the EIS in total that has dismissed and minimised environmental impact and concerns regarding the certainty of maintaining downstream flows.

#### **15.1.2.6 Community Values**

##### **Social Capital**

*“Social capital is highly variable within and between the region’s LGAs, but social capital levels within SLAs other than Cooloola are unlikely to be affected by the Project.”*

*(EIS, p15 – 62).*

#### **15.1.3.3 Social use**

##### **Fishing**

*“During operation of the Project, the operator would maintain environmental flows downstream in accordance with the Water Resources (Mary Basin) Plan. By maintaining the required environmental flows, any potential impacts on recreational and commercial fishing would be effectively managed. For example, with the Project in place there is still anticipated to be 90% of the predevelopment mean annual flows reaching the mouth of the river, some 207km downstream of the Project. In addition, levels of sedimentation in the river are slightly reduced by the Project. Consequently, there is not anticipated to be any adverse impacts on fishing in the estuary and beyond as a result of the Project (Chapter 9 – Matters of National Environmental Significance).”*

(EIS, p 15 – 112).

#### 15.1.4.2 Predicted impacts and benefits for other areas

*“Noting that the Project would not affect water entitlements or the necessary environmental flows along the river and at the estuary, residents in downstream areas and adjacent communities are not expected to experience significant impacts on community well-being or sustainability.”*

(EIS, p 15 – 132).

**Recommendation** Section 15.1.4.2

**Include a full assessment of the impact downstream that will occur between the dam wall and Hervey Bay & Fraser Island; and that will occur upstream from the dam wall with changes on land use, and imposition of restrictions on land use.**

#### Language Use

The EIS SIA is presented with a confusing structure that promotes ambiguity and discontinuity in its discussion of the impacts on communities in the present and into the future.

- Negative impacts reported by consulted residents are reported as “*perceived*” whereas positive assumptions or expectations are rarely shaped as perceptions, but as actual expected outcomes.
- The use of the term “*drought*” is used frequently throughout the EIS SIA to demonstrate the impact of hardship on residents prior to the announcement in April 2006.
- For example:

#### 15.1.3.3 Social use

*“For some others, the Project would provide a mechanism to leave farming and reduce their exposure to industry trends, drought and escalating pressure from coastal and lifestyle real estate trends.”*

(EIS, p 15 – 109).

- The use of drought as a factor driving people off the land must be considered contradictory to the proponent’s view that drought is not a sufficient factor to enhance the risk associated with building the proposed TCD.

**Recommendations** Section 15

**Accurately reflect the feedback from the community.**

**Include the risk associated with drought in the development of mitigation measures.** The key mitigation measure, tourism, is unlikely to be viable while the dam is operating much of the time at low levels. Provide contingency measures in the likely event that drought or other circumstances impact upon the medium and long term success of the proposed TCD.

#### Conduct of Government Agents

The EIS fails to meet the requirements of the ToR in particular the following:

Social and Economic Environment...

*“Recommend practical mitigation strategies and include details of appropriate complaints response mechanisms.”*

*(TOR TCD page 67)*

- The EIS does not critically examine the conduct of democratically elected representatives, bureaucrats or contracted government agents to date or provide mechanisms for complaint for residents concerned with the conduct and delivery of the proposed TCD.
- The “*act as if*” mentality by QWI and Community Futures Taskforce personnel has been derived from statements made by ex-Premier Beattie, indicating that the TCD will be built. The requirement of the proponent to obtain approval from the Federal Minister for the Environment appears to be regarded as a “*rubber stamp*” and suggestions that the Project can, will or should be prevented on environmental and cultural grounds, is dismissed outright by agents in conversational contexts with concerned members of the public.
- The STMRCG regard the QWI property acquisition program as an attempt to reduce the opposition to the proposal in advance of the approval process.

**Recommendations** Section 15

**Carry out further studies to assess the social impact already felt as a result of the conduct of QWI and other Queensland State Government services involved in the proposed TCD. Consult with STMRCG on the findings of the independently facilitated community workshops.**

**Provide appropriate complaints and response mechanisms.**

**Flawed key economic benefit: Tourism**

- The EIS SIA’s overriding benefit to mitigate the present negative impact on communities is based on fundamentally flawed science and exaggerated positive social mitigation.
- There are no compelling or reliable sources to suggest that tourism will offset the negative impact on the local or regional economies. On the contrary, the evidence suggests that tourism would be enhanced if the proposed TCD were not to proceed.

**Recommendation** Section 15

**Do not proceed with the proposed TCD. Adequate social mitigation measures cannot be provided.**

**Non-approval to proceed**

The EIS SIA does not acknowledge the possibility that the proponent will fail to demonstrate that the proposed TCD can meet the EPBC (1999) Act’s requirements and will not be approved by the Federal Minister for the Environment.

- The EIS should acknowledge this outcome.

**Recommendation** Section 15

**Develop a detailed contingency plan that recognises that damage has already occurred to the people in the region, with best endeavours to restore the values to the pre-April 2006 levels.**

## Methodology

There are several concerns the STMRCG have identified with the methodology and methods used to support the findings of the EIS SIA. For example:

- There have been no attempt to establish baseline community values and no attempt to determine those values prior to April 2006 in consultation with residents. Pre-announcement surveys are needed.

### 15.1.1.1 Methodology

*“Consultation with residents and community organisations in the primary study area and adjacent shires to identify existing community values and potential social impacts, including:*

- *Meetings with community organisations;*
- *Workshops focusing on community values, impacts and benefits.”*

(EIS, p15 – 2).

- **Inappropriate questions put to community during consultation with residents.** Asking residents what the benefits of the proposed TCD will be is inappropriate given the limited information available, expertise or resident’s experience with projects of this nature. This is merely “*crystal ball gazing*”.
- **The EIS SIA fails to adequately assess primary study and direct impact area.** The scale of the primary study area is too large. By assessing the impact at this level the impacts on such a large number of people will be subsumed into the larger population of the primary study area.

### 15.1.1.1 Methodology

*“The characteristics of the existing social environment for the direct impact area are not separately described in detail as this level of demographic data is not available. The direct impact area is included within the analysis of the primary study area.”*

(EIS, p 15 – 2).

- **The characteristics of the direct impact area are of sufficient magnitude to warrant more detailed analysis.** The total proposed dam site (Stage 1 and 2) covers 7,600 hectares and will potentially impact on more than 599 properties and more than 2,000 people. Including these people within the larger study area will mean that the reporting of impacts will be proportionately underestimated. This is a major failing that needs to be addressed.
- **The baseline study needs to include an inventory of individuals impacted in the direct impact area.** To adequately assess the direct impact an inventory of individual property owners and tenants that have been displaced or will potentially be displaced needs to be completed and analysed.

### 15.1.1.1 Methodology

*“Potential social impacts for each phase of the Project including pre-construction, construction and operation were then identified and evaluated. The impact assessment included:*

- *consultation with residents and community organisations in the primary study area and adjacent shires to identify existing community values and potential social impacts, including:*
- *meetings with community organisations;*
- *workshops focusing on community values, impacts and benefits;*
- *discussion with individuals at QWI information days; and*

- a survey of regional residents;
- etc...”

(EIS, p15 – 2).

- The list of consultation strategies that continues on the page quoted above does not include surveys of all affected individuals in the direct impact area.
- The displacement of people from the direct impact area (Stage 1 and 2) involves considerable social and economic risk for this group. The residual risk of the people in the direct impact area cannot be ascertained by using the present methodology. However, the ToR is explicit about assessing this aspect.

**Recommendation**      Section 15

**Comprehensive surveys should have been conducted by the Community Futures Task Force prior to the EIS.** If they have not been completed the consultants engaged by QWI to undertake the EIS should have completed this. This is vital for evaluation of the socio-economic impacts of the project.

**General EIS Guidelines**

*“Rigorous assessment of the residual risks of environmental impacts arising from the Project and relevant alternatives on environmental, social and economic values, relative to the “no project” scenario. The extent of baseline and predictive studies should be commensurate to risks. Assessments should address direct and indirect, combined, short and long term, beneficial and adverse impacts, as well as cumulative impacts in combination with other known activities. An estimation of the reliability of predictions should also be provided.”*

(ToR TCD p14)

- The threat of compulsory land acquisition when formal project approval is given, and the lack of appeal processes under new legislation makes affected landowners vulnerable to threats of decreased valuation of property and assets. The risk for this group to democratically protest the proposed TCD is considerable because there are no “hardship” packages for people who have not sold their property but have been affected adversely by the proposal. Baseline studies have not been implemented that are commensurate to assessing and mitigating these risks.

**15.1.1.1 Methodology**

*“The baseline for the existing social environment has, where possible, been set at mid 2006, to capture community characteristics prior to the Project announcement. This recognises that social perceptions and attitudes may change as a result of a Project’s announcement, particularly where pre-construction property purchase is required.*

*Post-announcement and pre-construction, a range of strategies aimed at mitigating social impacts were employed by the Queensland Government. This has been described in Section 15.1.5.1.”*

(EIS, p15 – 3).

- The project was announced by the then Premier Peter Beattie on the 27 April 2006. Social and economic impacts were apparent in the community immediately after announcement. There were later alterations to the project design, but the impacts of Stage 1 and 2 still remain identical to the initial announcement.
- The direct impact area is not defined. In many sections the EIS states that the direct impact area was assessed but the EIS does not define the geographic extent of this area.

### 15.1.2 Study Area

*“Figure 15-1 shows the study area for the social impact assessment. The area surrounding and within the inundation area forms the primary study area for social impact assessment. This area is outlined in more detail in Figure 15-2.”*

(EIS, p 15 – 5).

- Data used to describe the population profile is dated and irrelevant to the present day. The EIS must be revised to contain 2006 ABS data.

### 15.1.2.3 Demographic Profile

*“The main source of data used to describe the population profile is the ABS 2001 Census of Population and Housing.<sup>22</sup> It is acknowledged that the 2001 Census data is now six years old. However, at the time of writing this report, 2006 Census data was not available. As such the 2001 Census data has been used to provide a demographic profile of potentially affected areas.”*

(EIS, p 15 – 14)

- The EIS SIA relies on the assumptions of scientific validity and that the engineering of the proposal is low risk.
- The EIS SIA relies on a set of assumptions that the scientific and engineering studies are accurate, reliable and valid assessments of the proposal. It also assumes that the wider SEQ water supply strategy is sound in its assessment of the demand/supply balance and that TCD adequately addresses water supply needs for the future growth and economic security of the region.

### 15.1.3.1 Property, Demography and Housing

#### Regional Population Growth

*“The Queensland Government’s water strategy will provide a reliable water supply for the SEQ region extending from Noosa, south to the New South Wales border and west to Toowoomba. The water strategy includes both demand and supply management strategies. Demand management (such as recycling and water efficiency measures) is expected to contribute 19% to the “water balance” required by 2050, with existing supplies contributing 45%, and new planned supplies (dams, weirs and desalination) around 25% (draft MWH 2007 p. 20). Other new sources (e.g. purified recycled water) would contribute 11% to the water supply balance. The Queensland Water Commission expects the Project would deliver to the South East Queensland water grid an additional 70,000 megalitres of water a year, or approximately 32% of supply requirements to 2016. The Project is seen as responding to the water supply needs of the existing and future populations of South East Queensland, and as contributing to security of water supplies for residential and economic development.*

*The Project would also ensure a reliable supply of water to consumers and maintain environmental flows in the Mary River.”*

(EIS, p15 – 8).

#### Interpretation of Community Consultation Reports, Appendix E.

*“Appendix E of the EIS provides a summary of a range of consultation devices used since the announcement of the proposal in April 2006. Feedback forms have been scanned, reports of consultation meetings for the preparation of Chapter 15 of the EIS and the results of surveys have been detailed.” (EIS)*

*“One must question how the comments and feedback from consultation have been interpreted in the EIS SIA. It is clear that from the data provided in Appendix E, a great deal of criticism of the proposal has been ignored.*

*The top twenty most common issues raised by stakeholders were:*

- *Opposition (General)*
- *Social Impact*
- *Consultation Process for the EIS*
- *Economic Cost*
- *Alternatives.*”

(Consultation Report Proposed TCD, Appendix E, p 37).

- Feedback, of a critical nature, is reported, but downgraded and minimised. Structuring the criticism as coming from “*some participants*” is often followed by statements that respond to or reduce the concern, and at times may even exaggerate favourable comments made in the consultation reports. The proponent uses this technique to appear to be responding to community concerns and criticisms. Typical examples include:

### **Potential positive outcomes anticipated by participants**

“Lifestyle of people could improve - may have better roads, water- may attract people to area - lot of unknowns.” (Consultation Report Proposed TCD ,Appendix E, SIA Workshop Report – Gympie Page 7 of 12)

“A **number** of community members recognised potential benefits for local access provided by the Project following construction, through road upgrades and improvements to the existing road network. New roads would be constructed to appropriate safety and design standards leading to an improvement on the existing road network in some locations.”

(EIS, p15 – 102, our emphasis)

### **Potential positive outcomes anticipated by participants**

- “*Some possible employment opportunity during construction*”
- *Nil to limited tourist opportunities*”

### **Outcomes sought in respect to the Project’s potential effects on values**

“*Don’t build the dam and help rebuild what’s left of our community.*” (Consultation Report Proposed TCD Appendix E, SIA Workshop Report – Kandanga Page 6 of 12)

### **Employment and economic development**

#### **During operation?**

“*Post construction the weed covered, mosquito breeding swamp will decimate the region.*”

(Consultation Report Proposed TCD Appendix E, SIA Workshop Report – Kandanga Page 8 of 12)

“*While **some** people believed the Project provided very limited tourism opportunities, others believed that the Project provided a number of opportunities to increase tourism, limited to the lake or those townships close to the lake rather than extending to downstream areas. Other people again suggested that the Project would provide opportunities to develop bed and breakfast accommodation, agri-tourism, and recreation based tourism activities and saw a range of opportunities for community involvement in beneficial tourism-related activities and economic outcomes.*”

(EIS, p15 – 114).

- This is most evident by the failure of the EIS to treat seriously the suggestion that the proposed TCD should not be constructed due to the high social, environmental and economic costs associated with the Project, and particularly as more reliable alternatives are viable.

**An independent EIS would evaluate the truth statements of the Queensland Government and QWI by recognising and considering independent reports that contradict and pose substantial questions about the economic feasibility of building the proposed TCD in the face of alternatives that are dismissed or ill-considered by the EIS. The EIS should consider the mounting counter-evidence that this water supply strategy is not viable, cost effective or sustainable particularly as it impacts on downstream flows.**

#### *Recommendations* Section 15

**Redesign the research methodology and tools, and carry out a further study to correct for bias and minimisation of the current and future potential impact of the proposed Traveston Crossing Dam.**

Conduct research that includes an inventory of individuals in the direct impact area and survey results of all those affected individuals.

Develop questions and conduct new research that adequately assesses the primary study and direct impact areas, to better understand the characteristics of the direct impact area and upstream & downstream communities.

A study that appropriately assesses the current and future real estate trends under alternative scenarios is essential. The EIS fails to acknowledge or provide assessment and mitigation measures for landowners at risk of decreased valuation of property and assets.

Set the baseline for social and economic assessment prior to the 27<sup>th</sup> April 2006 announcement that the dam would be built.

Revised survey outcomes to utilise only the 2006 ABS data to describe population profile.

Assess for validity and reliability the demand/supply balance, and alternative options for water supply in South East Queensland, against the total social cost incurred by communities impacted and affected by the proposed TCD.

### **Existing Social Environment**

The following section outlines the key concerns the STMRCG has with statements made in the EIS under the section Existing Social Environment. Each concern of the EIS is provided with comments and recommendations where applicable.

#### **15.1.2.2 Social Context**

##### **Agricultural Uses, Forestry and Fishing**

*“Many of the farms in the Cooloola region are small scale operations, including part-time farms or hobby farms, with about one third earning less than \$22,500 per annum in 2000 / 01, and a further one in five earning between \$25,000 and \$50,000 per annum.”*

(EIS, p15 – 11)

- This EIS SIA comment undervalues the economic contribution and vital role of small farm holdings to agricultural production.
- The effect of this is to undervalue the role of agricultural production and innovation that is happening in the region and area affected by the proposed TCD.



- There is insufficient data to support the statement above. Production outputs of small and peri-urban farm holdings in this region are not likely to be able to be assessed. It is likely that earnings of farm holdings would be derived from Company Returns data and would show break even positions. Salary and wages would not be identified.

### 15.1.2.2 Social Context

#### Agricultural Uses, Forestry and Fishing

*“In the last 20 or 30 years, the study area has attracted a large number of small acreage farmers, including lifestyle and hobby farmers, in part due to the region’s proximity to Brisbane and the Sunshine Coast, and comparatively cheap land. This has led to the emergence of small acreage farming blocks in the Mary Valley and adjacent localities.”*

(EIS, p15 – 11)

- This EIS SIA Statement is correct.
- The emergence of small farm acreage farmers in recent times demonstrates the opportunities available for viable small farm holdings in the Mary Valley and adjacent regions due to the high quality land and historical rainfall that enables viable small farm undertakings.
- If the proposed TCD commences, this will significantly reduce business opportunities of this nature in the region and impact on the economic contribution and agricultural innovations that have been characteristic in the region prior to the announcement of the proposed dam.

### 15.1.2.2 Social Context

#### Tourism

*“The Sunshine Coast and Fraser Coast/ South Burnett regions incorporate a number of major tourist destinations including Noosa LGA, Maroochy LGA, the Cooloola Coast communities of Rainbow Beach and Tin Can Bay, and Maryborough and Hervey Bay. The regions attract a large number of domestic and international visitors (Table 15.1). The proximity of the Sunshine Coast to Brisbane also means the region is a popular destination for day trip visitors. In 2006, the Sunshine Coast was the third most popular domestic daytrip destination in Queensland.*

*Tourism contributes substantially to the regional income of the Sunshine Coast and Fraser Coast South Burnett. Expenditure by domestic and international visitors to the Sunshine Coast was \$1,564 million for the year ending December 2005. Domestic and international visitors to the Fraser Coast South Burnett spent \$440 million over the same period.”*

(EIS, p 15 – 12).

- This EIS SIA Statement is correct. Tourism to the Mary Valley provides a significant growth opportunity.

### 15.1.2.3 Demographic Profile

- The Demographic Profile constructed in the EIS SIA distorts the pre-construction image of community wellbeing.
  - High home ownership and strong community capital demonstrates that the pre-April 2006 communities on the Mary River are not suffering from economic depression or inadequate service provision.
  - Crime rates, child intervention, health and other indicators strongly support a view that the communities were harmonious with a binding social fabric that strengthened their resilience to the impacts of drought and shifting economic

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dependences on industries such as forestry. Sub-Section Community Capacity and Wellbeing under 15.1.2.8 Community Health and Safety supports this view.

- The following evidence is provided to support the contention that the EIS SIA is misleading and attempts to distort the pre-construction image of community wellbeing.

### **15.1.2.3 Demographic Profile**

#### **Age Profile**

*“Older adults (people aged 45-64 years, known as ‘baby boomers’) comprised the largest age group in the study area. This was above the Queensland average, and may reflect both the ageing of local families and the numbers of older adults moving to the district in search of affordable housing and the local lifestyle.*

*The area had lower proportions of older people compared to Queensland. Imbil / Brooloo and Kandanga had higher proportions of elderly people compared to other townships within the area, although these were still lower than Queensland as a whole. As the current cohort of baby boomers age, the population will age rapidly, with all age cohorts older than 60 years expected to increase at a faster rate than younger cohorts.”*

(EIS, p 15 – 18)

- The EIS SIA misleads the positive impact older Australians have and will continue to have on the region’s community and its agricultural vitality.
- The attractiveness of the region to older Australians demonstrates the viability of the area to pursue rural enterprises.
- The majority of older people are within working age and are interested in taking up income producing, rurally based activities on a small scale whilst being able to enjoy the natural amenities of the region; beaches, forests, canoeing and community-based recreational interests.

### **15.1.2.3 Demographic Profile**

#### **Income and Economic Resources**

Advantages/Disadvantages

- The Australian Bureau of Statistics produces four Socio-Economic Indices for Areas (SEIFA) based on Census data, to identify areas of relative advantage and disadvantage.
- The EIS SIA Statement’s use of 2001 Census data is a misuse of data and potential gross distortion of the accuracy of the economic position residents had prior to the announcement in April 2006.

### **15.1.2.3 Demographic Profile**

#### **Summary of characteristics and trends in the primary study area**

#### **Income and Economic Resources**

*“Income influences people’s capacity to cope with change. The primary study area communities, the adjacent communities and the regions LGA’s all had lower median weekly household income compared to Queensland average...This denotes the likelihood of areas where people experience low income because of isolation from services and employment options.”*

(EIS, p15 – 27).

- The EIS SIA Statement is not correct in presenting the region as economically less advantaged without considering such things as the high rates of home ownership referred to in the summary.
- High home ownership may offset low income levels reported in the 15.1.2.3 Demographic Profile Income and Economic Resources.

#### **15.1.2.5 Social Infrastructure**

##### **Summary**

*“The area had a high rate of home ownership, with nearly 80% of homes owner occupied. This shows a high level of investment in and ownership at the local community level.”*

(EIS, p15 – 49).

#### **15.1.2.5 Social Infrastructure**

##### **Primary Study Area**

*“Notwithstanding the level of social infrastructure available across the study area, particularly within the Mary Valley, few of the facilities are well equipped or well resourced to respond to demographic growth and change. Community networks are also in good supply, but with a small population many are stretched and rely on volunteers for support and funding.”*

(EIS, p 15 – 53)

The EIS SIA Statement is incorrect.

- Community networks are networks of volunteers characterised by adaptation to change and evolution.
- The networks that have operated in the Mary Valley and across the region pre-announcement were not :stretched” but could be characterised as harmonious and sustainable, meeting valuable and supported community needs.
- The SIA is correct in identifying the negative impact the announcement and resumption of properties across the study area has had on social networks which should not be downgraded for their importance.
- In some instances, the damage done to community networks maybe irreversible

#### **15.1.2.8**

##### **Community Health and Safety**

*“The ToR requires description of existing social values including health status and sensitive groups. ‘Health status’ refers to the levels of health indicators in the area relative to averages but also, in a predictive sense, to determinants of health. ‘sensitive group’ include people who are vulnerable due to age, social isolation, or disadvantage. A number of determinants contribute to health and these include:*

- *Individual factors (e.g. income, genetic factors, and behaviours such as physical inactivity and smoking)*
- *Social factors (e.g. access to health services and social infrastructure, opportunities for physical activity); and*
- *Environmental factors (e.g. air quality, community safety).*
- *A baseline of community health status therefore typically includes:*

- *Population characteristics and socio-economic factors which denote sensitive groups;*
- *Determinants of health such as access to health infrastructure, active lifestyles, and community capacity; and*
- *Health indicators, such as comparative performance on key health factors, mortality rates, and rates of hospital admissions.”*

(EIS p15-67)

This section of the EIS SIA Statement demonstrates the lack of coherence between the EIS stated adherence to the International Guidelines and Principles for Social Impact Assessment and the actual practice of the proponent relating to health assessment.

- Health assessment is more than assessment of health statistics.
- The International Guidelines and Principles for Social Impact Assessment states that:
- The SIA community of practitioners considers that all issues that affect people, directly or indirectly, are pertinent to social impact assessment. ...their health and wellbeing... health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity. (International Guidelines and Principles for Social Impact Assessment 2003 p4).
- The EIS SIA’s method for baseline of community health status is one of the absence or presence of disease or infirmity as recorded in hospital and other medical practitioner records. The baseline method of health assessment does not assess wellbeing in a way that captures the (present) impacts of the project and a desktop level attempt to assess community wellbeing is inadequate.

#### **15.1.2.8 Community Health and Safety**

##### **Community Capacity and Wellbeing**

##### **Health Indicators**

*“As noted there was difficulty in obtaining data which accurately reflects the status of health indicators in the most directly affected areas.”*

(EIS, p15 - 72)

The EIS SIA Statement has gathered insufficient data to draw reliable and valid conclusions.

- There is a heavy reliance on qualitative data from an inappropriate time period.
- Survey work within the direct impact zone is needed to be able to assess the baseline and evaluate changes in this important attribute of health.
- At present EIS TCD baseline health assessment of the affected communities does not meet the ToR.

#### **15.1.2.8 Community Health and Safety Community Capacity and Wellbeing**

*“The primary study area and adjacent communities show evidence of high community capacity. The communities, although small, have significant numbers of community organisations and volunteer programmes (Section 15.1.2.5). Together, these indicate high social capital, strong family and community ties, volunteerism and safe communities, and thus strong communities. Indicators of family stress and child safety provide further evidence of the value of social capital.*

*In comparisons to State averages, the “Cooloola excluding Gympie” SLA has lower levels of:*

- *Substantiated child abuse notifications;*
- *Child protection orders (nil);*
- *Youth justice orders; and*
- *Births to teenage mothers (a key indicator of need for family support).*

*The Australian Unity Wellbeing Index monitors the subjective well-being of the Australian population. A national project in 2005 was undertaken to compare self-reported well-being in rural and metropolitan areas. The project found that the highest level of personal well-being is achieved by people who live in rural towns, and that this was related to factors such as self reported health, opportunities for social interaction, satisfaction with community safety, and enjoyment of social relationships and community connections. It noted further that household incomes did not drive well-being in rural towns, and that “it seems clear that the best place to live in Australia (for personal well-being) is a rural town”. In many respects, this is illustrated in towns within the primary study area.”*

*(EIS, -p P15 – 70).*

- These statements in the EIS SIA are compatible with the STMRCG’s contention that the region of the Mary Valley was not experiencing undue or abnormal levels of social disharmony caused by low income, crime, regional economic depression, drought or other circumstances prior to the announcement of the proposed TCD in April 2006.

### **15.1.2.8 Community Health and Safety**

#### **Summary**

*“In combination, the Mary Valley and adjacent communities are liveable and socially sustainable communities. Good access to local social infrastructure, the physical environment, community networks and interdependencies between towns and rural localities contribute to support quality of life and strong communities.*

*Against this, there are low levels of social and economic resources in most localities. Most local communities have been affected, economically and socially, by dairy deregulation, forestry and timber rationalisations, the drought, and the need for upgraded physical and social infrastructure to cope with growth and demographic change. This has affected some households’ well-being (due to stress, unemployment or reduced financial resources).”*

*(EIS, p15 – 79)*

This statement demonstrates the bias within the EIS SIA.

- The summary attempts to downgrade the strengths discussed in the community in terms of its resilience, social connectivity, self dependence, high level of home ownership, safety and recreational facilities.
- Efforts to minimise these strengths against selectively chosen statements is misleading.

### **Impact Assessment**

#### **15.1.3 Impact Assessment**

##### **15.1.3.1 Property, Demography and Housing**

#### **Property**

*“Properties that would be required for both stages of the Project include those for:*

- *Project works, including construction and water storage;*
- *Relocating local roads;*
- *Relocating and upgrading of the Bruce Highway; and*
- *The buffer area.”*

(EIS, p15 – 80)

The EIS SIA Statement is incorrect and misleading.

- It has failed to include properties required for VMO (Vegetation Management Offsets). The properties required for VMO had not been announced prior to the release of the EIS.
- No consultation with communities or landowners affected by VMOs has been undertaken prior to the release of the EIS.

### 15.1.3.1 Property, Demography and Housing

#### Property

*“A total of 334 properties have been identified as likely to be impacted, either wholly or in part, by the Project.”*

(EIS, p 15 – 80)

The EIS SIA Statement is incorrect and misleading.

- There are a total of 599 properties which includes Stage 2.
- The properties affected by VMOs. are also not included. The number of properties identified as likely to be wholly or in part affected by the Project is unclear.

**Recommendation** Section 15

**Correct the statement relating to impacted properties to show the number of both Stage 1 & 2 properties and the properties required or likely to be required for Vegetation Management Offsets.** In addition, include a statement of the total area (Hectares) of Stage 1, 2 & VMO properties required.

### 15.1.3.1 Property, Demography and Housing

#### Property

*“Properties affected by the Project are currently being purchased under voluntary agreements, to provide certainty for those property owners. The voluntary purchasing approach was adopted after feedback from the community and is outlined in the QWI Land Purchasing Policy, which has been provided to all affected landholders.”*

(EIS, p15 – 80).

The EIS SIA Statement is misleading.

- From the very first DNR information briefing, residents were advised that the government would be ‘standing in the market’ to buy affected properties. To the best of our knowledge there was no consultation and feedback from the community prior to the decision to begin the purchase programme. If this is not correct, where is the evidence that prior consultations took place?
- Between May to November 2006, agents from the State Government in discussion with landowners in the affected region repeatedly stated that the period of voluntary resumptions

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would cease at some future point in time (suggested as sooner rather than later). After this time, land would be acquired under compulsory acquisition.

- **Following a community based challenge as to the moral right of the government to compulsorily acquire properties prior to Federal Government approval, Anna Bligh stated at a public meeting in November 2006 that no land would be compulsorily acquired unless and until Federal Government approval for the project was granted.**
- Landowners have been told that if land is acquired under compulsory acquisition, the QWI offer based on their property valuation will be non-negotiable and that recourse can only be taken through the Land Court.
- QWI may not acquire the entire property, preferring a portion of land potentially leaving landowners with less viable land, preventing ongoing farming or other pursuits and limiting business opportunities.
- Certainty should not be used as the motive to describe QWI purchase of properties. Certainty is not the issue for landholders. The issue has been avoidance of financial loss. The only way to avoid losses has been to sell their property. No other assistance package available.
- A mitigation measure to provide interim compensation packages whereby individuals could be given business assistance until the final approval is given, could have been provided.
- The STMRCG contends that the voluntary purchasing program amounts to force in the sale of properties.
- Residents report being pressured by QWI staff to sign contracts within a 3 month period, an issue raised with Anna Bligh at the public meeting in November 2006. This contravenes the International Guidelines and Principles for Social Impact which QWI states they abide by in the EIS.

### 15.1.3.1 Property, Demography and Housing

#### Properties purchased to date

*“As at 31 August 2007, QWI had reached agreement on 61% of all properties affected by Stage 1 and the possible Stage 2. The properties are progressing to settlement, as documentation is executed and contracts become unconditional. Total settlements as at 31 August 2007 were 261 residential, rural residential and primary production properties, representing 117 in Stage 1 and 144 in Stage 2 areas.”*

(EIS, p 15 – 81).

The EIS SIA Statement is misleading.

- The statistic 61% is misleading. In fact, only 43% of proposed Stage 1 & 2 properties have been settled. 18% will be settled “as...contracts become unconditional”, and the remaining 39% are retained by their current owners.
- Only 35% of proposed Stage 1 properties have been settled indicating a strong resistance to displacement.
- Using the average of 65% as the percentage of properties purchased that have been leased back, approximately 88% of properties in the proposed Stage 1 area are occupied by residents who were in place prior to the announcement.
- Most of these people have been very adversely impacted by the Queensland Government’s actions in pushing its case to build the proposed dam and actions it has undertaken along the way.

### 15.1.3.1 Property, Demography and Housing

#### Properties purchased to date

*“In the vast majority of cases, the properties are continuing to be used for the same purpose as prior to sale to QWI. Of the total settlements completed, 51 are primary production and/or business, 17 are residential, and 193 are rural residential.”*

*(EIS, p 15 – 81)*

The EIS SIA Statement is misleading.

- The figure 193 rural residential fails to identify how many properties are small rural farming enterprises that provide employment and contribute to South East Queensland’s agricultural output and food security.

### 15.1.3.1 Property, Demography and Housing

#### Properties purchased to date

*“Approximately 76 dwellings would be required for the Project and road relocations.”*

*(EIS, p 15 – 81).*

The EIS SIA Statement is misleading.

- Reducing the number of households acquired, by directing the roads through arable land and agreeing to purchase the required sections of land, reduces the perceived impact and cost of the proposed TCD, but does not offset the imposition on landholders.

#### **Recommendation** Section 15

**Publish the results from a survey of each property owner** that ascertains:

- a. Financial compensation provided;
- b. Perceived loss/gain in business opportunity for landowners;
- c. Perceived positive/negative impact on quality of life, service connectivity at stages prior to, during and post-construction; and
- d. Level of satisfaction with consultation and negotiation process.

**Disclose the number of properties with dwellings on them, in addition to the 76 dwellings listed, to enable a full assessment of the impact of road relocation.**

### 15.1.3.1 Property, Demography and Housing

#### Property Impacts

*“A number of potential impacts for property owners, both positive and negative, have been identified during consultation for the EIS in relation to property purchases. These include:*

- *Changes to property values, since the commencement of the land purchase scheme for the Project;*
- *Lease-back arrangements for owners of both Stage 1 and Stage 2 properties;*
- *Restrictions upon the use of land within the buffer area;*
- *Potential impacts associated with the purchase of properties comprising community uses such as the Kandanga Bowls Club and Kandanga Hall; and*



- *Stress associated with the land purchase process and effects on residents’ health.”*

(EIS, p 15 – 81).

The EIS SIA Statement is misleading because it understates and downgrades the level of identified stress associated with the proposed TCD.

- The stress associated with the land purchase process and effects on residents’ health is caused by the pressure the QWI has exerted on the community by attempting to acquire the land required for the project prior to achieving approval under the EPBC (1999) Act.
- Compensation for pain, hardship and suffering has not been reflected in the property settlement values.

### **15.1.3.1 Property, Demography and Housing**

#### **Community Concerns about Property Purchases**

*“Concerns about property prices declining, while held strongly and in good faith, are not likely to be realised. Some community members suggested that land prices may become more positive following Project construction. Such opinions are supported by real estate advertisements for properties adjacent to the Project area (and not owned by QWI) promoting the properties as having ‘guaranteed water views’ and ‘sitting pretty’ when the Project is complete.”*

(EIS, p 15 – 85).

The EIS SIA Statement is misleading and an example of the dismissive approach this EIS SIA applies to genuine concerns of landowners.

- The community have provided overwhelming feedback that adjacent land values have been inadvertently and detrimentally affected. The quoting of real estate advertising to support the proponent’s contention that land values for properties within and above the immediate “buffer” zone will and are benefiting from the proposed TCD, is dubious and poor social science practice.

#### **15.1.3.1 Property, Demography and Housing Community Concerns about Property Purchases**

*“Some community members have raised concerns about the impacts of property purchases, particularly on property values and the marketability of properties within the Mary Valley since the announcement of the Project. Concerns expressed include:*

- *A lack of confidence in the Mary Valley [property] market;*
- *A downturn in property sales other than through negotiated sales with QWI;*
- *Many landowners have sold their properties too early and the remaining ones have been drastically devalued;*
- *The Project is removing land from the market place, which is driving real estate prices up; and*
- *It is desirable for property sales to be at the same level as before the Project was announced.*

*These responses provide an indication of the conflicting views, confusion and concerns genuinely held by residents of the Mary Valley. For example, there are conflicting views about property prices, which are not supported by advertising activity in the property market.”*

(EIS,p 15 – 85).

- Credible evidence that land values in the region are not uncertain, has not been provided.

- The viability of business and personal assets has been put at great risk. No evidence is provided to enable landowners to dismiss these current concerns.
- Landowners in adjacent areas to the proposed dam are not eligible for compensation and cannot apply for a voluntary resumption with QWI now on grounds of compassion or hardship incurred by the proposed TCD.
- Prior to the release of the EIS, properties affected by Vegetation Management Offsets (VMOs) were not identified. Land affected by this announcement will have been detrimentally affected in terms of property value as uncertainty of the implications of a VMO announcement resides In fact VMO-affected land holders still have no idea what the VMO proposal entails.

**Recommendation** Section 15

Offer voluntary acquisition arrangements to owners of properties identified for VMO, and owners of properties located within one kilometre of the lake at full supply level.

### 15.1.3.1 Property, Demography and Housing

#### Effects of Changes in Property Values

*“Some people have commented in consultation discussions that property prices achieved in the Mary Valley are not competitive with other places where they may wish to relocate, and so are limiting peoples’ choices for relocation. However, the prices recorded for the Kandanga and Carter’s Ridge areas over the past twelve months compare well with other rural, or ‘lifestyle’ localities and many urban areas in SEQ.”*

*(EIS, p 15 – 82).*

### 15.1.3.1 Property, Demography and Housing

#### Effects of Changes in Property Values

*“Beaudesert, Boonah, Esk and Gatton”*

*(EIS, p 15 – 82).*

### 15.1.3.1 Property, Demography and Housing

#### Summary – Property, Housing & Demography

*“Housing and land prices in the Mary Valley are comparable with other locations offering rural living or lifestyle opportunities in South East Queensland.”*

*(EIS, p15 - 96).*

The EIS SIA’s Statements are misleading.

- Sites which the EIS uses for comparison are not appropriate. Too few comparative regions are provided and do not include areas within the SEQ region. The sites that were used for comparison are more inland localities which have less rainfall and poorer soils than the Mary River Valley. The inland localities do not have the same access to the beaches and service centres of the Sunshine Coast.
- The experience of property owners wanting to find a similar type of landscape and community is that they would have to either move closer to the coast where property prices were higher than the Mary Valley.
- Alternatively displaced landowners could relocate to Northern New South Wales but they would face further community severance issues.

**Recommendation** Section 15

**Appoint independent licensed valuers to study comparable locations in Southern Queensland and Northern NSW and provide a report for reference in negotiations for voluntary purchases and/or compulsory acquisitions. Further, where it is able to be established that DNR or QWI have underpaid for properties already acquired, provide a make-up payment to the former owners.**

### 15.1.3.1 Property, Demography and Housing

#### Effects of Property Discounted Lease-back Scheme

*“The property discounted lease-back scheme has proved to be successful, with approximately 65% of the purchased properties still occupied by the former owners at 31 August 2007. The flexibility of the scheme has also been demonstrated by allowing former owners the option to relocate to other locations, including within the Mary Valley. The scheme has allowed people to exercise choice in their response to the Project proposal, which is often not available for other major infrastructure projects. Overall, occupancy of QWI owned properties is approximately 97%, allowing properties to remain in productive use. There have also been 25 agistment agreements entered into on QWI property.*

*For owners of properties identified for a possible Stage 2, the lease-back scheme provides them access to the capital value of their land while offering a concessional rent in return. This allows the owners to access and use capital which otherwise is tied up in their land, while still deriving the benefits of property use over an approximate 28 year period (i.e. 2007 to 2035).”*

*(EIS p15 - 84)*

The EIS SIA’s Statements are misleading.

- The feedback received to members of the STMRCG is that people feel under great pressure to sell now since experience is that outside buyers are not interested in properties in the Stage 2 areas now and are unlikely to be in the future. Many landowners believe they have no option other than to lock in a sale now rather than run the risk of being unable to sell it later on.
- Under the ‘Land Purchasing Policy – TCD’, the landholder has no right of appeal if they do not agree to the negotiated price they are at a considerable disadvantage in the negotiating process.
- There have been many incidents reported in the media about discrepancies in payments for different properties. However, since no formal, publicly transparent reporting of compensation occurs accountability of QWI is minimal. This is further exacerbated through QWI being listed as a wholly Queensland Government owned company which allows the company to block requests for information citing commercial confidentiality as a reason for refusal.

### 15.1.3.1 Property, Demography and Housing

#### Effects on Community Infrastructure

*“It is acknowledged that such relocations and re-establishment of facilities may not be supported by all residents of the town. However, the Memoranda of Understanding with the various sporting clubs and other community groups indicate a proportion of community support for the proposal. Memoranda of Understanding and letters of support have been received from the following groups:*

- *Kandanga Bowls Club Inc.;*
- *Mary Valley Rangers Soccer Club Inc.;*
- *Kandanga & District Amateur Swimming Association Inc.;*

- *Kandanga Play Group;*
- *Kandanga Community Hall;*
- *Friends of Kandanga;*
- *Kandanga Creek State School Community; and*
- *Kandanga State School Community.”*

*(EIS, p15 – 85).*

**The EIS SIA’s statement above is grossly misleading and highly offensive to the Kandanga community.**

- Similar references in QWI Project Updates have caused great personal stress to many people in the above mentioned organisations. How can the following paragraph from the so called “letters of support” that accompanied the Memorandum of Understanding be interpreted in any other way than absolute lack of support for the project?

*“Adverse effect of proposed TCD on the communities of the Mary Valley including Kandanga.*

*The Associations who are signatories to this letter submit that the proposed TCD will have an adverse effect upon the social and community fabric of the Mary Valley including Kandanga.”*

And further on in the letter:

*‘submission not to be taken as support for the proposed TCD.*

**The associations and groups who are signatory to this letter are comprised of members many of whom are opposed to the building of the proposed TCD and, accordingly, wish it recorded that this letter of submission is not to be taken as supporting the proposed TCD.”**

**Recommendation**      Section 15

**That the Premier provides a public apology to the Mary Valley community for the blatantly untrue statement in the EIS.**

**Publish copies of each of the Memorandum of Understanding and Letters accompanying them in an appendix to the EIS.**

### 15.1.3.1 Property, Demography and Housing

#### Housing & Accommodation - Construction Phase

*“Increasing rents would have the greatest impact on affordable rental housing access during construction, resulting in a potential increase in housing stress for low income households, or requiring low income households to find alternative rental accommodation. In April 2007, 23% of low and very low income households in the Cooloola Shire were considered to experience housing stress. The actual proportions of low income households experiencing affordability problems would likely be understated, as this analysis does not include self funded retirees or working people on very low wages.”*

*(EIS, p 15 – 78).*

The EIS SIA’s Statements understate the impact of the construction phase.

- The demand / supply imbalance for rental accommodation if the construction of the dam was to proceed will most certainly adversely impact low income renters and further destabilise the community.

### 15.1.3.1 Property, Demography and Housing

#### Housing & Accommodation - Construction Phase

*“Construction-related impacts on housing and accommodation are more likely to be experienced in those towns close to the Project (including Gympie), and particularly in those areas that provide good access to the worksites. Demand for housing from the construction workforce will be for temporary accommodation and permanent accommodation. Some of the workforce may be accompanied by their families for periods of time. For the purposes of this impact assessment, it is assumed that:*

*Approximately 30-40% of workers (i.e. about 200) are expected to be sourced from the local area and adjacent communities;”*

*(EIS, p15 – 86).*

The EIS SIA’s Statements are based on assumptions.

- The figure of a third of the workforce to be sourced from the local area appears to be an estimate.
- The EIS needs to contain details of the jobs that may be offered to local people in the event of the proposed TCD’s approval.
- Details would include the qualifications and skills required, number of permanent, part-time and casual positions, the salary and condition packages offered and succession planning for employees making transitions from construction to operation phase.
- The EIS SIA is inadequate, reflecting a failure to commit to the future of the communities in the Mary Valley.

#### **Recommendation**      Section 15

**Provide an appropriately comprehensive list and number of positions likely to be offered to people in the local region together with qualifications and experience required, and terms and conditions of employment.**

### 15.1.3.1 Property, Demography and Housing

#### Housing & Accommodation - Operation Phase

*“The Office of Urban Management have undertaken a land use and planning study of the Mary Valley to plan for the orderly transition of land use consequent upon the implementation of the Project. The planning process has identified opportunities for areas of possible future urban expansion and rural living. These include the Imbil/Brooloo district and in areas adjacent to the existing towns of Kandanga and Imbil. QWI owns land adjacent to Kandanga, which would be suitable for urban expansion as well as accommodating the proposed sporting precinct. Possible creation of approximately 20-30 residential allotments may be suitable for this area, subject to planning approval, the extension of necessary infrastructure and general community acceptance. Such planning measures would assist in addressing potential future housing and accommodation needs”.*

*(EIS, p 15 – 87).*

- The EIS SIA’s Statements do not provide details of how consultation around future development will be conducted.

- The communities of the Mary Valley are very concerned that land that has been fragmented due to the QWI property acquisition program will be on sold to developers for residential allotments.
- The term “*general community acceptance*” is greeted with cynicism, because there is not “*general community acceptance*” for the proposed TCD to proceed.
- The trust the community once may have had in governance and democracy has been eroded. See STMRCG Social Values Report.

### 15.1.3.1 Property, Demography and Housing

#### Regional Population Growth

*“The Queensland Water Commission expects the Project would deliver to the South East Queensland water grid an additional 70 000 megalitres of water a year, or approximately 32% of supply requirements to 2016. The Project is seen as responding to the water supply needs of the existing and future populations of South East Queensland, and as contributing to security of water supplies for residential and economic development.*

*The Project would also ensure a reliable supply of water to consumers and maintain environmental flows in the Mary River.”*

*(EIS, p 15 – 87).*

The EIS SIA’s Statements is misleading.

- The use of the figure 32% is misleading and exaggerates the importance of the proposed TCD particularly when there are viable, responsible and attractive alternatives. In fact, the proposed TCD Stage 1 estimated performance would provide significantly less of the stated water needs of South East Queensland.

### 15.1.3.1 Property, Demography and Housing

#### Housing & Accommodation - Operation Phase

*“As discussed in Section 15.1.3.1, approximately 76 dwellings located in the primary study area will be required to be relocated or demolished prior to the Project becoming operational. This represents less than 4% of the dwelling stock (approximately 1,900 dwellings) present in the primary study area in 2001. The supply of housing has increased since the 2001 Census, with further building approvals and commencements. There were also a further 8,870 dwellings in the adjacent areas in 2001.”*

*(EIS, p 15 – 88)*

The EIS SIA’s Statements understate the impact of the operation phase.

- The figure of 76 dwellings conceals many details concerning the quality of life and value of properties with dwellings that will not be acquired.
- It is likely that on a property with a dwelling, while not required to be demolished, will be located where it is no longer an attractive place to live due to the relocation of new power lines, roads, bridges etc, or acquisition of only part of the whole property.
- The EIS should state the number of properties acquired that have an existing dwelling and how infrastructure relocations will affect the value.

### 15.1.3.1 Property, Demography and Housing

#### Population Change

*“With the delivery of the Project, the Mary Valley would become more attractive for lifestyle and rural living due to the potential for waterfront aspects, improved access and facilities, and due to the accelerated transition to eco-tourism and nature-based tourism likely to accompany the Project.”*

(EIS, p 15 – 90).

The EIS SIA’s Statements are misleading and incorrect.

- There will always exist a risk to persons and improvements located at or below 90 metres AHD in the event of a major flood event.
- There is no evidence presented in the EIS that can dismiss the risk that the proposed TCD would not look like every other dam in the SEQ region. The significant areas of exposed ground and swampy margins that emerge over time as water levels move up and down will result in ugly landscapes that will be unattractive to potential buyers. (See MRCCC 2008 Figure 8. Area of land between FSL and shoreline, area of shallow lake margins.) The exposed highly fertile vegetation will emit methane and other GHG emissions which will pose a risk to public health as well as contribute significantly to our State’s emission levels.
- Estimated population growth, the hype contained in selected real estate agent’s advertisements and speculation about the valley’s appeal to tourists is an unreliable basis to build an argument that the valley will become economically prosperous and recover from the current negative impact.
- In Southeast Queensland there is no evidence that dams have been a major catalyst for increasing property demand or tourism demand. Some small benefits have accrued to the Wivenhoe dam region in terms of local tourism and recreation but there have been no reported property booms in that region resulting from the existence of the dam. It must also be noted that during the current drought there has been a downturn in visitation to the Wivenhoe dam which indicates that tourism is an unreliable source of revenue for local populations especially given climate change scenarios of lower stream flows into dams.
- In contradiction to the proponent’s view, the reality for residents in the affected area is that immense damage has been done to the community and social infrastructure by the announcement, land acquisition program, and the activities of Queensland Government personnel or their agents, and that this damage may well be irreversible if the TCD is approved.

#### **Recommendation** Section 15

Provide details of the studies that support the contention that dams have been a major catalyst for increasing property and tourism demand.

### 15.1.3.1 Property, Demography and Housing

#### Population Change - Operation

*“The impact on the population in the Mary Valley over the medium term to 2016, for the “with Project – Scenario (2.2% growth)” compared to the “without Project” would be a net reduction of approximately 48 people or less than 0.8% of the population in the “without Project” scenario. This impact would be negated and reversed within the next five years following 2016 (Figure 15-17).*

*With the delivery of the Project, the Mary Valley would become more attractive for lifestyle and rural living due to the potential for waterfront aspects, improved access and facilities, and due*

to the accelerated transition to eco-tourism and nature-based tourism likely to accompany the Project. Under two scenarios, the population growth would be moderately higher (at 2.2%pa) or, slightly higher again (at 2.6%). With the moderately higher growth rate of 2.2%, the population of the Mary Valley would be approximately 5444 in 2011 and approximately 6,070 in 2016”.

(EIS, p 15 – 90).

The EIS SIA’s Statements are misleading.

- Population growth projections falsely assume that the proposed TCD is a major factor in future migration. The claims that the Mary River Valley population will increase because of increased amenity and possible tourism is unfounded based on historical records.

**Recommendation** Section 15

Provide details of studies that support the contention that population of the Mary Valley will increase.

### 15.1.3.1 Property, Demography and Housing

#### Impacts on Community Vitality

*“The estimated departures would represent approximately 6% of the estimated population in 2006, indicating that it is probable many of the remaining people would know someone who has departed.”*

(EIS, p 15 – 93).

The EIS SIA’s Statements understate the impact of demographic changes in the affected communities.

- The departure/s of long-term residents of the Valley has already had a significant impact on the remaining residents.
- Children, in particular, in the school communities have lost many friends. For example, the Kandanga State School reports that only 6 original family’s children remain enrolled in the school which represents a rapid change to the children’s social structure and friendship networks. This impact spills over into extracurricular and sporting activities hosted by the community i.e. Soccer club, equestrian clubs, etc.

### 15.1.3.1 Property, Demography and Housing

#### Impacts on Community Vitality

*“There are few properties in the Mary Valley suitable for older people who have frailties or disabilities, which means that some older people may have to move away from the local area as their housing needs change, regardless of whether the Project proceeds. While the primary study area has lower proportions of people aged over 65 years than the Queensland average, the movement of older people out of the Mary Valley has been and remains a concern for local people. The overall effect on the age profile of the primary study area is likely to be negligible.”*

(EIS, p 15 - 94).

- The EIS SIA’s Statements understate the impact of the proposed TCD on the elderly residents who were, or still are, living in the Mary Valley.
- The STMRCG receives comment from the community that suggests there is great concern regarding the treatment of the Valley’s elderly community by the proponent.



- Many elderly people have incurred relocation and displacement problems that have had a direct, detrimental impact on their health and wellbeing.

### 15.1.3.1 Property, Demography and Housing

#### Impacts on Community Vitality

*“In its operational phase, the Project would have minimal direct impact on population numbers but would be expected to lead to indirect population growth (refer to Section 15.1.3.1) as people move to the Mary Valley to take advantage of the enhanced lifestyle and diversified employment offered by the Project.”*

*(EIS, p 15 – 94).*

The EIS SIA’s Statements are based on assumptions regarding the employment impact the proposed TCD would have in its post-construction phase.

- The EIS must demonstrate how many jobs the Project will actually create.
- The term “diversified employment offered by the Project” requires explanation.
- Details regarding the skill/qualification levels that will be required by permanent and casual staff must be provided.
- The salary and condition packages that would be offered must be provided.

#### **Recommendation** Section 15

Provide an appropriately comprehensive list and number of positions likely to be offered in the operational phase to people in the local region together with qualifications and experience required, and terms and conditions of employment

### 15.1.3.1 Property, Demography and Housing

#### Impacts on Community Vitality

*“The construction camp would be located in consultation with Council and local communities following Project approval. The location of the construction camp would determine potential impacts on and benefits to the local area. For example, a construction camp situated in proximity to Kandanga would be more influential on community life, local business and services there than it would if situated in proximity to the larger population and greater range of higher-order business and services in Gympie.”*

*(EIS, p 15 – 92).*

The EIS SIA’s Statement is incomplete.

- The camp site is not identified in the EIS.
- However, it is understood that the most likely site for the camp will be on the site of the present Kandanga Bowling Club.
- Kandanga is a very quiet rural community.
- Lack of consultation, clarity and openness in discussing options with the community has exacerbated the levels of stress and sense of uncertainty about the future of the township of Kandanga.
- Residents are concerned that a very substantial increase in vehicle movements will have a detrimental impact on the road safety for school children in the town, air quality and noise

pollution as an increased number of four wheel drives and heavy vehicles use one or both of only two roads into and out of the township.

- The camp is unsuitable for any of the Mary River townships.
- It is unlikely that essential and auxiliary services such as service stations, supermarkets, coffee shops, medical practices, chemists and so on would be established to assist residents of the workers' camp.
- The EIS must provide appropriate planning details that have been developed in full consultation with the Mary Valley residents.

**Recommendation** Section 15

Define areas considered suitable and likely for a construction camp and details of plans that address the above concerns.

### 15.1.3.1 Property, Demography and Housing

#### Impacts on Community Vitality

*“Once operational, it is expected that the economic stimulus and recreational activities related to the Project would contribute to the established trend of “tree changers” moving to the area as well as people who support such change through new or enhanced local businesses and community services. This would increase and diversify the population, reinvigorate community relationships and networks, and diversify and strengthen the local economy. It is likely that recreational activities and visitation to the Project would strengthen allied businesses in the Mary Valley, and would have a positive effect on socio-economic indicators within five to ten years from operation”.*

*(EIS, p 15 – 94).*

The EIS SIA's Statements are misleading and based on unsupported assumptions.

- The expectation that there will be significant economic stimulus from the constructed proposed TCD is unsupported and unprecedented.
- In Southeast Queensland there is no evidence that dams have been a major catalyst for increasing property demand or tourism demand.
- Evidence to demonstrate positive economic and ongoing social returns to the pre-2006 residents of the region is lacking in the EIS.
- The EIS must provide modelling to demonstrate how this expectation can be realised particularly with the weight of evidence worldwide that dams do not provide an economic stimulus.
- The EIS does not detail scenarios in which the proposed TCD operates for extended periods at 30 – 40% of its capacity.
- The EIS must outline mitigation planning to compensate the local economy and people to enable the region to cope with the burden of an environmental devastation including major damage to professional and recreational fishing in the Hervey Bay and Fraser Island regions.

**Recommendation** Section 15

Provide evidence that supports the above statement (*EIS, p 15 – 94*).

### 15.1.3 Impact Assessment

#### Effects on Businesses

##### Community concerns about businesses

*“Some participants in the consultation process from downstream areas, stated that the lack of certainty regarding future water supplies was affecting farming confidence and that some workers had left the industry and the area as a result. The range of externalities including drought and trends to changing land use are considered to be stronger. There is no change proposed to the existing entitlements for water allocations downstream of the Project.”*

*(EIS, p 15 – 92).*

The EIS SIA’s Statement understates the concerns of residents downstream.

- The above statement is an exercise in bias interpretation of comments from farmers in the downstream regions of the Mary River.
- Understating the impact on downstream communities demonstrates that the full impact of the proposed TCD has not been fully explored by the EIS.
- Water allocation entitlements are likely to change as the proposed TCD will have an impact on downstream flows and possible water entitlements.
- This is a serious flaw and omission that must be corrected with adequate methodology.

### 15.1.3 Impact Assessment

#### Effects on Businesses

##### Community concerns about businesses

*“The perception of uncertainty is asserted to have affected businesses in the adjacent communities which had derived business from the Mary Valley. To address the perception of uncertainty and to enhance opportunities for local business and employment, QWI has established a register for local businesses wishing to participate in Project construction and related works. This initiative is attracting increasing interest with over 500 businesses registered in September 2007. To ensure local and regional suppliers can fully prepare to make the most of potential opportunities, QWI has also established a working group involving business, training and government bodies. The working group comprises representatives from:*

- QWI;
- Industry Capability Network Queensland;
- Australian Industry Engineering and Manufacturing Network;
- Wide Bay Institute of TAFE;
- Department of State Development; and
- Department of Employment and Industrial Relations.

*Consultation participants stated that some local businesses lost clientele immediately after the Project announcement, and that workloads for some businesses, including tradesmen, earth-movers, and service providers to the farming community, have dropped by up to 50% and in some cases up to 100%. Residents believe that, as more properties in the Project area are acquired, this impact would increase. The effect of business losses and downturn in business income has been identified by consultation participants as significant at the local level. While other factors such as changes to agriculture and the current drought conditions may have*

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*already affected businesses, the Project is thought by consultation participants to have contributed to loss of local businesses and local people from the area.”*

*(EIS, p 15 – 95).*

The EIS SIA’s Statements understate the impact on businesses in the present.

- Clear feedback from the community and surrounding business centres indicated that the announcement of the proposed TCD triggered a significant downturn in local business.
- Selective references to pre-announcement drought and changes to agriculture minimises the impact of the announcement of the proposed TCD.
- Uncertainty is not offset by a register of business providers.
- Business operators are being misinformed by the agents of the QWI and other government services, by the assumption that the project will get approval.

### **15.1.3.1 Property, Demography and Housing**

#### **Summary – Property, Housing & Demography**

*“Some residents have chosen to accept QWI’s offer of purchase and take up other opportunities.”*

*(EIS, p 15 – 95).*

The EIS SIA’s summary is inadequate.

- The EIS fails to explain that many residents that sold their properties did so because they were unable to cope with or unwilling to be continually exposed to the pressure to sell.
- The EIS fails to recognise, report or adequately explore the opportunities foregone by land and business owners due to this decision.
- Due to the reticence of QWI to disclose details of land use agreements, including regulations or impediments to land use prior to land acquisition negotiations commencing, landowners report that the uncertainty that was generated by the land acquisition program could only be resolved by entering a voluntary acquisition negotiations for properties affected by both Stage 1 and 2 of the Project.

### **15.1.3.1 Property, Demography and Housing**

#### **Mitigation – Population, Housing and Demography**

##### **Population Change – Operation**

*“The Project is not expected to have any impact on population in the upstream local government areas of Maroochy, Noosa and Caloundra.”*

*(EIS, p 15 – 97).*

The EIS SIA’s Statement is inadequate.

- The negative impact on upstream communities must be included.

### 15.1.3.1 Property, Demography and Housing

#### Mitigation – Population, Housing and Demography

##### Summary – Access and Connectivity

*“A number of community members recognised potential benefits for local access provided by the Project following construction, through road upgrades and improvements to the existing road network. New roads would be constructed to appropriate safety and design standards leading to an improvement on the existing road network in some locations.”*

*(EIS, p 15 – 102).*

The EIS SIA’s Statements understate community concerns regarding the construction phase of the proposed TCD.

- The community have concerns about the road changes; distances outer regions of the adjacent inundation areas would have to travel; and increased use of heavy machinery and traffic on the regions’ existing roads.
- The community has concerns about noise, air and visual pollution created during the construction phases.

### 15.1.3.1 Property, Demography and Housing

#### Mitigation – Population, Housing and Demography

*“The following mitigation measures are recommended to manage or avoid potential impacts on property, demography and housing in the Mary Valley and adjacent communities.*

*Employment – continue to extend training and skills development programs to local businesses and the labour force to optimise employment benefits, to minimise the requirement for a workforce-related population inflow to address Project construction requirements, and to reduce the demand for more temporary and longer-term accommodation.*

*Economy – extend business planning training to local businesses to optimise economic benefits from both the construction phase and the post-construction phase.*

*Housing 1 – develop a coordinated approach to housing supply in the Mary Valley for the construction phase in consultation with relevant State and local government agencies and community housing groups.*

*Housing 2 – use dwellings purchased by QWI, for construction workforce accommodation, reducing the demand by approximately 76 dwellings in the Mary Valley, as well as investigate the feasibility for flexible housing types within the construction camp to cater for both single workers and workers with families.*

*Housing 3 - monitor housing prices and rents in the Mary Valley and adjacent communities to support the timely delivery of State housing programs to low-income households.*

*Housing 4 – investigate the opportunities for relocating and reusing dwellings to be removed at the completion of the Project lease back period as an option for addressing short-term housing needs in conjunction with the OUM land use planning study.*

*Land use and planning – finalise the Land Use Plan and Infrastructure Study presently being undertaken by the Office of Urban Management (OUM) and due for further community consultation in 2007.”*

*(EIS, p 15 – 97)*

The EIS SIA lacks adequate details.

- The EIS's recommendations should be supported with plans or details of how these plans are to be developed and the community consultation processes.

The following points must be considered:

- Employment: details of training, support and incentives must be provided. "Continue to extend" implies that plans have been developed and are presently being enacted although Federal approval for the Project has not been granted. Plans must also include contingency and career counselling (in the event that Federal approval is not granted) to any community member undertaking training and skills development with the prospect of being employed in the construction of the proposed TCD.
- At the time of preparing this submission, houses in the proposed pondage area are being relocated and properties redeveloped prior to Federal approval being granted to undertake the project despite point 6 above: "*Housing 4 – investigate the opportunities for relocating and reusing dwellings...*". These actions by QWI and its contracting agencies, indicate that such plans do exist (see Housing & Accommodation - Operation Phase, EIS, p 15 – 88) and have not been released for public discussion; were developed without public consultation; and are not intended to be released to the public at any point in the future despite the recommendation point 5 above: "*Land use and planning – finalise the Land Use Plan and Infrastructure Study presently being undertaken by the Office of Urban Management (OUM) and due for further community consultation in 2007*".
- If public consultation with the OUM has commenced, full transcripts and related documentation should be released and included in the EIS as well as opportunities to participate be widely advertised to members of communities in affected and adjacent areas of the proposed TCD.
- Housing – 3. The implication is that 76 houses are currently not occupied however although some may not currently be occupied, most are. It seems then that the plan is to dislocate the existing occupiers and insert construction workers instead. This reflects a harsh and unreasonable approach to existing residents in the community.

#### 15.1.3.4 Community values

##### Changes during construction phase

*"At present, residents' understanding of the potential Project effects is influenced by personal values and knowledge. A full understanding of the potential effects has not yet been possible for some people to determine. It is likely that given a greater understanding of the Project's implications, and with time, such people would be ready to re-commit to the community's future, and begin restoring key elements such as relationships, facilities and community values to former levels."*

*(EIS, p 15-103).*

The EIS SIA's Statement is incorrect.

- A greater understanding of the Project's implications will not be the driving force to allow people to re-commit to the community's future.
- Since the proposed TCD is still in the feasibility stage community members are most likely to embark on restoring sense of community only after the future of the dam is determined.
- Possible benefits to the community from the construction and operation of the dam are now being considered by the community but this is a secondary feature in re-building a sense community.
- In addition to the EIS it should be noted that one of the most important aspects for the community in building a sense of community is the bonding and bridging surrounding the political resistance to the dam.

### 15.1.3.3 Social use

#### Mitigation strategies – tourism

##### Recreational Access

*“Recreational and tourism benefits would also make substantial contributions to local and regional economic development, diversification of the local economy, and local and regional job creation.”*

*(EIS, p.15 – 103.).*

The EIS SIA’s Statement is founded on unsupported assumptions and is very likely incorrect.

- The recreational and tourism benefits are overestimated and the EIS assumes that the aesthetics of the landscape can be maintained in and around the dam. This is simply not possible given that the fluctuating water levels will always expose muddy and swampy ground.
- A key visual feature of shallow dams with variable streamflows and high extraction rates is that large surfaces of bare, un-vegetated earth are exposed for large periods of time.
- This feature of the landscape ranks low in visual landscape scales and will have a large impact on the attractiveness of the area around the ponded area.
- Variable water supplies also impact on users of the water itself.
- If the full supply level of the dam cannot be met for 75% of the time there would be considerable ground exposed on the edges and the middle section of the dam.
- A thorough examination of landscape amenity and local recreational demand under likely water level scenarios will give a more realistic appraisal of tourism and recreational benefits. This is not completed in the EIS and therefore overestimates the benefits of the project.
- There is significant risk that the social harmony and wellbeing of people who may purchase land adjacent to the pondage area on the basis of “waterfront views” will be disappointed at being deceived as the value of their property erodes.
- This will be exacerbated if residents invest in false business opportunities promoted by the QWI and Queensland Government based on a favourable EIS.
- Benefits to local economy from tourism have not been quantified. If no quantification of benefits is undertaken analysis comparing other existing storages in Southeast Queensland should be undertaken to determine likely demand and the economic benefits of the proposed mitigation strategies relating to tourism and recreation.

### 15.1.3.2 Social infrastructure

#### Pre-construction impacts on social infrastructure

##### Increased Demand for Community Services

*“New or enhanced government services provided following the announcement include:*

- *Establishment and operation of the Kandanga One Stop Shop to provide a central source of information about the Project and referral to government services;*
- *Funding to Lifeline to provide personal and financial counselling, and emergency relief payments;*

- *Appointment of a Community Development and Engagement Officer to assist community organisations;*
- *Increased provision of farm financial counselling, industry development and rural extension services;*
- *A Business Adjustment Scheme;*
- *Maintenance of school bus operators’ subsidies at pre-announcement levels;*
- *Confirmation that teacher staffing numbers for each school in the Mary Valley will remain at the same level as 2006 for 2007;*
- *Support and advice to sporting clubs regarding funding proposals for facility relocation (DLGPSR);*
- *Detailed planning for managing potential impacts and changed access arrangements for the Kandanga Cemetery;*
- *Extending a range of personal services (e.g. Public Trust Queensland has offered support to help people deal with making their wills, enduring power of attorney and guardianship aspects); and*
- *Extension of a number of special events (e.g. the “Locker Room” forum, the “Get Active” workshops, the “Living Works” counselling program, the personal safety advisory service, and*
- *The QT safety audit of certain roads in the primary study area).*

*These services are comprehensive, reflecting the importance of the community issues, and have addressed most needs. They will be needed for some time as the community adjusts to the Project during both construction and operation.”*

(EIS, p 15 – 104).

The EIS SIA’s Statement exaggerates the services listed.

- With the exception of obvious need for personal and business counselling, many of these ‘services’ are misleading (teacher staffing numbers) or inexpensive duplications of government services that should already be provided, i.e., Public Trust.
- Token gestures i.e. business subsidies, to a community shattered and adjusting to massive change are regarded with cynicism by frustrated residents.
- The community is especially grateful for the support provided by the dedicated Lifeline team who have been so caring, compassionate and effective in their work. There is no doubt that their contribution resulted in the prevention of several suicides.

### **15.1.3.2 Social infrastructure**

#### **Pre-construction impacts on social infrastructure**

##### **Increased Demand for Community Services**

*“Confirmation that teacher staffing numbers for each school in the Mary Valley will remain at the same level as 2006 for 2007.”*

(EIS, p15 – 104).

The EIS Statement is incorrect.



- Immeasurable levels of uncertainty to staff, parents and students throughout 2007 and into 2008 have been caused by the failure of Education Queensland to confirm that staffing numbers will remain stable.
- Confirmation of 2007's staffing numbers did not arrive at schools until after the day 8 systemic audit procedure of all Queensland State Schools and staff numbers for 2008, at the time of preparing this submission, continue to be uncertain.
- Assurance in staffing numbers and allocated resources has not been provided through the P&C bodies, rather in informal dialogue between EQ staff and principals. It is understood by the P&C that these conversations are unrecorded and tie expected support for the school to 'favours' with the implication that one favour per school is all that can be used.

### 15.1.3.2 Social infrastructure

#### Construction impacts on social infrastructure

##### Community Facilities

The EIS SIA makes several comments concerning flooding and the impact on community facilities.

*“Flood modelling completed for the Project investigations shows that the Kandanga hall, school and the Kandanga hotel would not be impacted by the Project.”*

(EIS, p 15 – 104).

*“The Federal State School buildings will not be affected by the Project's inundation or during major flood events.”*

(EIS, p 15 – 105).

*“Community facilities in other townships in the primary study area, such as Imbil, Brooloo and Carters Ridge / Ridgewood, would not be affected by the Project's full supply level, or by additional flooding as a result of the Project.”*

(EIS, p 15 – 105).

*“The establishment of a grassy verge is proposed to eliminate potential flood risks for the Kandanga Cemetery.”*

(EIS, p 15 – 105).

*“The proximity of Kandanga Cemetery to the potential inundation levels is of concern for the Kandanga community. While there is no impact on the cemetery by the Project at its full supply level, QWI has developed technical solutions which would protect burials from risk of inundation during major flood events.”*

(EIS, p 15 – 106).

The EIS SIA's Statements are incorrect.

- A severe consequence of the failure by the proponents to undertake appropriate flood modelling and planning will be the impact of a major flooding event, similar to the February 1893 event.
- Property or infrastructure below 92 metre AHD are at risk of inundation in the event of a major flood event and the dam control mechanisms not functioning perfectly.
- The community has concerns about not being able to obtain appropriate insurance for improvements below 92m AHD and that this will severely impact property valuations. The presence of this threat to dwellings, property and infrastructure will devalue landowners' assets.

The Queensland Government must undertake to provide full personal and property insurance cover at normal premiums to cover this risk.

- Infrastructure and services, i.e. schools, halls, and businesses, built at or below 92m AHD will also be subject to severe damage caused by flood water inundation. Services and roads will have to close and this would cause major disruption to residents during the event and for weeks following as they clean up and repair the damage.
- Regarding the future of the cemetery, the EIS should report that there has not been an agreement reached between the community stakeholders in the cemetery and the Taskforce and QWI over the future mitigation of the cemetery. The SIA downgrades the potential flooding impact on the cemetery and omits to report that the community representatives do not have any trust or faith in the current modelling.

**Recommendation** Section 15

That the Queensland Government undertake to provide full personal and property insurance cover at normal premiums to cover the risk of flood impacts where this risk cover is not able to be achieved through normal commercial channels.

### 15.1.3.2 Social infrastructure

#### Planning & urban development

*“Some community members are concerned also about planning measures associated with the Project, for the future of Kandanga’s main street and the possible relocation of key community facilities. Any changes to Kandanga’s main street would be the subject of on-going community consultation and involvement in the detailed planning process.”*

(EIS, p15 – 106).

- The EIS SIA’s Statement understates the lack of confidence in the planning measures.
- The statement, “on-going community consultation” is dubious.
- There has been a chronic lack of consultation since the announcement of the proposal in April 2006.
- Research and investigations by agents has been conducted in secrecy, government reports, requested by members of the community have been denied under Queensland Government Cabinet Confidentiality legislation.
- Feedback able to be provided in scheduled consultation events have been extremely limited and preventative of expressions of ‘no-dam’ sentiments. Questions and feedback has been constructed to ask residents to comment on post approval scenarios.

### 15.1.3.3 Social use

#### Farming, forestry and rural use: Potential Impacts

*“The Project would occupy rural land currently used for grazing, dairy and crop production. This is expected to impact approximately 19 of the 60 remaining dairy farms in the Cooloola Shire, reducing annual milk production by about 20 ML. However, the DPIF reports that 10 of these dairy farms would exit the industry irrespective of the Project, as a result of factors such as dairy deregulation, drought, increasing real estate prices and land use changes.”*

(EIS, p15 – 109).

The EIS SIA’s Statement is misleading.

- This statement directly contradicts evidence provided by the Queensland Dairy Corporation at the 2007 Senate Standing Committee on Rural and Regional Affairs and Transport Inquiry into the TCD proposal.
- The Mary Valley is identified as a growth region for milk production.

### 15.1.3.3 Social use

#### Community views – farming forestry and rural use

*“Community concerns expressed during consultation also related to perceived flow-on effects for local and regional communities including:*

- *Loss of employment;*
- *Impact on local businesses that supply and receive goods and services from rural uses (i.e. rural supply stores, equipment suppliers, mechanics);*
- *Displacement of farming families, some of which have lived in the Mary Valley for a number of generations;*
- *Difficulty for some farmers in getting work elsewhere or in alternate industries;*
- *Loss of the area’s rural heritage, relating to the agricultural and timber industries; and*
- *Potential increases in prices of produce, particularly milk and dairy products.*

*Some community members suggested that the impact of the Project for farmers would exacerbate changes in recent years to the agricultural industry, such as deregulation of the dairy industry, decline in the sugar industry, larger farms taking over smaller enterprises, and pressure from prolonged drought conditions, urban development and subdivision of land for rural residential uses.*

*Much of the land within the inundation area has been subdivided, over time, into small rural lots well below the minimum viable lot size for rural pursuits in the Mary Valley. While these lots are held in common ownership, agricultural pursuits can be maintained. However, there is often no restriction on the future separation of the titles of these rural lots, enabling them to be sold separately and used for a range of uses, including residential, that comply with the Planning Scheme. This fragmentation of rural holdings is commonplace in coastal localities and has had a significant impact on agriculture in similar locations. With the ageing of farmers in the Mary Valley, the process of land holding fragmentation would be expected to emerge as a major land use issue, regardless of whether the Project proceeds, with the same impacts as those of concern raised in consultation.”*

(EIS, p 15 – 110).

Several issues from the EIS SIA’s Statement warrants further explanation.

- If the fragmentation of rural holdings is commonplace, why does it make sense to permanently remove over 6,700 hectares from current agricultural production?
- Rural planning by-laws have prevented subdivisions of property under 100 acres. Smaller rural lots were rezoned during a brief change in the law in the 1970s. The prevention of further subdivisions has protected the agricultural viability of larger holdings and can continue to do so into the future. The recent amendments to the Queensland Government’s Integrated Planning Act 1997 to enable subdivisions of these properties and QWI’s resumption program guarantees that the risks outlined in the EIS statement above would be actualised.
- Therefore the comment “With the ageing of farmers in the Mary Valley, the process of land holding fragmentation would be expected to emerge as a major land use issue, regardless of

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whether the Project proceeds, with the same impacts as those of concern raised in consultation” must be contested. As the region provides fertile and productive land there is great prospect for the future of the Valley as a food and fibres basin with good reason to retain family holdings and pass them to future farming generations and to attract innovation and enterprise as has been evidenced by the recent flow of people into the Valley to take up agricultural pursuits.

- As has been previously mentioned in the submission, many of the rural residential holdings on small acreages are productive agricultural enterprises that contribute to the productivity, research and development and innovation in agriculture of the region and cannot be dismissed as simply “lifestyle” residential.
- Finally, regarding the language of the statement: “Perceived flow-on effects for local and regional communities...” This suggests that these impacts are not real. To the contrary there has been employment loss, downturn in local businesses that supply and receive goods and services from rural uses, displacement of farming families and problems for some people finding work elsewhere or in alternate industries and with the departure of farming families, knowledge about the area’s rural heritage is diminishing hence efforts by the Friends of Kandanga and other community organisations to record and archive as much as possible to prevent further loss of heritage to the area.

### **15.1.3.3 Social use**

#### **Community views – farming forestry and rural use**

##### **Mitigation strategies**

“Strategies recommended to mitigate potential impacts on rural uses, include:

- *opportunities for education, training and assistance to provide farmers with the skills to gain alternative employment, adopt alternative farming practices (i.e. on smaller properties), develop alternative rural industries and manage change and effects of changes in farming operations; and*
- *communication strategies about anticipated water flows downstream of the Project, address community concerns.”*

(EIS, p 15 – 110).

The EIS SIA’s Statement’s mitigation measures are inadequate.

- If the mitigation measures cannot be implemented to preserve and strengthen the pre-existing values of the community, economy or security of tenure once felt, then the recommendation of the EIS should be not to proceed with the proposed TCD.

### **15.1.3.3 Social use**

#### **Fishing: Potential Impacts**

##### **Community views – Fishing**

*“Potential impacts on fish habitats and recreational and commercial fishing downstream of the Project were raised by community members during consultation for the EIS. These included:*

- *Potential disruption to marine ecosystems and the Mary River and Great Sandy straits, due to an increase in sediment downstream of the dam;*
- *Potential impacts on the fishing industry due to changes to the flow of water downstream of the dam; and*

- *Need for sustainable flows for all current water allocations and environmental flows to ensure a health river and productive downstream fisheries, ecosystems and tourism”*

(EIS, p 15 – 112).

The EIS SIA’s Statement is correct, but needs to be further expanded.

### 15.1.3.3 Social use

#### Community views – Tourism Benefits and Impacts

*“While some people believed the Project provided very limited tourism opportunities, others believed that the Project provided a number of opportunities to increase tourism, limited to the lake or those townships close to the lake rather than extending to downstream areas. Other people again suggested that the Project would provide opportunities to develop bed and breakfast accommodation, agri-tourism, and recreation based tourism activities and saw a range of opportunities for community involvement in beneficial tourism-related activities and economic outcomes.”*

(EIS, p 15 – 114)

The EIS SIA’s Statement overstates the general support by the community for the proposed TCD.

- The EIS pitches the possibilities inherent in tourism as a key mitigation strategy.
- The Statement above in the EIS attempts to suggest that the community believes that there would exist reasonable tourist potential resulting from the proposed TCD. From feedback from the community, this is not the case.
- There is considerable feeling within the communities that post-construction, the visual appeal of the Valley will be irreversibly destroyed and that this contention is supported by evidence.
- Given that the methodology and sampling for studies was flawed. The term “*other people*” is dubious and the language is constructed to misinform and position community opposition to the project as weak.

### 15.1.3.4 Community values

#### Community views on values

*“Around 60% of survey respondents from the primary study area said they had experienced changes to community values over the past twelve months to June 2007. More than three-quarters of these respondents attributed changes to the Project, and some made additional, specific comments in regard to the proposal. This reflects the high awareness of the proposal in terms of the potential changes to community values identified by residents.”*

(EIS, p.15-117).

The EIS SIA’s Statement that relies on the community Values Survey understates the impact on values.

- This community values survey fails to account for the views of the people who have left the community and includes people who have recently moved to the community to occupy vacant QWI owned premises.
- There needs to be a break-down of the type of resident, as this will impact on the results shown above.
- Anecdotal evidence suggests that for people who have left the community one of the issues that has contributed to their decision to leave is that the community values have been affected.

- The views of the people who have moved to the community should not be included in the survey because they are incapable of determining change. If these two segments of the sample population are excluded from the survey the result of 60% will significantly increase. Thus the survey most likely underestimates the impact of the project on community values.

**Recommendation** Section 15

Correct the bias of the survey results by surveying those residents who have left the community and by removing the data gathered from those who have joined post the announcement.

#### 15.1.3.4 Community values

##### Changes during construction phase

*“At present, residents’ understanding of the potential Project effects is influenced by personal values and knowledge. A full understanding of the potential effects has not yet been possible for some people to determine. It is likely that given a greater understanding of the Project’s implications, and with time, such people would be ready to re-commit to the community’s future, and begin restoring key elements such as relationships, facilities and community values to former levels.”*

(EIS, p 15 – 119).

The EIS SIA’s Statement is erroneous.

- There is no evidence that “given a greater understanding of the Project’s implications, and with time, such people would be ready to re-commit to the community’s future, and begin restoring key elements such as relationships, facilities and community values to former levels.”
- The EIS ought to be written with greater sensitivity. Comments such as these imply stupidity on the part of the people impacted.
- The EIS consistently fails to adequately acknowledge the serious impact that the announcement in April 2006 had on residents. Some have been permanently damaged by the announcement and the manner in which the communities along the river have been handled by Government agents including senior bureaucrats, State Government Ministers and Premiers Beattie and Bligh.
- A consistent theme in people’s response to the proposed project has been that the impacts of Stage 1 and 2 are occurring now. Community members can distinguish between Stage 1 and Stage 2 impacts, but there are still direct social and economic impacts on the community as a result of the Stage 2. The impact of the proposed Stage 2 must not be under-emphasised. Consider the following comment from the EIS:
  - *“Many community members are unable to distinguish between Stage 1 and Stage 2 impacts. Even though it has been clearly stated by QWI, and reinforced by publicly stated policy by the Queensland Government, that Stage 2 would not proceed, if at all, until 2035. There are people in the primary study area concerned about the social and physical fragmentation expected as a result of inundation and changes to the physical landscape as a result of and the possible Stage 2.”*(EIS, p15-120).
- The EIS highlights another example of contradiction between comments made by the Premier and agents acting on behalf of the Queensland Government to construct the proposed TCD.
- If Stage 2 impacts are to be treated as secondary QWI should not be implementing property leaseback arrangements with the threat of compulsory acquisition.

#### 15.1.3.4 Community values

##### Summary and Mitigation

*“For some residents, the only way to resolve uncertainty and perceived threats to security and local values is to rescind the decision for the Project to be a component of the Government’s water supply strategy. An on-going commitment to information, consultation and negotiation would be required to address impacts on community values.”*

(EIS, p 15 – 121).

The EIS SIA Statement understates the extent to which the community believe that to rescind the project is an option.

#### 15.1.3.5 Health and Well-being

##### Pre-construction

##### Stress

*“The community survey asked respondents: “Has the proposal for the Project had any effects on your household’s health and well-being?” (and if so) “in what ways has your household’s health and well-being been affected?”*

*In the primary study area, 57% of respondents said the proposal had had effects on their household’s health and well-being.”*

(EIS, p 15 – 122).

The EIS SIA’s Statement is misleading.

- A Health Survey including the economic cost should be included in the EIS.
- The Community Survey underestimates the health impact.
- The results include people who have moved to the region since the announcement and do not include people who have left the community. Thus the stress impacts are underestimated because of sample issues. Additionally, there should be segmentation of the sample in that the results of the direct impact area residents (Stage 1 and 2) should be presented.

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| <b>Recommendation</b> Section 15 |
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|                                                                   |
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| Provide results from the survey for direct impact area residents. |
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#### 15.1.3.5 Health and Well-being

##### Health Professionals’ Input

*“The limitations of small area data, privacy concerns, the complex nature of health determinants and a lack of longitudinal data preclude empirical assessment of changes in mental or physical health. Anecdotal evidence was sought from health professionals to identify observed trends in stress impacts in the Mary Valley.”*

(EIS, p 15 – 124).

The EIS SIA’s Statement lacks empirical assessment.

- Given the resources of the Queensland Government and the size and impact of this project it is required that appropriate surveys are completed. Failure to do so will underestimate the impact of the project.

- Mental health impacts are still significant and have only marginally decreased over time.
- The claim that mental health presentations have reduced to pre-dam announcement levels are not founded on evidence. In fact there seems to some evidence presented in the EIS that contradicts the following conclusion:

### 15.1.3.5 Health and Well-being

#### Health Professionals' Input

*“By July 2007 the rate of presentation of adults from the Mary Valley had returned to 2005 levels, with active management of some cases continuing.”*

(EIS, p 15 – 124).

The EIS SIA's Statement is misleading.

- Lifeline counselling service has increased its capacity to manage cases.
- There have been increases in the number of people using this service. If the Lifeline patient load numbers (as quoted in the EIS) is used the active case rate at June 2007 is 9 in 1000. If the Life Line patient load numbers (as quoted in the EIS) is used the presentation rate for year prior to June 2007 is 29 in 1000.
- This would result in fewer people using other medical services in the Mary Valley. In 2005 the presentation rate for the Mary Valley was 3 in 1000. After the announcement the rate was 12 in 1000 for the Mary River Valley local medical practitioners.
- The claim above is made based on the medical services in the Mary Valley only and not Lifeline services.
- Thus the statement above does not factor in this service and the patient load it takes away from medical services.
- It is false to claim that the mental health issues have returned to 2005 levels.
- In addition to the Lifeline counselling service provided, the Federal Government recently granted the Queensland Scripture Union to employ a full-time School Chaplain/Youth worker appointed to the Mary Valley College (Imbil) and Kandanga State School (Kandanga) for 3 years (appointed November 2007). This opportunity was sought by the Christian communities in the area to support families and children in crisis as a direct consequence of the proposed TCD. The appointment of the Chaplain may also relieve the number of people using the medical services in the Mary Valley and highlights that the community are actively sourcing support and expert personnel where the State Government and contractors have failed to meet genuine community needs.

### Evaluation of Significance

#### 15.1.4.2 Predicted impacts and benefits for other areas

##### Water Supply Security and Reliability

*“Without additional bulk water supplies, severe water restrictions are likely to become a permanent feature in daily life in SEQ. It is expected that the Project would alleviate the need to rely on demand reduction measures (i.e. water restrictions) in excess of those already proposed, such as rainwater tanks and household plumbing fittings. Failure to provide adequate water supplies for SEQ is likely to result in increasing restrictions on outdoor use of reticulated water and limitations on indoor use of water.”*



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*The Project would also increase the geographic spread of catchments contributing to the SEQ water supply. Currently, SEQ urban supplies are highly reliant on rainfall in the North Pine, Somerset and Wivenhoe catchments to the north-west of Brisbane, with these catchments supplying around 72% of above ground storages for urban supplies, whilst catchments to the south and southwest supply around 16%, and catchments to the north supply around 12% of yield in SEQ. The Project is expected to reduce the effects of climatic variability on water reliability for urban, commercial and agricultural uses in SEQ and provide additional.” security to the coast.*

(EIS, p 15 – 133).

The EIS SIA’s Statement is incorrect.

- Lower overall cost and more reliable bulk water supplies are available by way of desalination plants and stormwater harvesting.
- These options would both be available at significantly lower social impact levels.

#### **15.1.4.3 Distributional Equity**

*“The Mary Valley area would share the economic benefits of construction, the recreational benefits of the Project, and the stimulation of tourism-related activities which would be likely to develop in relation to the Project.”*

(EIS, p 15 – 135).

The EIS SIA’s Statement is based on unsupported assumptions.

- The statement: “The recreational benefits of the Project” must be questioned. Have recreational benefits been proven? Is there sufficient evidence to ensure that there will be recreational benefits that outweigh the environmental disaster including the potential extinction of many species; loss of downstream flows; inundation of aquatic weeds; and the possible suppression of long-term economic viability of the region; and the ongoing stress experienced by the local people.
- Human resource planning is not detailed in the EIS so there is little but assumed employment opportunities for the local community.
- The case that the economic benefits of construction counteract the known loss of current environment and social fabric is not made.

### **Mitigation**

#### **15.1.5.4 Strategies**

##### **Mitigation Strategies**

##### **Queensland Government**

*“The following strategies are recommended for consideration by Queensland Government agencies and the Community and Economic Futures Taskforces.... co-ordinate and support implementation of agreed strategies for economic futures.”*

(EIS, p 15 – 144)

The EIS SIA’s Statement is misleading.

- The use of the term “agreed strategies” is questionable.

- Full plans to engage with and consult the communities must be outlined in the EIS. It cannot be assumed, given recent history, that the Queensland Government will consult and involve the community in future and further planning related to this Project.

**Recommendation** Section 15

Provide a commitment to an appropriate planning and consultation process and outline the details of how these would work.

#### 15.1.5.4 Strategies

##### Mitigation Strategies

##### Queensland Government

*“Investigate feasibility for enterprise/business park/ or industrial estate/tourism hubs.”*

(EIS, p 144).

The EIS SIA’s Statement is too ambiguous.

- This is the first mention of an industrial estate proposition in Chapter 15 of the EIS.
- Given community concerns regarding the future land use and subdivision possibilities for the Valley, a plan to introduce industrial estates should be provided with appropriate methods of community engagement and consultation.

**Recommendation** Section 15

Provide a commitment to an appropriate planning and consultation process and outline the details of how these would work.

#### 15.1.5.2 Mitigation Objectives and Criteria

*“Table 15.46 outlines recommended objectives, criteria and monitoring responsibilities for mitigation of social impacts and maximisation of Project benefits. Monitoring is further discussed in the following section.”*

(EIS, p 15 – 138).

The EIS SIA’s Statement is inadequate and understates the scale of the project.

- The scale of mitigation objectives and criteria are too large to ensure all affected people become beneficiaries.
- There is a lack of coherence between the EIS stated adherence to the International Guidelines and Principles for Social Impact Assessment and the actual practice of the proponent relating to the fundamental goal of SIA.
- For affected people to become beneficiaries the mitigation objectives and criteria in the majority of objectives need to be defined in a smaller scale. At present there is either no scale for the measurement of the objectives or that the objective will be measured at the “Mary Valley” scale. At this scale it is most likely that locally a large number of people will be significantly worse off using stated objectives because their negative ratings on the objective will be subsumed into the larger population figures of the Mary Valley.

Example objective from Table 15.46:-

*“...3 Ensure income levels in the Mary Valley remain stable or increase, and keep pace with increased housing rental and purchase costs”*

(EIS, p 15-138).

- The mitigation criteria is not capable of measuring Primary Study Area cost or benefits. The following criteria will partially assess the objective of maintaining income levels:

*“Annual average household income growth in line with regional average, monitored annually.  
Proportion of households experiencing housing stress stable or decreased, monitored annually.”*

(EIS, p 15-138).

- Better methods to assess the level of economic cost or benefit to the community include social and economic indicators that were used in the description of the social and economic environment in the EIS. The criteria should use the Australian Bureau of Statistics Socio-Economic Indices for Areas (SEIFA): Index of Advantage / Disadvantage and the Index of Economic Resources as well as the Index of Education and Occupation. These are the most reliable way to compare across SLA's and LGA's to pinpoint areas of potential disadvantage that may or may not occur as a result of the construction of the dam. Given that the EIS identified that the Primary Study Area did not score well on the Socio-Economic Indices and that there were sensitive groups in the area it is vital that these criteria are used to evaluate the cost of benefit to the Primary Study Area and the regional area.

#### **15.1.5.3 Implementation and monitoring**

*“Criteria, timing and responsibilities for data collection are outlined in Section 15.1.5.2. Monitoring could be undertaken by the Coordinator-General or his delegate.”*

(EIS, p 15 – 140)

The EIS SIA's Statement's monitoring responsibilities are not adequate.

- The monitoring responsibilities and timeframes should be explicitly stated. The monitoring responsibilities are extremely ambiguous given the size, scale and public profile of the project.
- The outcomes of the monitoring need to be publicly available given the size, scale and public profile of the project.
- QWI should not have the responsibility of monitoring the objectives of the mitigation of impacts.

#### **15.1.5.3 Implementation and monitoring**

##### **Co-ordination and Resourcing**

*“The investment of resources for implementation by QWI, Government agencies and potentially other stakeholders would need to be co-ordinated and informed by local community input.*

*Responsibilities for implementation would be negotiated and co-ordinated between a number of agencies and community organisations. This should be co-ordinated through a cross-agency working group charged with responsibility for mitigation, including:*

- QWI;
- The Local or Regional Government Authority for the primary study area;
- Department of Infrastructure, including OUM;
- The CFT;
- The Economic Futures Taskforce;
- Department of Communities;
- Queensland Health;
- Department of State Development

- Department of Local Government Planning Sport and Recreation;
- DPIF; and
- *The Construction Project Principl*

*The involvement of agencies including the Department of Emergency Services, QT, Department of Education Training and the Arts, Department of Employment and Industrial Relations, Queensland Police and Department of Housing would be required from time to time.*

*The involvement of Commonwealth Government agencies in identifying and addressing training and employment issues should also be sought.”*

(EIS, p 15 – 140).

The EIS SIA’s promise to involve the local community is ambiguous.
- Despite the statement “ ... *co-ordinated and informed by local community input*” no local community-based organisations or representative is identified.
- Assumptions of involvement are not sufficient.
- Clear processes for community engagement must be provided.

#### 15.1.5.5 Tourism and Recreation Mitigations

##### Background Investigations

*“The key finding from the SEQ Outdoor Recreation Demand Study (QOFR, 2001) was that large numbers of people are seeking to participate in a wide range of outdoor recreation activities, with potential demand placing increasing pressure on places perceived as being **substantially natural**. The most common motivation for participants was found to be for leisure, whereas the least common motivation was participation for competition. With continued population growth in the SEQ region, as well as in the Mary Valley and surrounding areas, it could be expected that the demand for and use of the **natural areas in the Mary Valley would have continued to increase.**”*

(EIS, p 15 – 146).

- The EIS SIA’s Statement misuses research findings from the SEQ Outdoor Recreation Demand Study.
- The EIS’s stated demand for outdoor recreation is questionable.
- Research presented in the EIS highlights a fundamental contradiction between the demand for natural features that the region offers tourists now, and the tourism and recreational benefits being portrayed by the EIS.
- The construction of the proposed TCD would destroy the outdoor recreation features that presently attract people to the Mary Valley region.

#### 15.1.5.5 Tourism and Recreation Mitigations

##### Background Investigations

*“In summary, the key implications for the tourism and recreation mitigations proposed to address identified community and economic impacts of the Project include:*

- *There is a high demand for outdoor recreation opportunities in natural settings in the SEQ Region, with the demand expected to double in the next 20 years;*

- *Existing recreation and tourism opportunities based on natural areas and places of high landscape value are limited and are likely to come under pressure from population growth and related demand;*
- *The proposed TCD and environs has the potential to cater for a range of active tourism and outdoor recreation activities (i.e. picnicking, walking, camping, bicycle riding, horse riding, water activities, driving, trail bike riding, non-motorised watercraft); and*
- *The high landscape values and the existing opportunities deriving from tourism and outdoor recreation facilities in the Mary Valley provide a sound platform to support community and*
- *Economic development in the short to medium term.”*

(EIS, p 15 - 147).

The EIS SIA’s Statement misuses research findings from the SEQ Outdoor Recreation Demand Study.

- The recent South East Queensland Outdoor Recreation Demand Study has indicated that there is a decline in water activities between 2001 and 2007. Whilst there is still a large number of people engaging in outdoor recreation activities, since then, there is a slight decrease in rates of participation despite increases in population. There is serious doubt over the assumption that recreation demand will increase.
- Further quantification is needed before any claim surrounding recreational and tourism benefits that result from the dam are made.

***Recommendation***      Section 15

The proponent be required to immediately develop and implement strategies that mitigate the adverse impacts already felt and that with broad community involvement investigates mitigation strategies that would be employed if approval to build the dam is given.

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## *Chapter 17 Cumulative impacts*

One of the problems with the way the EIS has been structured is the piecemeal approach to investigating the impacts and risks of the project, which makes it difficult to integrate what the implications of the project are likely to be for the river system and the communities of the Mary Valley as a whole. Even though a formal methodology has been used in the Cumulative Impacts Analysis presented in Chapter 17, the basic information that was used as input to this process, as presented in Appendix F12, is “*severely lacking in credibility*”. Much of the information is internally inconsistent, makes assumptions not supported by the scientific data in the EIS and is clearly at odds with local knowledge of the catchment. Certainly, no attempt was made to engage expertise from within the local community in assisting with this identification and assessment of risks and consequences.

Some of the mistakes may just be the result of a lack of professional diligence in the editing of the information, such as the example on EIS page 13 (which lists the risk of nutrient enhancement in the storage as a high benefit ascribed to the project!) However some of the statements are just incomprehensible, such as the statement on EIS page 20 that the predicted downstream flow regulation will have an immediate high local benefit to downstream habitats, and then somehow relating this statement to a comment about para grass control by allowing increased cattle grazing in the river. In many cases, the mitigation strategies mentioned bear no relationship to the risks being tabulated.

In addition to the lack of credibility of the information included in the analysis, it is also instructive to examine some of the major predictable and relevant risks that have been left out of the analysis. Nowhere does this analysis mention the RAMSAR wetlands or the Great Sandy Strait in general – one of MNES that the EIS is supposed to specifically examining. This analysis does not once refer to risks associated with climate change. The analysis does not mention salinity; the Mary is a priority catchment under the National Action Plan for Salinity and Water Quality. The analysis nowhere refers to assessing human health risks such as methyl mercury accumulation or increased mosquito populations. The analysis does not address the problems caused by the large areas of bare soil that will be exposed during extreme drawdown events like that which would have occurred in 2002. The analysis does not even address the risk of dam failure.

It seems that the entire risk and opportunity analysis outlined in Appendix F12, which provides the base information for the cumulative impacts assessment, was nothing more than a cynical box-ticking exercise, conducted in the expectation that no-one would actually attempt to read the miniscule fine print and examine the credibility of the underlying information being presented. Certainly, none of this information was prepared in consultation with the local community or anyone with specific expertise in the functioning of Mary Catchment, and the information was obviously not adequately checked before being published in the EIS. This completely undermines the credibility of this part of the EIS and the whole section is an insult to the intelligence of anyone seriously investing time in attempting to assess the overall risks that this project poses to the Mary Catchment.

The following points need to be considered under cumulative impacts:

- The cumulative impacts of a series of barrages/weirs/dams and inter-basin water transfer.
- Although seldom analysed, cumulative impacts occur when several dams are built on a single river and water is transferred between catchments. They affect both the physical (first-order) variables, such as flow regime and water quality, and the productivity and species composition of different rivers. The problems may be magnified as more large dams are added to a river system, resulting in an increased and cumulative loss of natural resources, habitat quality, environmental sustainability and ecosystem integrity. New biota from the source basin may invade the recipient basin and compete with the native species.
- The cumulative impacts of inter-basin water transfers can be of special concern, as this often involves the transfer of species into new watersheds. When waters of one basin are diverted into another one, changes in volume and seasonality of flow result.

- The construction of TCD will result in the Moreton WRP receiving an extra 150 000 megalitres per year through the water grid. A comparative analysis between the draft Moreton WRP and the Mary WRP shows the vast difference in flow deviation (alteration) in low, medium and high flow events between the draft Moreton WRP and the Final Mary WRP sub-ordinate legislation. Interestingly in the “Special Ecological Outcomes” section (page 12) of the draft Moreton WRP sub-ordinate legislation it states “Moreton Bay / Pumicestone Channel – to minimise changes to the delivery of freshwater, natural sediments, nutrients and organic matter”. However in the “Ecological outcomes for particular parts of the plan area” in the Final Mary WRP subordinate legislation (page 10) there is no recognition of the special requirements of the Great Sandy Strait to maintain its international significance through RAMSAR listing and minimise the likelihood of impacts on the Matters of National Significance
- Comparing the environmental flows in the water resource plans; it is highly likely that there will be irreversible impact to the threatened species of the Mary River catchment at the expense of protecting the Moreton catchment estuary areas. The 1 in 20 year floods at the Bremer River mouth will cut by 4%. – Thus allowing 96% of 1 in 20 year floods to reach the Bremer River mouth. The 1 in 20 year floods at the Mary River mouth will be cut by 31% - thus only allowing 69% of 1 in 20 year floods to reach the mouth.

#### Impacts on the ecological character of the Great Sandy Strait Ramsar Wetland

##### Cumulative impacts within the Mary catchment

- The condition of the estuarine reach of the Mary River system has already been compromised by the Mary River Tidal Barrage and the Tinana Creek Tidal Barrage. The Mary River Tidal barrage isolated a 30km tidal reach of the River. Reductions in low and medium flow events will increase salinity levels within the estuarine reach and reduce the quantity of ponded water behind the Mary River Tidal Barrage and consequently the number of occasions which it overflows. The natural flushing of the river and mixing of freshwater with the sea water that creates brackish conditions will be reduced. No consideration was made for the impacts of climate change. It is unknown what impacts the combination of climate change and the proposed Traveston Crossing Dam will have on the size and frequency of major flood events which are essential for the maintenance of the western side of Fraser Island (World Heritage Area) and the Great Sandy Straits.
- Freshwater flows also help support marine fish production as many marine fish spawn in estuaries or deltas. A decrease in freshwater flow and in nutrients due to dam construction affects the nursery areas in a number of ways, including increasing salinity, allowing predatory marine fish to invade, and reducing the available food supply. All these impacts will affect Ramsar wetland species including migratory birds and have flow on impacts to endangered species beyond the 3 nautical limit of the *Commonwealth Marine environment*.
- Prior to the construction of the Mary River Tidal Barrage, the river supported a thriving Fish Board in Maryborough. The Board had one of the highest product turnover in Queensland (Maryborough Fish Board, 1980). Fisheries production dropped levels and the Board became unviable after the construction of the Mary River Barrage in 1979. The combination of the existing Tidal Barrage and a new barrier to fish passage on the main channel of the Mary River if this dam goes ahead, will further deplete fish populations in the Great Sandy Straits. As well as impacting the Ramsar wetlands, this will have a social impact on the communities downstream who rely on this area for income from Tourism related activities.
- While a fishway structure will be incorporated into the dam design, evidence from the “state of the art” fishway on the Burnett has demonstrated that this measure is not enough to reduce the level of impact below the “significant impact” threshold.
  - Low flows in the river will also impact on the efficiencies of the fishway and the salinity levels at the Mary River Barrage and thus impact on fisheries through the Ramsar wetlands and Great Sandy Straits.

- Similarly in the FRC consultant's report for the EIS is stated, "The fisheries productivity of the Mary River estuary is not only dependent on freshwater flows, but also the ability of many species to move between freshwater and estuarine habitats. Currently, fish passage is sometimes impeded by the ineffective operation of the fish ways on both the Mary and (in particular) Tinana Barrages.
- Improvements to the operation of the both the Mary and Tinana Barrage fishways could significantly improve the fisheries productivity of the estuary from the current situation, and could contribute to mitigating any negative impact of the dam on fisheries productivity. Improvement of the fishways may include engineering/design changes, and the provision of flows to be dedicated to fish way operation. Direction of the environmental flows discussed above through the fishway on the Mary Barrage may be beneficial. (FRC Marine Ecology Report Appendix F-6.1 p99)

#### Cumulative impacts from Mary and Burnett catchments

Ribbe (2006) in a study on hyper salinity in Hervey Bay, has revealed that a contributing factor is the lack of freshwater flows from both the Burnett and Mary rivers.


"Both rainfall and river runoff in the Hervey Bay region of subtropical Queensland are at a minimum during the winter/early spring period often approaching zero. The mean monthly average freshwater discharge via the Mary/Burnett rivers into Hervey Bay for the July to September 2004 period, i.e. the period prior the September survey, was very low and estimated to be less than  $5 \text{ m}^3 \text{ s}^{-1}$ . This is well below the climatological mean value for that period which is about  $12 \text{ m}^3 \text{ s}^{-1}$

(Data not shown, but is available from the Queensland Department of Mines and Natural Resource. No data for the Burrum River is available, but since the Burrum River catchment is significantly smaller than that of the other two, the contribution would be very minimal). Based upon the simple evaporation-runoff balance, an inverse circulation within Hervey Bay is clearly most likely during this low rainfall, runoff period.)

Furthermore, the balance between evaporation and runoff indicates that the inverse circulation may not be restricted to the low rainfall, runoff winter/early spring months, but may persist throughout the year.

- Taking into account the historical record of mean monthly freshwater discharges from the Mary/Burnett Rivers for the period January 1950 to December 2004, only 10 % of all discharges were larger than  $201 \text{ m}^3 \text{ s}^{-1}$ , 15 % were larger than  $122 \text{ m}^3 \text{ s}^{-1}$ , and 20 % were larger than  $88.9 \text{ m}^3 \text{ s}^{-1}$ . Over the same period, rainfall trends in parts of eastern Australia were negative. Southeast coastal Queensland was and still is characterised by a 'drying' trend.
- This contributes to a decline in freshwater discharges over the same period. For example, during the period January 1980 to December 2004, only 10 % of all monthly mean discharges were larger than  $122 \text{ m}^3 \text{ s}^{-1}$ , 15 % were larger than  $87 \text{ m}^3 \text{ s}^{-1}$ , and 20 % were larger than  $65 \text{ m}^3 \text{ s}^{-1}$ , which is a significant reduction if compared to the period 1950 to 2004.
- Flows above the 10 % cut-off were due to single climatic events that reflect in high monthly mean values, of which the year 1999 major flooding one is an example (Campbell and McKenzie, 2004). In particular, for the period 1980-2004, freshwater discharges were mostly well below the minimum evaporation rate of  $E = 139 \text{ m}^3 \text{ s}^{-1}$  in June which in turn would lead to **persistent hypersaline conditions throughout most of the period.**
- "This follows from an analysis of the historical runoff - evaporation budget. In particular, since 1980 runoff declined and was only larger than the minimum evaporation rate for the region in less than 10 % of all instances." (Ribbe 2006, pp 13) .
- This period corresponds to an increase in tidal barrage and dam infrastructure, within both the Burnett and Mary Rivers This preliminary research may be revealing the first impacts on





estuarine ecosystems (Ramsar wetlands) from infrastructure related flow reductions to the Great Sandy Straits Ramsar wetlands. These findings also raise serious questions as to what effect further reductions in freshwater flows, under the Mary Water Resources Plan and the Traveston Crossing Dam proposal, will have on Matters of National Environmental Significance within the Great Sandy Strait.

***Recommendation*** Section 17

The entire cumulative impacts analysis presented in Chapter 17 must be completely disregarded because the data provided as input to the analysis has no credibility.

A contributing factor to hypersalinity in Hervey Bay is the lack of freshwater flows from both the Burnett and Mary rivers. Cumulative impacts on the ecological character of the Great Sandy Strait Ramsar Wetland of a series of barrages/weirs/dams and inter-basin water transfer from the Mary and Burnett must be assessed in the EIS.

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## Chapter 18 Environmental Management Plans

### 18.1 Environmental Management

The EIS states, “An outline of the Draft EMP is provided in this EIS to demonstrate the commitment of QWI to ensuring that the recommendations of this EIS are implemented.”

However there are a number of areas where this is commitment is not demonstrated:

- A review of EIS Section 18.3 identifies a number of recommendations contained within the EIS that have not made it into the Management Plan. This strongly supports the fact that this is a ‘Draft EMP’. The omission of details within the EMP clearly highlights the rushed nature of the EIS and EMP.
- The use of *‘would’*, *‘should’*, *‘could’* and *‘may’* throughout the draft management plan is considered inappropriate. These terms are non-committal in their nature, and as the EMP is designed to demonstrate the commitment of QWI Pty Ltd to the implementation of the EIS recommendations, these will require to be amended to reflect a commitment (i.e. use terms such as *“will” and “must”*).
- The Draft EMP makes mention of a number of management plans yet to be developed. The majority of these are to be developed by the contractor and assessed by QWI and relevant government agencies. However, it is of concern that the public may not have the opportunity to review them also as there are many aspects of these plans that will impact on the community. The management plans include:
  - Soil and water management plans
  - stormwater management plan
  - groundwater monitoring plan
  - Plans detailing the staging of works, areas to be retained, significant areas of exclusion
  - Landscaping and re-vegetation plan
  - Plan for the control and monitoring of aquatic weed growth
  - Weed management (terrestrial)
  - Weed management plan (aquatic)
  - Waste management plans (for material with the potential to cause environmental harm)
  - Air quality management plans for: road works, dam wall construction, and ERA related activities to be licensed.
  - Construction noise management plans.
  - Construction environmental plan (roads)
  - Road use management plan (haulage contractor)
- In addition to these plans, there are a number of monitoring programs proposed, which are also ‘yet to be developed’ (i.e. frog monitoring, ground water)
- **Furthermore, as it stands, the proposed management structure and division of responsibilities for the Environmental Management Plan do not allow objective monitoring and evaluation, or ensure accountability of these processes.**

- According to the EIS, the Proponent (QWI) is responsible for the management of “*the construction process... review the CEMP submitted by the Contractor... initiate audits of environmental performance*”, among other things (EIS p.18-5). The same Proponent is also member of the Alliance (to be made of QWI, Contractor and project management company) which is responsible for “*regular monitoring in relation to environmental management issues, ensure corrective actions ..., ensure adequate and accurate identification and reporting of any nonconformances..., ensure that environmental protection measures are implemented in accordance with CEMP...*”.
- Moreover, it appears that environmental audits will only be reviewed by the “*Alliance management*” which will supposedly address all recommendations / actions raised, while “*copies of audit reports and details of corrective actions*” will only be made “*available for regulatory inspection, on request*” (EIS p.18-9). Likewise, monthly environmental summary reports for the duration of the works will only be available for regulatory agency inspection on request; and there is no mentioning whether the annual Environmental Summary Report will be available to the public, raising doubts about transparency of the reporting processes, and the role of the Community Advisory Committee.
- The omissions and deficiencies detailed in the subsections of Chapter 18 are limited to the areas to which we have been able to review in the limited time, and are not exhaustive by any means.

### 18.3.2 Geology and Soil

#### Mitigation measures

Soil and water management plans are yet to be developed; as such public review of such documents is currently not available, and not ever likely given the proposed procedure for their development and review (QWI and State Agencies to review plans. Construction EMP’s developed by contractor).

The use of terminology such as “*should*” within mitigation measures does not generate certainty in the execution of such measures. An EMP is a document designed to give certainty of actions being undertaken. Replace ‘should’ with ‘will’.

#### Monitoring

This is an important aspect in an environmental management plan. Monitoring to be effective needs to be prescriptive in both timing (frequency) and parameters (vectors to be monitored).

The use of terms such as “*Regular inspections*” is inappropriate as it fails to provide guidance on the frequency of monitoring.

### 18.3.3 Land Contamination (Spills & Clean Up)

The use of terminology such as “*should*” within mitigation measures does not generate certainty in the execution of such measures. Replace ‘should’ with ‘will’.

### 18.3.5 Water Quality

**Stormwater management plan** is yet to be developed; as such public review of such documents is currently not available, and not ever likely given the proposed procedure for their development and review (QWI and State Agencies to review plans—CEMPs—developed by contractor).

### 18.3.6 Groundwater

#### Mitigation measures

**Groundwater monitoring plan** is yet to be developed, public unable to review.

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Without provision of a plan, comment on the effectiveness of monitoring and reporting is not possible.

### **18.3.7 Terrestrial Flora**

#### **Mitigation measures**

Plans detailing the staging of works, areas to be retained, significant areas of exclusion are still required to be developed – they are not currently available for public review.

Prior to clearing in remnant vegetation, a qualified botanist *should* inspect the site for EVR flora. “Should” is non-committal, replace with “will”. Also extension to all vegetation is required, not just ‘remnant’ vegetation.

Weed management plan not yet developed, costs unlikely to be currently known.

Translocation plan for EVR species not yet developed, techniques and costs unaccounted for.

Landscaping and re-vegetation plan yet to be developed for Off-set strategy :the details of the offsets are still to be confirmed. Serious concerns are raised with the vegetation interpretation from 3D Environmental, which proposed options for off-sets have been developed from.

#### **Monitoring**

“*Regular inspection of cleared areas...*”, needs to be more prescriptive (i.e. weekly, monthly, 6 monthly).

### **18.3.8 Terrestrial Flora**

#### **Mitigation measures**

Identification of Habitat Trees - Habitat Trees have not yet been identified. These should have been identified as part of the previous studies to ascertain impact on natural environment.

#### **Monitoring**

Long term monitoring of both translocation sites and frog species not detailed. These need to be costed.

### **18.3.9 Aquatic Flora & Fauna**

#### **Mitigation measures**

Aquatic Weed Control plan for the control and monitoring of aquatic weed growth not yet developed.

### **18.4.1 Management of Water Storage**

Concerning the maintenance of environmental flows in compliance with the Water Resource Plan of 2006 during operation, it is unclear how this will be ensured. According to the draft Operational Environmental Management Plan (EIS p.18-57), hydrological monitoring seems to include dam levels near the spillway, river levels upstream, water quality within the impoundment, but not water level or quality downstream from the dam which can potentially impact on downstream Matters of National Environmental Significance. Similarly, there is little assurance about the maintenance of water quality downstream from the dam as the water quality monitoring program appears to focus on upstream and impoundment areas, although there is a mention of reporting to EPA any impacts to downstream water quality (EIS p.18-61). In addition it is not clear if the Proponent is not the Operator of the dam, how the commitments from the Environmental Management Plan are legally transferred to another entity

**Recommendations** Chapter 18

Environmental Management and monitoring plans must be in more detail in the EIS to demonstrate how mitigation strategies are going to be implemented, their cost, their past effectiveness and how they will be assessed in this project as effective. **“To be developed” does not demonstrate commitment nor give confidence in the methods to be used.**

A number of recommendations contained within the EIS have not made it into the Management Plan.

The use of *‘would’*, *‘should’*, *‘could’* and *‘may’* throughout the draft management plan is considered inappropriate. These terms are non-committal in their nature, and as the EMP is designed to demonstrate the commitment of QWI Pty Ltd to the implementation of the EIS recommendations, these will require to be amended to reflect a commitment (i.e. use terms such as *“will” and “must”*).

A supplementary report to this EIS must review the proposed management structure and division of responsibilities for the Environmental Management Plan to allow for objective monitoring and evaluation or ensure accountability of these processes. It should clearly identify the plans to be developed in future; who is to develop them; and the responsible authority to ensure compliance.

It must be made clear if the Proponent is not the Operator of the dam, how the commitments from the Environmental Management Plan and legal obligations from the EPBC Act are legally transferred to a new entity.

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***Appendix 1 ISF Review of Alternatives Section of EIS***

Review of Water Supply Demand Options for South East Queensland (February 2007) prepared by Cardno and the University of technology Sydney (PDF 5.66MB)

**This report can be assessed at**

*[www.cooloola.qld.gov.au/documents/SEQ\\_Water\\_Review.pdf](http://www.cooloola.qld.gov.au/documents/SEQ_Water_Review.pdf)*



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## ***Appendix 2 Text of Letter to Mr G Newton, CEO of Queensland Water Infrastructure on 7<sup>th</sup> June 2007***

Following feedback from the Social Impact Assessment Workshops held in Gympie on 31<sup>st</sup> May and Maryborough on 1<sup>st</sup> June our Management Committee would like to suggest a process that we believe will better represent the views of the community. We believe that endeavouring to obtain a clear picture of the baseline and current position without directly engaging the members of the general public through open public meetings is a seriously flawed process.

There are three key reasons why the people of the Mary River Valley should be directly involved in the process of the social impact assessment. The first is to ensure there is an accurate record of the extent and depth of the present and future social impacts of the project. This is important in the final assessment of the EIS by the Federal Government. The second is to ensure that the affected people become beneficiaries of the project, if it is to proceed. And thirdly, direct participation is a way to ensure accountability of the proponent.

### **Recommended Approach to SIA**

- Modern social impact assessment (during the EIS phases) involves more than a description of the existing social environment and the prediction of impacts and benefits.
- We suggest that best practice Social Impact Assessment (SIA) has progressed towards a more process oriented approach where negotiating with communities is a 'ground up' process. The SIA practice in the Traveston Crossing Dam project appears to adopt the older approach.
- Extensive public involvement, proponent accountability and project transparency are the cornerstones of a progressive approach to the process of social impact assessment whereas the older approach typically places a lower value on these aspects.

### **Process "Must Haves"**


- Clear description of the monitoring and auditing procedures of the social impact assessment process.
- Full transcripts of formal meetings made available to the public.
- Summary of proceedings be clarified and ratified by an extensive range of community interest groups and key individuals (chosen through an equitable process).
- Submissions and statements resulting from the SIA should define the social aspects of the community in terms of pre-announcement and post-announcement phases of the project.
- Submissions and statements should quantify the cost of the impacts (not just in money terms).

### **Identification of potential impacts and benefits of the project**

- The prediction of benefits should not be the major focus at the preliminary stage of public consultation. There should be consultation at a later stage that emphasises this aspect.
- Future adverse impacts arising from dam construction and impacts from project completion should be assessed separately from the impacts presently occurring.
- Adverse impacts resulting from the style and process of project implementation must be documented in the public consultation. This should occur either in the description of community values or identification of potential impacts and benefits

### **Next Steps**

- Having provided the public with ample prior notice and a clear description of the SIA objectives and the process, the Save The Mary River Coordinating Group will arrange public meetings in Kenilworth, Ridgewood, Imbil, and Kandanga to facilitate input from the communities. These meetings will be recorded and the audio tapes preserved as a record of the meetings.
- The inputs from the community will be analysed by STMRCG and QWIPL representatives and a report prepared that summarises the community values pre and post the announcement of the proposal to construct a dam at Traveston Crossing. It is envisaged that the format of this report will include the baseline values, the strength of those values and how the strength of those values have changed over time. In addition, values that have emerged post the announcement will also be documented.

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- Following preparation of the report, a draft will be provided to the community for comment and following a review of the comments, a final report will be prepared for inclusion in the QWIPL EIS provided to both State and Federal Governments.

In conclusion, while we recognise that this suggestion will impact on the current SIA project timelines we believe that the cost of the project and the impacts that it would have on the lives of thousands requires a truly representative input from the people who are potentially affected.

We look forward to your comments.”

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## *Appendix 3 Data from Community Values Workshops*

### **SOCIAL IMPACT ASSESSMENT**

Following discussions with the consultant appointed by QWIPL to conduct the SIA for the EIS and concerns raised by community members following the initial SIA workshops, the STMRCG wrote to Mr G Newton, CEO of QWIPL on 7<sup>th</sup> June outlining its view of an appropriate process for the SIA .

At the Kandanga workshop convened by the QWI consultant, in response to a direct question, it was apparent that the SIA process was not going to adequately cover assessment of community values that existed prior to the Queensland Government's announcement on 27<sup>th</sup> April 2006 and how those values had been subsequently impacted. In order for the community to have a voice on this very important matter, STMRCG decided to hold a series of community meetings to gather the all important baseline information. Subsequently, public meetings were held in Kenilworth, Imbil, Kandanga, Ridgewood, and Maryborough with an independent facilitator to seek community assistance in compiling the required information.

The information collected at those meetings and information from twenty eight written submissions informed a list of things that the community feels reasonably or very strongly about and the extent to which those beliefs and values existed prior to the announcement (the baseline position) and the extent to which those beliefs and values have been impacted by the decisions and behaviour of Queensland Government politicians and officials.

Table 1 lists the thirty main points and the assessments.

In addition, following the announcement that STMR would conduct the public meetings mentioned above, and prior to and subsequent to those meetings, many people who were unable to attend personally provided input to allow the listing of "Adverse Impacts"

Table 2 lists the thirty two adverse impacts.

What is clear from the information and data provided by the community is that even though the dam is not approved, the Queensland Government's drive to buy up as many properties as possible that are in the footprint and buffer zone of the combined Stages 1 and 2 of the proposed dam has had major consequences for a very significant number of people.

#### Recommendation:

The proponent be required to immediately develop and implement strategies that mitigate the adverse impacts already felt and that with broad community involvement investigates mitigation strategies that would be employed if approval to build the dam is given.

| #  |                                                                                                                                                                                                                                                                          | P | C |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|
|    |                                                                                                                                                                                                                                                                          | A | S |
|    |                                                                                                                                                                                                                                                                          | S | S |
|    | <b>Table 1 - THE THINGS THE COMMUNITY FEELS REASONABLY OR VERY STRONGLY ABOUT</b>                                                                                                                                                                                        |   |   |
| 1  | Freedom to plan for a healthy, sustainable, and enjoyable lifestyle<br><i>Up until the announcement, this freedom was pretty much "situation normal", now it most certainly is not.</i>                                                                                  | 5 | 3 |
| 2  | Right to participate in community development and governance<br><i>Where true consultation is always expected this has not turned out to be the case</i>                                                                                                                 | 4 | 2 |
| 3  | Government policies that protect the environment will be proclaimed and implemented                                                                                                                                                                                      | 5 | 2 |
| 4  | Opportunity to sell a property on the open market<br><i>Queensland government "standing in the market" is artificially setting prices</i>                                                                                                                                | 5 | 2 |
| 5  | If I own or am successfully paying off my property, nobody can take it from me<br><i>Many people are highly cynical of being able to retain their property and/or receiving fair treatment regarding government acquisition</i>                                          | 5 | 0 |
| 6  | If my property is compulsorily acquired I will receive compensation that will allow me to replace it on a like for like basis.                                                                                                                                           |   | 2 |
| 7  | Citizens and governments have rights and responsibilities                                                                                                                                                                                                                | 4 | 5 |
| 8  | Government leaders and senior public officials are trustworthy<br><i>The treatment of communities by the Queensland Government has destroyed faith in almost any government statement or activity</i>                                                                    | 4 | 1 |
| 9  | Strong, honest, democratic and consultative government and government processes are in place                                                                                                                                                                             | 3 | 1 |
| 10 | Infrastructure that results in increased flooding risk would not be approved                                                                                                                                                                                             | 4 | 0 |
| 11 | We do not expect to be bullied, manipulated or disempowered by government                                                                                                                                                                                                | 4 | 0 |
| 12 | Deceased friends and relatives should be allowed to rest in peace<br><i>Any consideration of significant changes to a community cemetery before a dam is approved is intolerable to family and friends of deceased</i>                                                   | 5 | 5 |
| 13 | Resilience of the "pre-dam" community (willingness to persevere in the face of adversity)<br><i>Some have moved away from the area but the fighting spirit of those that remain is stronger than ever</i>                                                                | 5 | 3 |
| 14 | Openness and honesty between community members<br><i>In many cases, a reduced willingness to discuss personal plans for the future</i>                                                                                                                                   | 4 | 2 |
| 15 | Self supporting family units and friends<br><i>Shared workload and resources creating viable rural enterprises. E.g. Cattle work, farm maintenance, etc</i>                                                                                                              | 4 | 2 |
| 16 | Strong friendship networks<br><i>Enjoyment of social and support aspects of life with long term local friends</i>                                                                                                                                                        | 4 | 2 |
| 17 | Condition, maintenance, appearance and productivity of property                                                                                                                                                                                                          | 4 | 2 |
| 18 | Focus on local community and environment<br><i>Support for and active participation in local activities e.g. sporting, fund raising, land care, social &amp; family event. The belief is now even stronger for those who remained but overall activity has decreased</i> | 5 | 3 |
| 19 | Preservation of heritage and historical values<br><i>Sense of personal identity with and understanding of local community development. "Where I fit in, in the overall scheme of things".</i>                                                                            | 4 | 5 |
| 20 | Contentment and well being are more important than large incomes<br><i>A high proportion of people who live here do so because they choose to for quality of life issues.</i>                                                                                            | 5 | 5 |

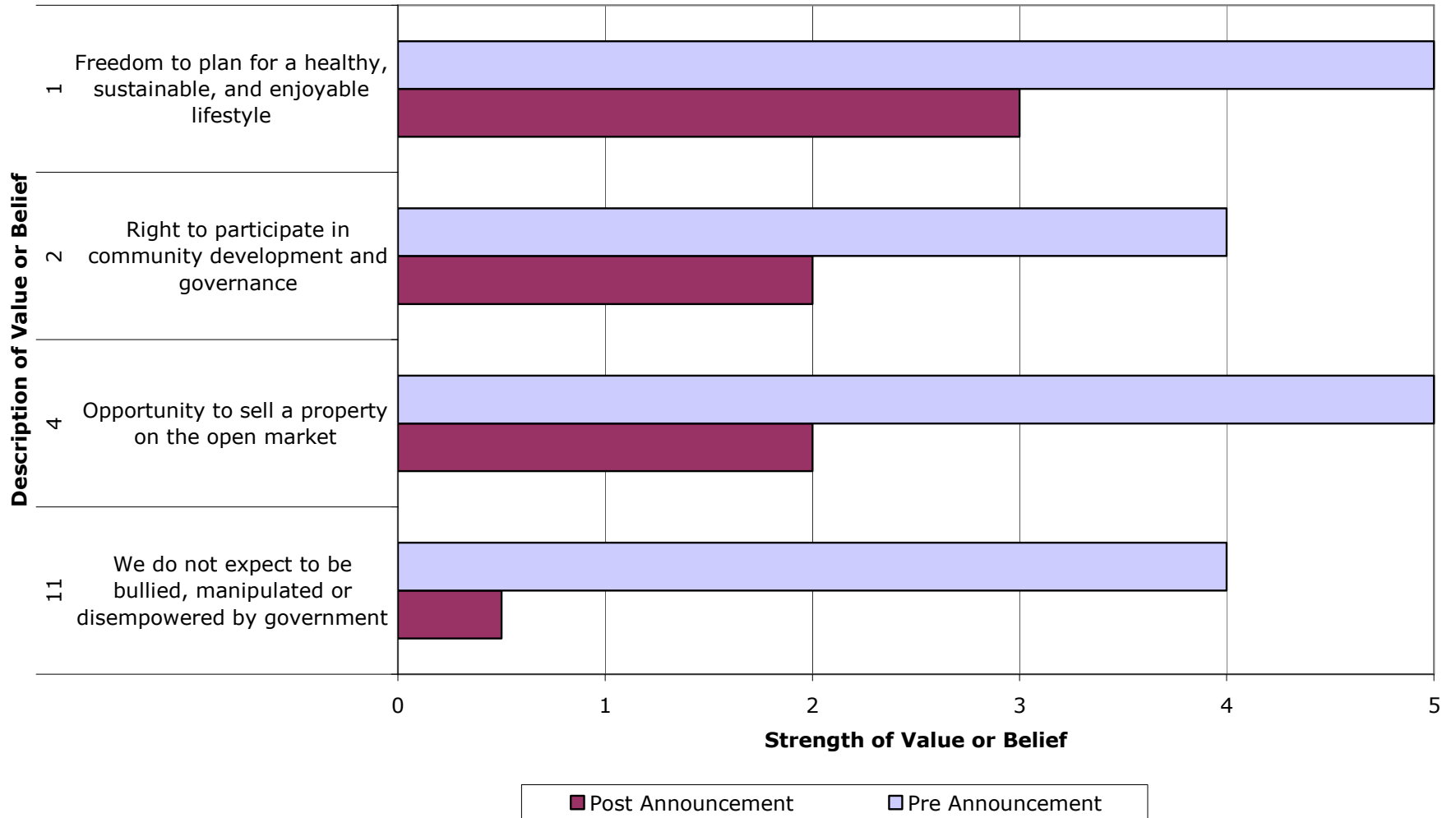
|        |                                                                                                                                                                                                                                      |        |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 2<br>1 | Safe and friendly community for the benefit of all and in particular children and the aged<br><i>The changing demographic due to a disproportionate high number of renters has eroded the sense of personal and property safety.</i> | 5<br>3 |
| 2<br>2 | Neighbours helping neighbours<br><i>Fragmentation and upheaval of community has resulted in loss of personal relationships and trust .e.g.Rural support network, Neighbourhood Watch etc.</i>                                        | 4<br>2 |
| 2<br>3 | Opportunity to pass property down to future generations                                                                                                                                                                              | 5<br>2 |
| 2<br>4 | Ability to plan for the future with relative confidence<br><i>For lots of people this is impossible in the current environment</i>                                                                                                   | 5<br>0 |
| 2<br>5 | Importance of sustainable water resources<br><i>Critical to ongoing rural pursuits and already over allocated</i>                                                                                                                    | 4<br>5 |
| 2<br>6 | Importance of preservation of natural beauty and habitat for iconic species for the benefit of future generations                                                                                                                    | 4<br>5 |
| 2<br>7 | Prime agricultural land should be reserved for sustainable agricultural production<br><i>Destruction of nurtured land in the footprint and downstream due to unreliable water supply is devastating to rural people.</i>             | 4<br>5 |
| 2<br>8 | Degree of certainty about ongoing income prospects                                                                                                                                                                                   | 4<br>2 |
| 2<br>9 | Active and passionate caring for river and surrounding environment and iconic species<br><i>But difficult to invest personal time and resources</i>                                                                                  | 3<br>5 |
| 3<br>0 | Sustainability requires caring for and getting the best from the land                                                                                                                                                                | 3<br>4 |

PAS - Pre-Announcement Situation - The extent to which this existed or was likely to have existed prior to 27<sup>th</sup> April 2006.

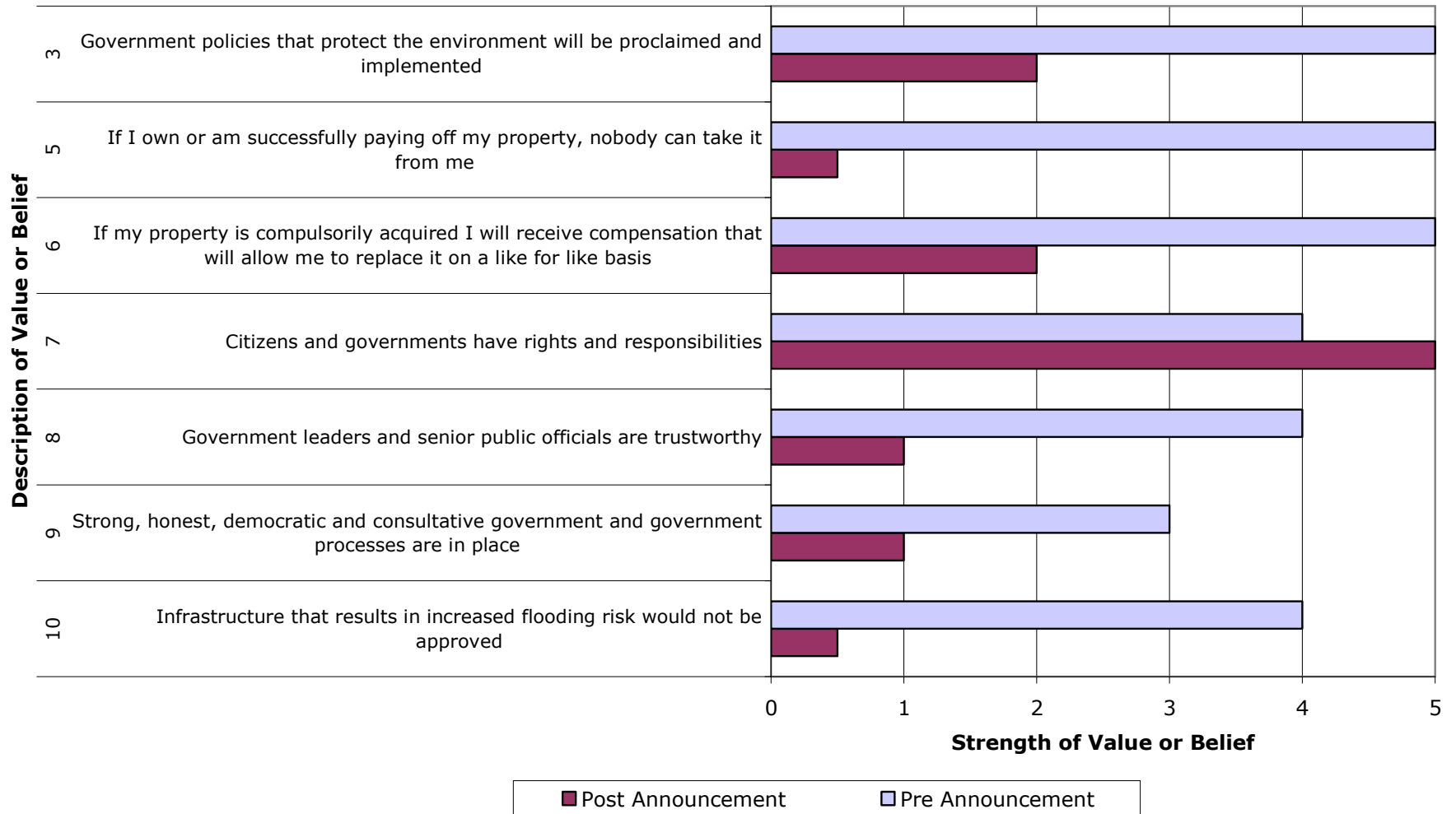
CS - Current Situation - The extent to which this exists as at August 2007 or is perceived likely to exist in the future.

| <b>Table 2 - REPORTED ADVERSE IMPACTS SINCE 27<sup>TH</sup> APRIL 2006</b>                                                   |
|------------------------------------------------------------------------------------------------------------------------------|
| Significantly increased levels of stress, anxiety, depression, sleep loss, loneliness and the need for medication to control |
| People traumatised by seeing others grief and loss                                                                           |
| Loss of sense of safety                                                                                                      |
| Medical practitioners and Lifeline counsellors report substantial increase in depression                                     |
| Anger due to missing and/or misleading information from government                                                           |
| Social dislocation, damaged & broken relationships, and loss of friendships                                                  |
| Confusion and uncertainty for people outside the dam footprint                                                               |
| Disintegration of social networks                                                                                            |
| Frustration due to a belief that since the dam is absolutely not viable, “something else is going on”                        |
| Frustration that government states that people outside the dam footprint are “not affected”                                  |
| Fewer owners more renters - long term friendships terminated                                                                 |
| Lack of maintenance on empty and rented properties impacting on quality of adjoining farm land                               |
| Increased family violence                                                                                                    |
| Declining incomes and increased unemployment                                                                                 |
| Concerns regarding long term financial position                                                                              |
| Property values outside dam footprint are reduced                                                                            |
| Concern that “leaseback’ agreements may not be secure.                                                                       |
| Loss of opportunity for improvement                                                                                          |
| Businesses declining and closing and loss of future livelihood opportunities                                                 |
| Sense of disempowerment                                                                                                      |
| Guilty feelings resulting from expressions of anger and hatred from adults and more importantly, children                    |
| Deterioration of behaviour at schools resulting from impacts on adults                                                       |
| Decreasing optimism and increasing pessimism                                                                                 |
| Threat of a dam dominates all conversations and takes its toll on most enjoyment activities                                  |
| Lack of ambition                                                                                                             |
| Loss of quality of life - recreation, relaxation, ambience, participation                                                    |
| Shattered dreams and uncertainty about the future                                                                            |
| Reduced community participation                                                                                              |
| Fear of flooding leading to isolation and possible death due to lack of access to essential services                         |
| Lack of recognition of impacts on upstream and downstream communities                                                        |
| Great uncertainty regarding properties on the “borderline” of the dam footprint - in/out/in/out                              |
| Property values preclude replacement of property on a like for like basis                                                    |

## COMMUNITY VALUES & BELIEFS Democratic Rights

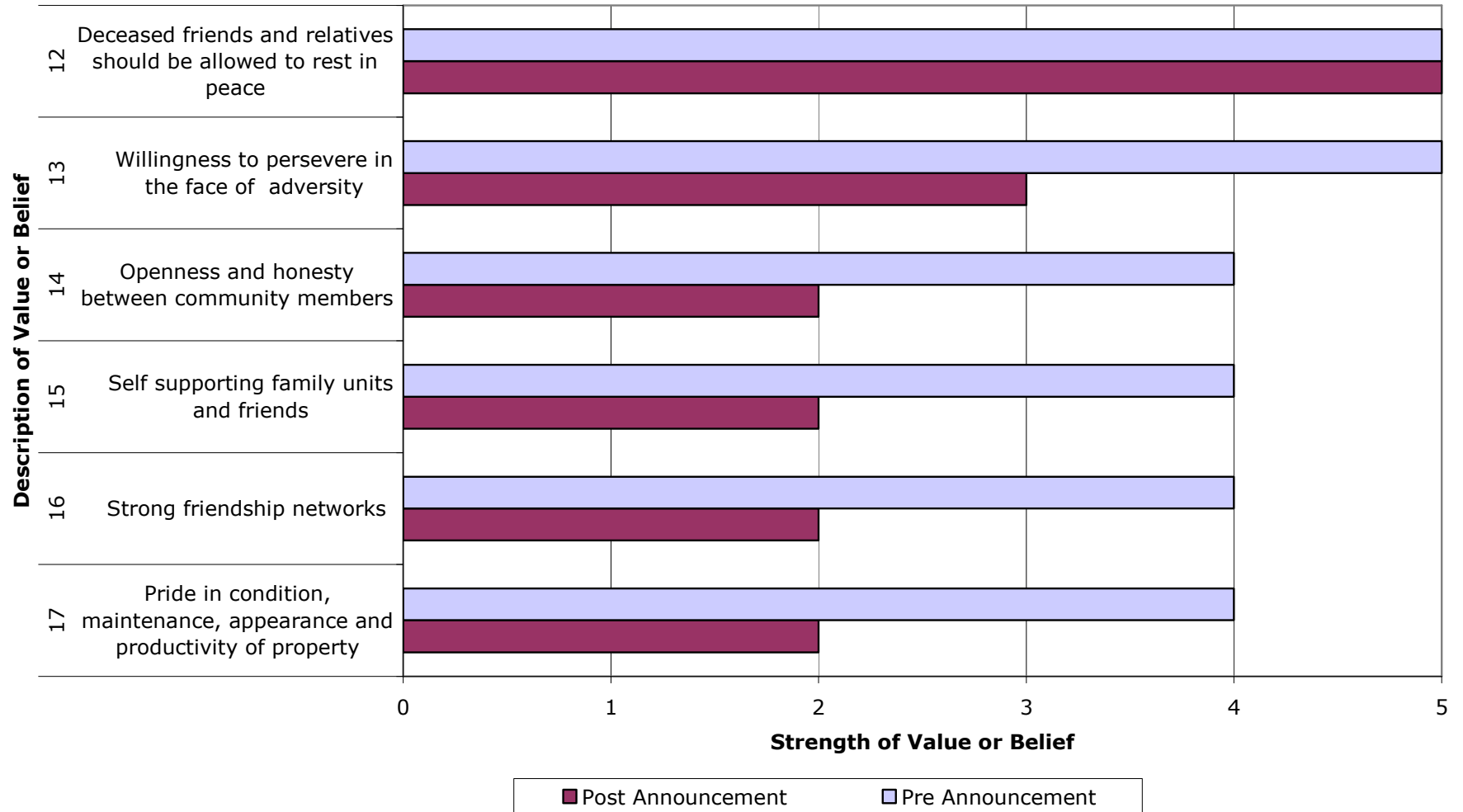


**COMMUNITY VALUES & BELIEFS**  
**Trust in Public Sector & Government**

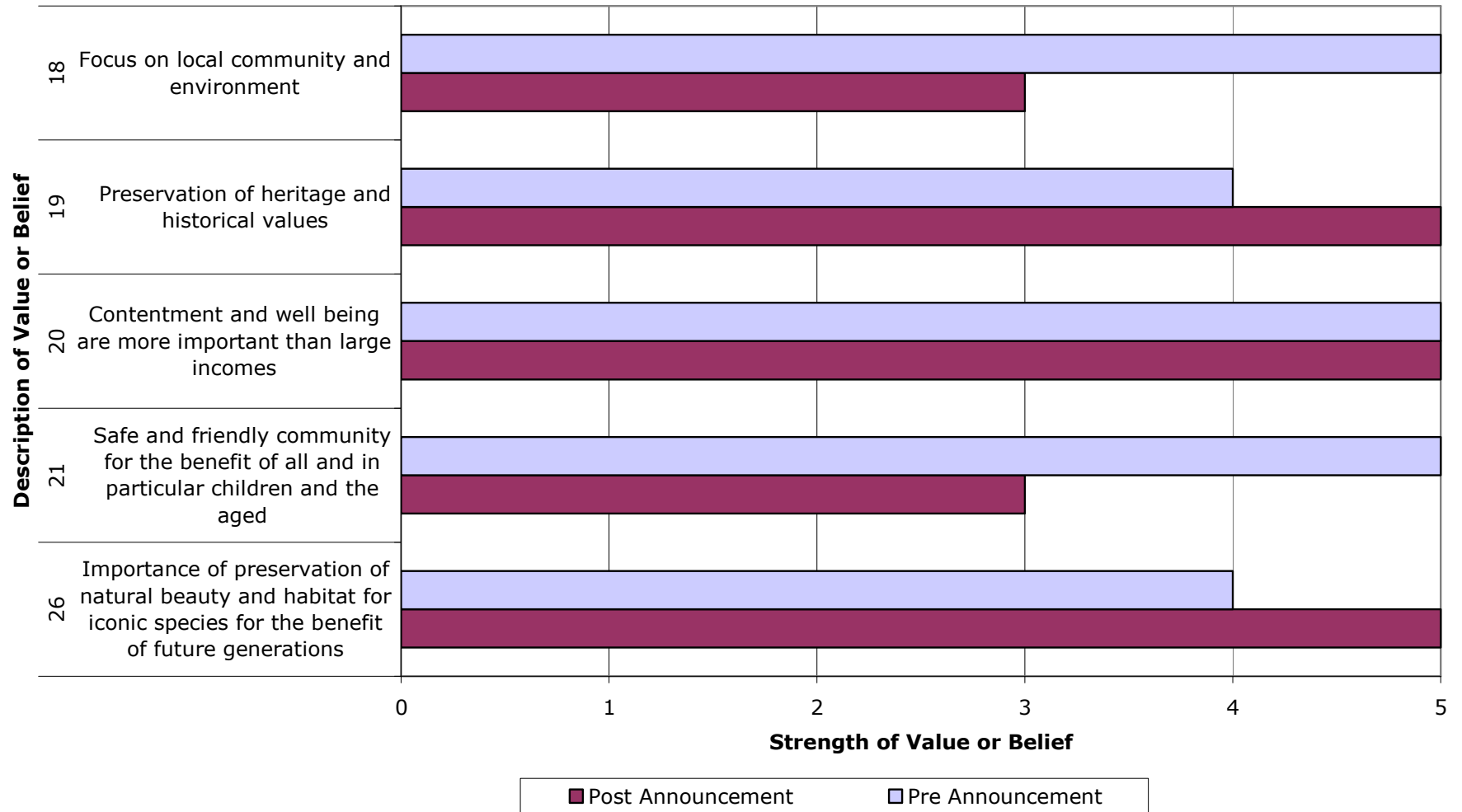




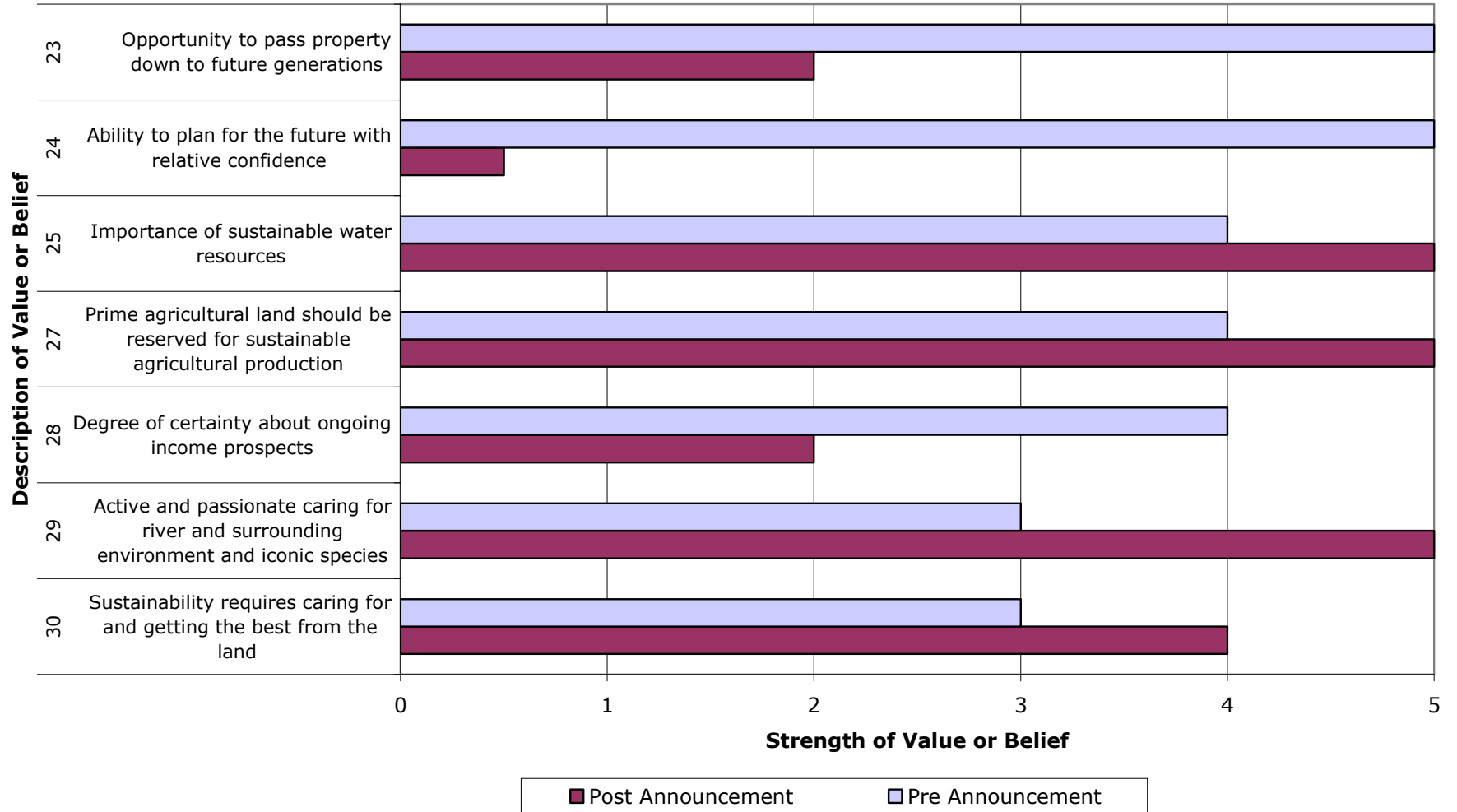
**COMMUNITY VALUES & BELIEFS**  
**Individual Values & Social Capital**



**COMMUNITY VALUES & BELIEFS**  
**Lifestyle Characteristics & Community Spirit**



## COMMUNITY VALUES & BELIEFS The Future



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*Appendix 4 The Mary River Coordinating Group conducted a detailed technical review of the flood modelling presented in the EIS*

# **Comments on the flood modelling in the EIS for Stage 1 of the proposed Traveston Crossing Dam and implications for hazard assessment, property purchase boundaries, infrastructure requirements and flood mitigation claims.**

Steve Burgess, SaveTheMaryRiver Coordinating Group

December 2007

## **Summary**

The structure of the catchment represented in the flood modelling presented in the EIS is demonstrably incorrect, as well as being inappropriately over-simplified, and as a result the modelling produces predictions that are unacceptably inaccurate when compared to historic observations. Some flow and probability calculations presented in the analysis of the risks of the dam overtopping are also demonstrably incorrect. Mapping presented in the EIS with respect to the flood modelling displays an obvious lack of knowledge about even the names and locations of watercourses in the project area. These worrying observations indicate that the modelling presented in the EIS has not undergone a sufficiently rigorous process of independent checking by anyone with specific knowledge of the river and streams in the vicinity of the project area.

The most worrying observation is that there is no dam break analysis presented in the EIS at all. The Queensland Dam Safety Guidelines Checklist of Dam Technology Issues lists a “Failure impact assessment (including dam break analysis) and consequence assessment” as the first requirement in the checklist list of hydrological and hydraulic data and analyses to be conducted on a new dam.

For this project, the results of the flood modelling determine the level of property purchase and infrastructure replacement needed for the project (both upstream and downstream). The proponent proposes to allow the Mary Valley to remain inhabited within the freeboard of the proposed dam and the impacts of the project during major flooding events (both downstream and upstream) constitute some of the major adverse risks and alleged benefits of the project. The demonstrated level of error and inaccuracy in the work presented in the EIS is not appropriate considering the scale of the possible consequences of the flood impacts of this proposal.

## **Technical information used in this critique**

- Report 15 of the supplementary technical reports included with the EIS. (Preliminary project description – September 2007.)
- Folder marked ‘Chapter 17 data’ included in the Supplementary Technical report CD.
- Report 19 the supplementary technical reports included with the EIS. (Hydraulic modelling summary report)
- Sunwater 90m inundation plan (attached to this note, not included in EIS)
- NRW stream gauge information for Yabba Creek and Gympie.

## **Risks and consequences associated with overtopping in the PMF event.**

- Page 5 of report 15 shows crest elevations for the project– 760m of RCC wall with a crest elevation of 89.0m AHD, accompanied by a saddle dam and 535m of earthfill embankment with a crest height of 90m AHD.
- The AEP of the probable maximum flood event used in the design is estimated at a 1:478000 year event. (page 16 of report 15).
- The AEP of the 1999 flood event is estimated at 1:75, with a peak discharge at the dam site of 5,800 cumecs (page 15).
- Section 6.2.7 (page 27) in report 15 shows an assessment of the risks in the event of a gate failure during a probable maximum flood event. Note that it states a flood height of 89.79m at the dam wall in this event, which will overtop the RCC section of the dam wall to a depth of

0.79m across the entire 760m width of the RCC section . **This section states a peak discharge of 1.19 cumecs per m of RCC wall section -implying a total peak discharge across the length of the overtopping RCC wall of only 904.4 cumecs at an implied flow velocity of 1.51 m/s. This is a surprisingly low and slow predicted discharge for a 1:478000 AEP event, given that the peak discharge during the 1999 flood (rated at 1:75) was given as 5800 cumecs.**

- While overtopping of the RCC section may be allowed for in the design, overtopping of the earthfill saddle dam or any of the 535m of earthen main wall embankment could be catastrophic, and there is only 21cm freeboard in the calculations (90m-89.79m) to avoid this risk.
- It could be argued that the PMF is calculated as a 1:478000 event, and precautions will be taken to prevent a gate malfunction, therefore the risks of a combined occurrence are extremely low. This is the argument put forward on page 40, in section 8. However, this is not necessarily the case. The extreme weather conditions that are likely to cause a PMF or even a 1:100 event (such as a cyclone) are also likely to pose significant related risks of spillway blockage by flood debris and/or gate malfunction due to loss of power or jamming by debris. Major floods in the Mary are typically characterised by significant loads of floating debris (trees, floating vegetation, aquatic weeds, buildings and bridge timbers).
- Notwithstanding the *assumed* low probability of such an occurrence, the extraordinary implications for this dam are that the proponent intends to allow the Mary Valley to remain inhabited, and towns and critical infrastructure to remain in place at elevations lower than 90m AHD *within the freeboard of the proposed dam*. During an overtopping event, these inhabitants would be inundated by the lake itself, not merely impacted by passing floodwaters. These extraordinary upstream hazards add to the extreme downstream hazards already inherent in an overtopping event with an earthen embankment
- The extent of this inundation risk is shown in the attached Sunwater 90m inundation plan, which submerges large areas of the towns of Kandanga and Imbil, the closely settled semi-rural area of Carter's Ridge and impacts as far upstream as the town of Kenilworth. The proponent intends to leave a significant proportion of this area inhabited.

### **What is the true probability of overtopping in the event of a spillway obstruction?**

- The reservoir storage curve on page 20 of report 15 shows the capacity of the storage at the 89m AHD stage to be slightly less than 1,500,000 ML
- The data in the file named "T3\_IQQM\_existingWRPSimulation.PDF" in the folder marked labelled "Report 17 data" contains the daily simulated flow data for the river generated for the climatic period between 1890 and 1999, assuming the current state of infrastructure development in the valley (including the operation of Baroon Pocket and Borumba Dams). These flows were generated from the whole of catchment IQQM model on which the Mary Basin WRP is based. The flows in this file for the Dagon Pocket IQQM represent simulated inflows at the proposed Traveston Crossing Dam site at AMTD 207.6.
- Even within this limited 109 year time span there has already been a flood event recorded which would have generated inflows at the proposed damsite significantly in excess of 1,500,000ML. (ie. causing overtopping and the formation of a lake at 90m AHD in the event of a spillway blockage) Just 4 days flow from this event between 1/02/1893 to 4/02/1893. combined with a gate failure would have been sufficient to exceed the stage 2 RCC crest height, supposedly designed to cope with a PMF with an AEP of 1:478000.
- It is valid to conclude that the AEP of an overtopping event and associated full lake inundation of around 90m AHD, in the event of a spillway blockage, is at least 1:109, or nearly 1%. This is a totally unacceptable level of risk to assume for a structure with an extreme hazard rating under the ANCOLD guidelines, bearing in mind the degree of habitation and infrastructure that are proposed to remain within this lake area, and the downstream consequences of a wall failure.

- To summarize, the data in the EIS demonstrates that in an event like the first flood event in 1893, associated with a likely spillway obstruction, the entire area marked in the Sunwater 90m inundation plan (allowing for the changed location of the dam wall since August 2006) would be under the waters of the lake, until such a time as the spillway obstruction was cleared or the earthen embankment section of the main wall and/or saddle dam failed as a result of overtopping.

**Comments on the failure impact assessment (including dam break analysis) and consequence assessment as required under the Queensland Dam Safety Guidelines.**

- These analyses were not provided in the EIS, and chapter 16 suggests that the necessary studies have not yet been conducted, merely appearing in the list of the proponent's commitments for future action. It is impossible for the EIS to meet its requirements with respect to assessing hazard and risk and environmental impact without these studies being presented as part of the EIS itself.

**Comments on linear hydrodynamic flood modelling (Mike11), the generated 1% AEP flood boundaries and implications for the affected area**

- The MIKE11 hydraulic model of the catchment in report 19 is demonstrably incorrect in its structure, its predictions in the vicinity of upstream tributaries (where the majority of affected properties are located) are unacceptably inaccurate, and the use to which these predictions have been put by the proponent imparts a systematic bias towards underestimating the area of land and infrastructure affected by the proposed dam upstream of the project and overestimating flood mitigation impacts in the modelled 1999 event at Gympie. This has significant implications for assessing the impacts and costs of the entire project. Each of these assertions is explained in finer detail in the following comments.
- The decision to base property purchase and infrastructure planning for such a significant project that has such large direct adverse social and economic consequences on such a simple 1-dimensional analysis is questionable, and far below the standards for industry best practice in flood modelling. The dynamic behaviour of flood flows in this section of the river and surrounding tributaries (around which most of the affected properties are clustered) is well known to be extraordinarily complex, (as admitted in the report - see reference to past attempts at modelling backwater effects at Moy Pocket in section 4.3) and the predictions of flood extents presented in the report are greatly at variance with local knowledge and past observations. Although the simplistic 1 dimensional modelling and level-pool flood routing assumptions which were used to set the boundary conditions for the model may be adequate for predicting flows and heights in the vicinity of the spillway and some downstream effects, a much more detailed 2 or three dimensional study, correctly executed, would be required to produce acceptable accuracy in the vicinity of the upstream tributaries. It is a clearly unacceptable to assume a uniform velocity profile across the stream sections outlined on drawing 229722 during the high velocity events that these streams experience when in flood. It is also clearly unacceptable to model the significant inflows in the major tributaries that have been deliberately left out of the model (eg. Six Mile Creek) as simple direct flow inputs to the main trunk of the river when considering flooding impacts on Gympie.
- The decision to base the "affected" area on the line that indicates where the predicted 1:100 AEP post-dam flood height comes to 0.5m above the modelled pre-dam flood height imparts a systematic bias that underestimates the extent of the affected area. The reason stated for this decision in the EIS is the inaccuracy of the topographic information available. However, this inaccuracy affects both the pre-dam and post dam scenarios equally, and the best predictor of the affected area is the line that marks where these modelled flood heights coincide. In fact, it could be argued that a suitable precautionary measure would be to extend the effected area to the point where the predicted "pre-dam" flood height is 0.5m above the predicted "post-dam"

flood height – thus allowing 0.5m elevation margin for error. It is also important to note that the slope of the land at the flood margins in many parts of the Mary Valley is very low, and a difference in elevation of 0.5m may correspond to hundreds of metres of horizontal distance.

- The prediction in the EIS of the pre-dam 1:100 AEP flood extent upstream of the dam wall and the modelling of the 1999 event is grossly at variance with historical flood observations in the Imbil/Brooloo area. Additionally, the predicted stream heights for the pre-dam 1:100 event underestimate historically recorded stream gauge heights in this region. This is hardly surprising since neither CoonoonGibber Creek nor the Yabba Creek Anabranh are accurately represented in the basic structure of the flood modelling. An example is that figure 6.43 shows a predicted extent of the 1999 flood that is several kilometres in error (underestimate) of the historically observed extent of flooding in Coonoongibber Creek for that event, which saw major floodwaters inundating the front steps of the Brooloo Hall.
- The recorded stream height at the Yabba Creek road bridge during the 1955 flood is several metres higher than the predicted 1:100 AEP stream height for this location. Table 6.23 shows a predicted 1:100 height of 85.4m AHD while NRW gauged height data shows a height of 87.63m AHD during the 1955 flood, a height of 85.6m in 1974 and a height of 85.9m in the 1999 flood. The probability of getting 3 events which exceed the 1:100 AEP flood height in the period of the recorded stream gauging record in Yabba Creek is very low, indicating that the estimation of the pre-dam 1:100 flood height at Imbil is probably incorrect. It is also important to note that flood flows in this location are particularly violent, having completely washed away the previous 3 road bridges, each thought to have been sufficient to handle the flooding previously experienced. Flows of this energy in a complicated system like that associated with the interaction between the Imbil Town Weir and the Yabba Creek Anabranh are not modelled appropriately by the simple assumptions used in the hydraulic modelling presented in the EIS.
- The calibration and verification data presented in report 19 (figs 6.9 to 6.20) for the 1992 and 1999 events for the upstream sites at Moy Pocket, Yabba Creek and Kandanga Creek show that although peak flood height was reasonably well estimated, flood duration and the general shape of the hydrograph were not well predicted at these upstream sites. This casts doubts on all the infrastructure impacts presented in the EIS in terms of Average Annual Time of Closure calculations for locations near the upstream tributaries (which comprises the bulk of the infrastructure adjustment needed for the project). The poor performance in the upstream tributaries may be explained in part by the following comments.
- **The basic structure of the Mike11 model and the mapping used in its construction is clearly incorrect**, a fact which is immediately obvious to anyone with first hand knowledge of the catchment. For example, the stream referred to on the maps and in the model as “Chinaman’s Creek” is in fact Happy Jack Creek, and the real Chinaman’s Creek is the next tributary downstream. (Sunwater drawings 228891, 229722, 229723). Although this error is not repeated in the mapping in the main body of the EIS, the flood inundation mapping in figure 6.43, (drawing 100477) represents Coonoon Gibber Creek as two separate creeks, ‘Gibber Creek’ and ‘Coonoon Creek’ the latter which is represented as flowing directly into the Mary instead of being a tributary of Yabba Creek. These gross mapping errors in the final document, in a locality where the flood behaviour of these creeks is the stuff of local legends (flood boats were historically stationed near the mouth of Chinaman’s Creek) are indicative that there has been inadequate on-ground checking and scrutiny of the work. A competent person who had personally inspected the streams they were modelling or mapping could not possibly have made such errors.
- The structure of the inflows in the catchment are not adequately represented in diagram 229146, and flows down several tributaries which experience significant local flows and complicated backwater effects in high intensity rainfall events are not represented in the model, which limits the accuracy of predictions in and nearby these tributaries. Some of these tributaries are closely settled and are directly affected by proposed infrastructure replacement and property purchase boundaries. In terms of modelling downstream impacts, major tributaries (such as Six Mile



Creek) which greatly influence flood behaviour in Gympie related to the relative timing of inflows from it and the main trunk of the Mary, are simply left out of the model, casting extreme doubts on the validity of predictions of flood mitigation at Gympie based on this model on any other than the 1999 (calibration) event..

**Table 1 Summary of significant structural errors and omissions in the Mike11 model as outlined in drawing 229146.**

| Location                   | Error/omission                                                                                                                                                                                         | Significance                                                                                                                                       |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Gympie Area                | Flows from and within 6 Mile Creek not modelled                                                                                                                                                        | major high volume flows with complicated behaviour                                                                                                 |
|                            | No explicit modelling of any major tributaries in the vicinity of Gympie other than Deep Creek (excludes Eel/Pie Creek, Gympie Creek, Calico Creek, and McIntosh Creek plus other local named gullies) | significant local effects on flood extents                                                                                                         |
| Carters Ridge Area         | Happy Jack Creek consistently misrepresented as Chinaman's Creek                                                                                                                                       | suggestive of a lapse of professional standards of due diligence                                                                                   |
|                            | Flows within Chinaman's Creek and Ironstone Creek not modelled                                                                                                                                         | property/ road infrastructure impacts                                                                                                              |
| Imbil Area                 | Complicated flow structures in the vicinity of the Yabba Creek Anabranh, Breakneck Creek, Western Creek and Coonoon Gibber Creek not modelled                                                          | significant local effects on flood extents and impacts                                                                                             |
|                            | Flows into Yabba Creek upstream of Imbil, such as Casey, Ryan and Bella Creeks not explicitly modelled                                                                                                 | Major high velocity flows with significant backwater effects                                                                                       |
| Moy Pocket/Kenilworth area | Gheerulla and Oakey Creeks not modelled                                                                                                                                                                | Known complicated flow and backwater effects associated with very significant inflows. Potentially significant effects on infrastructure (bridges) |
| Kandanga Area              | Blue Creek and Three Mile Creek not modelled                                                                                                                                                           | Significant inflows and backwater effects. Potential effect on Kandanga (Blue Creek) and infrastructure (3 MileCreek)                              |

### Downstream Flood Mitigation Effects

- The case for downstream flood mitigation has been built on the modelling of the one flood event against which the Mike11 model was specifically calibrated for the pre-dam case. Therefore it is not surprising that the simulated flood heights match the observed flood heights fairly well. However, this alone does not ensure that the model will accurately predict flood behaviour during different flood events, or accurately predict the impact of a dam at Traveston Crossing on the flood hydrograph at Gympie. It is very worrying that significant tributaries (such as Six Mile Creek) that have a major impact on flood behaviour in Gympie are simply not included in the MIKE11 modelling of the flood impacts at Gympie. Leaving out the flood behaviour of these tributaries close to Gympie, and matching the predicted flood height at Gympie using a

model mainly driven by the boundary conditions in the main trunk of the river at the damsite would tend to overestimate the impact of the dam on flood levels in the vicinity of Gympie.

- The predicted flood mitigation impacts are the result of a flood gate operation strategy that was determined with the benefit of hindsight, and specifically optimized for that one particular modelled event. This could not occur in real life, where a pre-determined gate operation strategy would need to be applied as the flood event was occurring. All of these assumptions lead to a bias towards overestimating the likely flood mitigation effects in the case of the 1999 flood event.
- There is a confusing inconsistency in the figures presented for flood duration in Table 6.3 of the EIS. This table indicates that the predicted no-dam flood height for the 1999 event stayed above 52.7m AHD for 60 hrs. This is longer than what is presented for the 1:100 event (the 1999 event was about a 1:75 event). The table is also inconsistent with the gauged heights for the 1999 event which indicate that flood heights were only above 52.7 m at Gympie for 48.7 hours. It is worrying that duration is so poorly predicted for what was essentially the calibration event. This casts doubts on the accuracy of all the duration predictions presented in the EIS and the Average Annual Time of Closure calculations for road infrastructure presented throughout the EIS.
- Notwithstanding the comments made in the previous point, the modelling does illustrate one crucial point with respect to likely impacts of the dam in major flood events. The dam will certainly significantly increase the duration for which high velocity water is running against the high banks of the river in a major flood event. This is illustrated in Table 6.3 of the EIS which shows the predicted increase in duration for which flood waters are higher than the Normanby Bridge crossing in Gympie, which is the highest level crossing of the Mary River in the vicinity of Gympie. The ridiculous statement in the EIS that this is not an important adverse impact of the dam because there are other crossings over the river either demonstrates an astounding level of ignorance or could have only been written with a deliberate intent to deceive. If the Normanby Bridge is cut, Gympie is completely isolated by road because the Normanby is the highest river crossing and all highway access to Gympie and the Mary Valley is cut at lower levels than this.
- Far more important than the effect that the predicted increase in major flood duration at the level of the high banks would have on road and rail transport, is the effect that it would have on bank erosion – already identified as the major river rehabilitation issue in the Mary. The Mary between the dam site and Gympie consists of a broad, deeply incised channel cut into deep floodplain deposits of unconsolidated alluvium. The effects of this extra inundation time and increase in duration of high velocity flows against the high banks on protective riparian vegetation and streamside infrastructure needs to be accounted for as an extreme adverse risk associated with the project.

Figure 1. Plan of upstream inundation area in a dam full event.

