QUEENSLAND WATER RESOURCE REFORM
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4 April 2007

The Secretary
Senate Rural and Regional Affairs and Transport Committee
Department of the Senate
PO Box 6100
Canberra ACT 2600

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

This submission has been prepared by the undersigned members of our group for consideration by the Senate Committee Members who are reviewing the water supplies proposal for South East Queensland. It is the result of research and extensive studies by our team over many months. all sites mentioned have been inspected and we have met with a number of senior well informed Government, community and business personnel.

The undersigned are concerned citizens interested in Water Reform with the prosperity of Queensland and Queenslanders in mind.

The shortage of dam water in South East Queensland is of utmost concern to all South East Queenslanders and therefore the Queensland Government's proposal to build the Traveston Dam is strongly supported, as is its full program for the proposed dams in Queensland.

Please keep us informed of the progress of this enquiry to lowline@optusnet.com.au and where there are public hearings, etc, we would like to be included.

The QWRR respect the required privacy pertaining to this submission.

Yours faithfully,

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

Why We Need the Traveston Dam
South East Queensland is Desperate for Water

Queensland Water Resources Reform

4 April 2007

I N D E X

1.0 Why We Need the Traveston Dam

South East Queensland is Desperate for Water

South East Queensland has just been in the grip of a severe natural drought for the past number of years, and is rapidly heading for a most serious water shortage due to population explosion of the region.

The Government has already put much endeavour into the visionary Traveston Dam project. To consider retreating from the proposal now is unthinkable. Eventually this potentially reliable water supply plan will be relied upon by the citizens of South East Queensland. To abandon the gains achieved by the State Government to date will make it very difficult, if nigh on impossible, for future Governments to resurrect.

While there are many ways of providing water currently under review, and indeed actions in place, the fact cannot be emphasized too strongly that, in our climate, water impoundments are unquestionably the most useful source of water supply. Where would we be without Wivenhoe – and would we not be far better off had Wolfdene been built? Whatever additional infrastructure can be put in place – and we do not condemn any of it – the need for more water impoundments (such as Traveston) is the only way to ensure future water supply.

Further – the weakness inherent in having Brisbane's major dams (Somerset and Wivenhoe) as well as Toowoomba in the same catchment emphasizes the necessity to have future dams built in other catchments, for the obvious reason that it is much less risky than to rely on a single catchment.

Somerset Dam – Very low capacity 11.06

Wivenhoe Dam

Even with ideal conditions South East Queensland will still run out of water by 2036 when demand will outstrip supply. If something is not done about it now South East Queensland will suffer enormously.

Water reservoir volume has not kept pace with population increase because of the Green policy of "no dams" since 1985.

South East Queensland is the engine room of Australia. It is going from strength to strength in prosperity. The population is expected to double to approx. 5 million people by 2050 – and it cannot be stopped.

It is clear the **Green** element in Government is responsible for the water reservoir volume not keeping pace with population growth.

Borumba Dam 2006

Building the Traveston Dam and raising the Borumba Dam wall in conjunction with it, is the sensible solution to not only meeting the impending need, but will provide for South East Queensland's needs well into the future. South East Queensland could be a world leader in economic development, as well as the best place to live, with these visionary projects.

The Traveston Dam project is in line with Federal Government's objectives for big water projects.

2.0 Engineering Advantages

2.1 Connection to the Water Grid

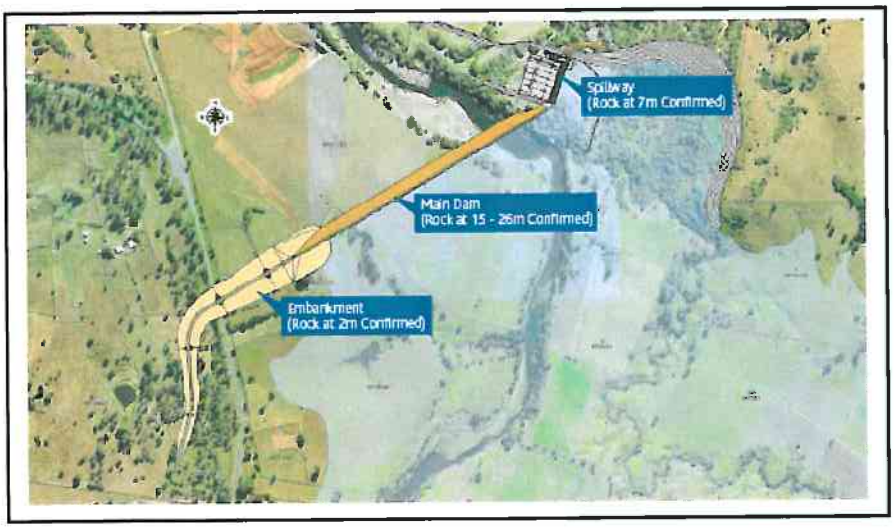
The State Government's proposal to connect the Traveston Dam to the other major dams in South East Queensland by a grid system of pipelines would benefit all areas of South East Queensland in event of a localized water shortage or local catastrophic event.

2.2 Highways and Roads

Road users normally welcome new, well designed roads and highways. The new 65 km Gympie bypass is to be a huge benefit to Queenslanders and is now pending Federal Government approval.[1] This will make the Bruce Highway both safer by avoiding "horror" stretches of the existing highway, and, built to up-to-date highway standards, will be reduce traveling time for thousands of people daily – another major economic benefit to Queenslanders.

2.3 Traveston Dam Wall Foundation

The Hon. Anna Bligh [Deputy Premier] has confirmed[2] that the geotechnical investigation has identified desired solid rock foundations on both left and right abutments as well as the centre section. More than 76 bore holes have been drilled recently, confirming earlier test results that the site is suitable. Thus there should be no engineering questions about location or construction of the wall. Hard rock material has been found on site which can be used for construction materials.



2.4 Railway, Electrical, Other Services and Structures

The cost of these works is inevitable as in any major project. However, many of the existing materials can be re-used. Houses and sheds can be relocated, trees cut for timber or chipping. Allocation of funds from the Queensland State Government will be made toward the utilities affected. The suggestion for raising the soil level of Kadanga Cemetery and replacing tombstones in exactly the same location but higher is quite a sensible suggestion.

2.5 Costs

The construction cost of Stage 1 of Traveston Dam is estimated to be $1.7bn which according to GHD Desktop Review[3] is an average of $4,695.00 per megalitre per annum on yield figures. Comparing this project with the other potential dam sites in the Mary River basin, this figure is most reasonable.

The operating costs of dams are well known to be significantly lower than those of desalination plants or IPU plants. The infrastructure costs are high but over the life of a dam, the economic benefits will far outweigh its initial costs. Compare it with the Snowy Mountain Scheme [and the significant economic benefit to Australia it has proved to be].

It cannot be overemphasized that water availability is one of the major factors likely to limit future development of Queensland's South East corner, particularly the proposed developments:-

Ripley Valley, Ipswich – 120,000 population increase
Mt Lindesay, Beaudesert – Study Area 1 80,000 population increase
Springfield, Ipswich – a further 65,000 population increase

Refer *SEQ Regional Plan 2005 – 2006.*[4]

3.0 Economic Advantages

3.1 Kadanga and Imbil

Local trade will certainly increase. Recreational activities will bring new shops and economic benefit to these townships which are in need of rejuvenation, and support for the locals. Those temporarily disadvantaged will in the long term be the benefactors. A thriving community will result.

3.2 Water Allocations

Abundant water from the Traveston Dam will be available for highly salable water allocations providing an income for the State Government for years to come. Nearby farming districts will benefit from this reliable water and regulated water sources.

3.3 General Economic Benefits

Gympie is already a thriving city and shows continuous growth. Once the Traveston Dam is built and the proposed Cooroy to Curra bypass is completed, the injection of Federal and State Government funds into the region will enormously increase the local economy. There will be an influx of residents and businesses to the area. This needs to be welcomed by the local people in the region.

Security of water supply is essential to enable better and more intensive use of the land by irrigation. Vast areas of fertile land without a secure water supply are currently being devoted to marginal endeavour, relying on production in good years to tide over losses in bad years.

Security of water supply ensures dependable supplies of product and so will encourage the development of value-adding industries in the region.

All areas of growth provide jobs and population increase which enables improvement in services and recreation facilities, providing an attractive lifestyle which in itself is conducive to continued growth.

3.4 Recreation

Recreation will be of benefit to a much wider community who will Traveston Dam a pleasure to visit with families and friends. There will be a potential to develop pontoons, boardwalks, walking and riding trails, beaches and shady picnic and camping areas. This will cater for anglers, boaters, picnickers, campers, cyclists and other visitors.

3.5 Employment

The Traveston Crossing Dam will be a catalyst to enhance the links between Gympie, Traveston Crossing and the Sunshine Coast economy. It is in the best interests of the region to deepen the connections between the hinterland and the main centres.

A considerable workforce of approximately 500 will be employed to build the dam and this will be beneficial to the region. Many (up to 40%) of these will be sourced locally. Employment opportunities will exist for maintenance and management of the dam in the long term, again boosting the local economy.

4.0 Environmental Advantages

4.1 Fish

We must challenge the environmentalists' motives in raising questions regarding the Lungfish and Mary River Cod, etc.

Major floods could destroy their habitat and wash many individuals out to sea and temporarily remove their food supply. This causes untold damage to the environment. The **Green** element is unusually quiet when this happens.

It is worldwide common practice for new dams to incorporate fish ladders to provide access for breeding fish. e.g. new Paradise Dam in Queensland.

Government managed fish hatcheries are provided at major dams. e.g. Lake Borumba and Lake Macdonald etc. **Adequate stocks are then assured.** Fish populations thrive in these conditions. The public are not permitted to take Mary River Cod or Lungfish but the latter are often taken by Aboriginals. It would be highly desirable for this to continue. If the public wish to catch big fish, they would normally go to a well stocked dam for native fish stocks.

Australian lungfish – *Neoceratodus forsteri*

Mary River Cod - *Maccullochella peelii mariensis*

4.2 Sustainable River Flow

Drought affected river flow is reduced so badly that fish stocks are affected. A controlled and regulated discharge from the Traveston Dam could be used with discretion to ensure sustainability of fish and food sources, and during floods the Dam could be used to minimise erosion and damage to vegetation from floods.

Hydrological modelling and TAP assessments have shown that this allocation of 150,000 ML/a can be provided without impact on the Mary River estuary or Great Sandy Straits. The allocation will provide an end-of-system mean annual flow of 85% of pre-development mean annual flow.[5]

Mary River downstream from Traveston Dam wall looking North

Mary River upstream from above bridge

4.3 Enhance Wetlands and Create New Wildlife Habitats

Storage dams enhance wetlands, and create wildlife habitats on lands surrounding projects. Wildlife reserves are often created around the reservoirs which may then provide habits for endangered and threatened species.

4.4 General Environmental Advantages of Dams

Storage dams are vital for the supply of water for urban areas. They provide a buffer against droughts that reduce and often stop river flow and necessitate water restrictions.

Storage dams maximize a river's benefit to human activity by enabling a sound choice that balances all competing values.

Storage dams can and do co-exist with healthy rivers provided adequate river flow is maintained.

Storage dams enhance wetlands, support healthy fisheries, and create wildlife habitats on surrounding lands.

Storage dams are often teeming with life, including water fowl, both anadromous fish and resident fish populations that depend on the reliable water for survival. Anglers place great value on these lakes because they often include "blue ribbon" fish and can be stocked with high value species. Wildlife reserves are often created around the lakes which then provide habitats for endangered and threatened species.

Comments from Dr. T.H. Kirkpatrick, *Environmental Consultant*

"It would be difficult to endorse NEGATIVE Environmental issues because:

1. Lungfish thrive in the Enoggera Reservoir, one of the impoundments in Brisbane, and there is NO reason why they should not in the proposed Traveston Dam.
2. The other fish (Mary River Cod and Bass) are well provided for in fish hatcheries should the need arise.
3. The Mary River Turtle would surely benefit from more water and margins of the proposed Traveston Dam.
4. Water fowl are always attracted to impounded water wherever it is, particularly a full dam with shallow margins as will be the case with Traveston Dam.

5. The maintenance of an 85% river flow as designed will help maintain the health of the Mary River and estuarine and coastal fisheries, which are substantial."

5.0 Social Advantages

5.1 Safer Water Supply

Dam water is a long proven safe water source worldwide. It is much safer than recycled effluent which is yet unproven in the long term. To embark on a major Indirect Potable Reuse program for drinking water supply in the long term is unchartered territory. Questions have been raised in *"Think before you agree to drink"* by Snow Manners of Toowoomba.[6] These are substantiated claims whereas the claims made by Queensland Water Commission appear to be unsubstantiated and we are concerned by this. We include a copy of this publication in Appendix 1 Section 8.0

The Toowoomba (pop. 90,000) referendum held in 2006 showed that 60% of the population preferred that more traditional and natural resources of water be investigated before IPR was to be used to compliment Cooby Dam.

The way Queensland proposes to use IPR is still unproven.

5.2 Productivity

The productivity gain by South East Queensland, and indeed all of Queensland will be **far** in excess of the productivity losses in the affected area of the dam.

5.3 Relocation of Residents

The farming community and businesses in the affected area should be encouraged to take advantage of the Federal Government's initiatives to establish greater farming industry in the northern areas of Australia where there is a proven long history of adequate rainfall and fertile soils. The State Government is providing assistance and advice to affected residents, through the Department of Community Services and Lifeline.

5.4 Flood Mitigation

Major flooding occurs in Gympie on average once every nine (9) years. The last flood was in 1999, however the current drought has been exceptional. See aerial photos of Gympie in Appendix 1 Section 8.0.

Many Gympie residents are looking forward to another major flood as they enjoy a great get together, helping one another shift stock, cleanout buildings and it puts them in the news! It's a way of life. Shops are built to minimize water damage. One must wonder at the mentality, but surely all the great positives mentioned in this submission could more than compensate for their "loss"! The Hon. Anna Bligh[7] said that had the Traveston Dam been in place in 1999, damages of $25 million would have been saved. It is the only proposed dam that would provide the most protection all the way down stream to Gympie and Maryborough in the event of floods. It is estimated that once the dam is completed it will reduce the flood levels in Gympie by up to 4 m and Maryborough by up to 2 m.

GYMPIE – Looking North
Mary River downstream
Bruce Highway on right.
Truck stop at centre.
1999

5.5 Advantages to Local Community

Looking towards the future, after the dam is full and the transitional emotions and anxieties fade, the Traveston Dam will provide many social advantages to the local community and benefits to many from further afield. These will include:-

a. Reliable water supply
b. An increase in Government spending in the local community townships will increase the income of families
c. Interaction with tourists and an increase in visitors to the area.
d. The payouts already settled provide money for investment, thereby easing the financial burden on families. To date, QWI[12] has reached voluntary agreement with the owners of **42%** of the total number of properties required for both Stages 1 and 2.

5.6 Its Yield

QWI state that the anticipated yield of Stage 1 is 70,000 MLPA and 150,000 MLPA with Stage 2 including the raising of Borumba wall. GH & D say it has potential to yield up to 215,340 megalitres per year. **No other single site in South East Queensland could be developed to provide water in comparable quantities to Traveston.** When connected to a grid system it will benefit many other areas that need water in South East Queensland. **It has by far the greatest potential to meet the long term needs of South East Queensland.**

5.7 Its Capacity

Its FSL capacity of 570,000 megalitres would be nearly twice the size of Somerset Dam and more than half the size of Wivenhoe Dam.

Both Stage 1 and Stage 2 operating in conjunction with a raised Borumba Dam wall show that the Dam would rarely fall below two-thirds full.

[See graphs below]

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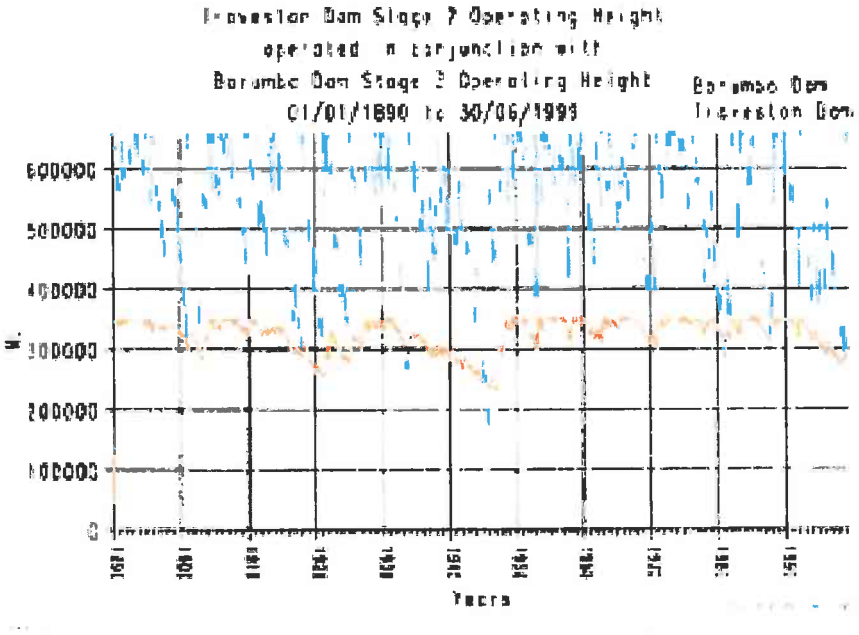

Figure 8 Storage behaviour curve for Stage 2 of Traveston Crossing Dam operating in conjunction with Borumba Dam Stage 3

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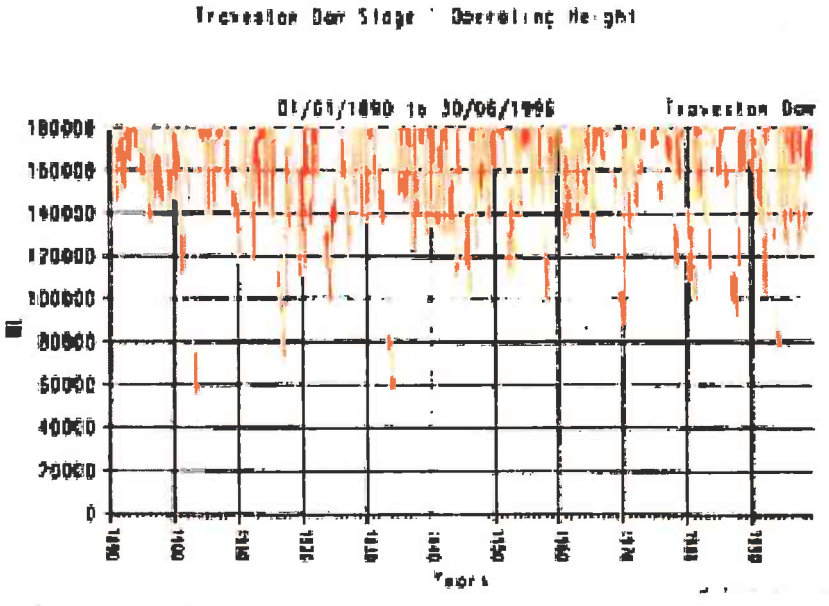

Figure 7 Storage behaviour curve for Stage 1 of Traveston Crossing Dam

5.8 Its Position

The headwaters of the Traveston Dam are in the second highest rainfall area in Queensland, second only to Tully in North Queensland.

6.0 The Alternatives

6.1 Raising Borumba

The Queensland Government has also proposed raising the Borumba Dam wall by 30 metres. It is not a suitable alternative in its own right, as it does not provide sufficient yield for long term sustainable future population needs. However it is an excellent compliment to the Traveston Dam project.

6.2 Desalination

Reasons to discourage desalination:-

1. High capital cost per megalitre
2. Huge energy demand that will tax our already stressed electricity supply resources and significantly increase greenhouse gases production to the atmosphere.
3. Very high maintenance costs.
4. Significant environmental issues…
    a. Hot water return to the ocean
    b. Disposal of large volumes of brine concentration generated to the ocean
    c. Waste disposal consequences.
    d. Large scale industrial plant "eye-sore".
    e. Noise.
    f. Substantially increased greenhouse gas emissions.
5. Subject to electrical power failures and mechanical breakdown.
6. Very vulnerable to terrorist and enemy attack.
7. In times of plentiful rainfall, with the dams full, the plant is not used. It would be considered a "white elephant".
8. There is **plenty of rainfall** in Australia, particularly Queensland. The only need is to harvest it, dam it, and pipe it to where it is needed.

6.3 Recycled Waste Water

The Government's planned Western Corridor Recycled Water Pipeline is both necessary and a **great initiative** and should be **fast tracked** with the prime aims to:

a. Replace dam water and potable water used by industry and power generators, thereby substituting waste water for fresh water.
b. Maintain the water in dams primarily for domestic uses.
c. Eliminate any risks to the public and potential litigation.
d. See Appendix 1 for discussion on IPR – Not for drinking.
e. Agricultural farming communities are in need of it. The Lockyer Valley District has been campaigning for sewerage effluent to irrigate their crops for over 9 years.

6.4 Tanks

Tanks are of limited use for industry and are susceptible to localized drought. They are to be treated as additional storage not a viable alternative to Queensland's future needs. The State Government and local Councils initiatives to subsidise the installation of water tanks for domestic use is supported generally in South East Queensland.

7.0 Recommendations

1. **That the Traveston Dam proceeds as planned by the State Government.**

2. That the raising of the Borumba Dam Wall by 30 m proceeds as planned by the State Government.

3. That the Traveston Dam be connected by "2 way" pipeline grid to other dams in South East Queensland as proposed by the Queensland State Government.

4. That the other dam sites namely Cambroon, Kiddaman Creek, Emu Creek and Amamoor Creek are further investigated in view of **future needs** for South East Queensland.

5. That the Government gives preference to Dam building – a safe, sure, reliable and necessary resource in preference to expensive

desalination plants and risky and controversial IPR recycled water plants.

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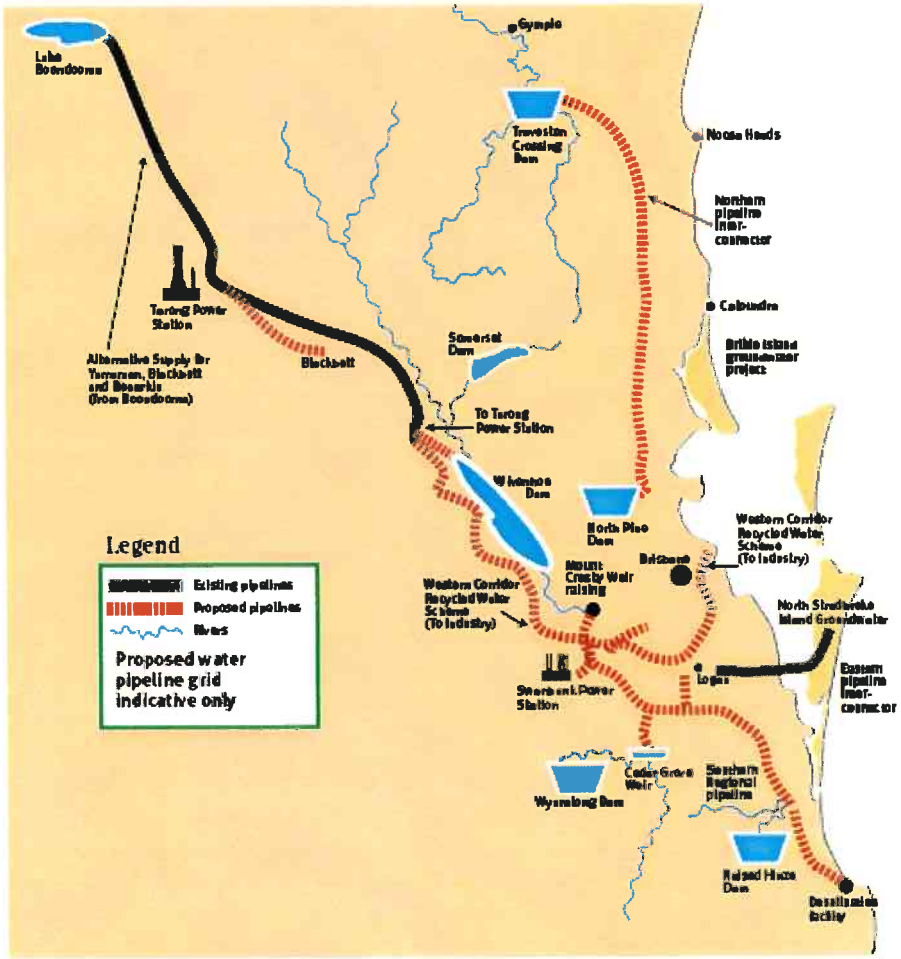
Map 5 Potential water grid for moving water between storage facilities in South East Queensland



8.1 'Think Before You Agree to Drink' [Reference [6]]

IS SEWAGE A SOURCE OF DRINKING WATER?

"The World's Scientific Community does not and will not know all the toxic agents and carcinogens that may be able to make it through the indirect reclaimed water process to drinking water. Also, there is simply no technology to detect them."

Professor Steven Oppenheimer,

Director of the Centre of Cancer and Development Biology

California State Northbridge University

This book has been compiled with all Australian citizens in mind, in particular those who may face the prospect of having to drink recycled sewage water added to their domestic supply. It alerts people to worldwide scientific studies, findings and opinions which would not be told to them by their state or local authorities during "education compaigns" to convince people to accept recycled sewage water in their water supply for drinking.

It is because of this threat, the idea for this book was born.

IT'S DONE ALL OVER THE WORLD—OR IS IT?

It is important to define the process of treating sewage water before talking about where else that process is already being used. **'Indirect Potable Reuse' (IPR)** is where there is a deliberate intent to introduce recycled sewage water into an urban water supply using a specifically defined process. Toowoomba proposed such a process.

'Unplanned Potable Reuse' (UPR) is where an urban water supply is drawn from a source of river water, bore water or dam water that contains sewage water in an unplanned way. London is an often quoted example because of the high number of sewage treatment plant outflows into the catchment of the Thames River from which London's water supply is sourced.

The statement that ***'there is no community on this planet that deliberately sources any significant proportion of its urban water supply from a sewage treatment plant'*** is true.

Singapore is an often quoted planned potable reuse example with a modern plant constructed at Bedok reclaiming 90 megalitres of water per day. Ninety-four percent of that water is sold at low rates for industrial purposes using a dual reticulation system. The balance is added to a reservoir. The total content of recycled water in urban supplies is limited to a maximum of 1%. This is a token amount by any standard and difficult to view as a precedent for other communities planning to rely on sewage water as a significant water supply [3]. Small promotional bottles of 100% treated sewage water from Singapore have been made available in Australia for promotional taste testing usually with maximum media coverage. This promotion is a "Red Herring" because taste is irrelevant in the scientific debate.

Windhoek in Namibia and Orange County in California are also examples where sewage water is used in a planned way.

Windhoek has ongoing issues with water quality and with the operation of its plant. [4] It is not a credible precedent.

When Australians travel to overseas countries, authorities and travel companies appear to go to great lengths to warn them not to drink the water.

Orange County takes treated water and injects it into aquifers as a seawater barrier. The water then percolates over a number of years back towards bores used for urban supplies. [5] Even this conservative practice must be considered in the light of remarks made by eminent American cancer research scientist Professor Oppenheimer, referred to a little later.

Ron Wildemuth, Communications officer for Orange County Water district said,

> **"No one knew what it was at the time or cared. It was launched under much different circumstances than today" [6]**

Using examples of **Unplanned Potable Reuse' (UPR)** to **'Indirect Potable Reuse' (IPR)** is not valid. For example the possibility that some of Esk and Kilcoy effluent may find its way into Wivenhoe Dam supplying Brisbane is not argued. Those towns are not large or industrialised and their contribution of faecal matter to the water is undoubtedly small by comparison to cows and kangaroos in the Wivenhoe catchment. The real issue acknowledged by scientists is possible chemical content of effluent. In the case of the Wivenhoe Dam catchment, agricultural chemicals, herbicides and pesticides are far more likely to be of concern than faecal coli forms.

Urban water quality has always emphasised the removal of waterborne pathogens. Typhus, cholera and dysentery are obviously well under control in Australian urban water supplies. Cryptosporidium, Giardia, E-coli and other protozoa or bacteria are monitored and killed by water treatment processes and colony regrowth prevented by chlorination in the water mains. The use of sewage water is highly unlikely to cause infectious disease outbreaks because those issues have been addressed over the past one hundred years.

Modern chemicals and drugs are the real concern. Any effluent from small villages and rural communities in dam catchments is unlikely to contain the complexity of the chemical cocktail of big city sewage.

About 87,000 chemicals with potential long term effects and potential endocrine disrupting effect on future generations have been identified by the United States Environment Protection Agency and are potentially present in sewage water.[7] Tests for these chemicals are yet to be developed and the long term effect on humans of minute doses is not known.

Introduction

Why has this book been produced?

The possibility of Australian cities running out of water has focused everyone's attention on recycling. **There would be few, if any, Australians who would oppose recycling every drop of water from sewage treatment plants for industrial and agricultural purposes.** But passions run high when it comes to putting recycled sewage water into drinking supplies. There are those who say it is safe and that to suggest otherwise is to be unintelligent and motivated by fear. This book has been produced to challenge those assumptions.

Many who promote recycling sewage water for drinking cite global warming and the environment as the moral force behind their push. However, it is this publication's contention that they have failed to give any firm assurances as to the safety of the idea and its long term effects on humans.

Many who support and promote recycling of sewage water for drinking, including scientific people, appear not to mention drugs and more particularly chemicals that are and maybe in sewage water.

After reading this book you are invited to ask yourself, **why is this?**

Turning a blind eye must surely be a terribly dangerous action.

This book seeks to present an opposing view based on reputable scientific opinion.

Water Quality Rating of Sewage Water

The book, *'From Waste-d-Water to Pure Water—Water Quality Star Rating'*, was launched at the Australian Water Association presentation in Toowoomba. Some people feel it presents erroneous and misleading information to support an AWA 'Six Star Rating System'. **This was criticised in the Toowoomba debate because it was presented to the public as an official water rating system when in fact it was not recognised by any regulatory body. There are no guidelines worldwide for the process of reclaiming drinking water from sewage beyond Hazard Analysis Critical Control Point (HACCP)' controls.**

A major concern of opponents in Toowoomba was that no tests for chemicals was mandatory in sewage water beyond those known to be chemicals of concern. Furthermore, tests for all known chemicals did not exist and new man-made chemicals and drugs are continually emerging.

It is on this point regarding minute traces of chemicals that the book *'From Waste-d-Water to Pure Water—Water Quality Star Rating'* [2] is claimed to be inaccurate and misleading.

In the early part of the Toowoomba debate a 'Pure H_2O' campaign was mounted with the claim that reverse osmosis technology allowed only water molecules to pass through the treatment machinery. Some Toowoomba City Council literature was published supporting this erroneous notion. It was later changed to show 'small organic molecules' passing through barrier membranes. Opponents maintained that small amounts of anything contained in the source sewage water could pass through the system. Proponents retreated to the position that you would have to drink unrealistically huge amounts of the water for any significant accumulation of chemicals of concern to occur in the body.

The 'Six Star Rating System', and the assertion that renal units used water reclaimed from sewage for kidney dialysis are the extreme end of the proponents campaign for the acceptance of drinking sewage water.

That London is erroneously used as an example of planned potable reuse. Traces of chemicals can pass through modern sewage water treatment processes and the information in the following section adds weight to the idea that long term testing should be mandatory before anyone is required to drink recycled sewage water. Consumers should demand incontestable evidence of the long term safety of sourcing urban water supplies from sewage water.

CHEMICAL CONCERNS

Australian Professor John Aitken is recognised as an international expert on reproductive health, particularly in the male. He has worked for the World Health Organisation (WHO) and the Medical Research Council of the UK on male infertility. He has developed research programs with the Rockefeller Foundation. He is Head of the School of Biological and Chemical Science and Mathematics, University of Newcastle, Co-Ordinator of Mother's and Babies Research Centre, a unit of the Hunter Medical Research Institute.

> **His research suggests that phenolic oestrogenic by-products that are often in reused drinking water could damage the male sperm line with resultant cancers. He says testing should be done for the removal of these products from drinking water, especially from recycled water. [1]**

In Brisbane, Professor Peter Koopman, Professor of Developmental Biology at the University of Queensland said,

> ***"In the last 50 years rates of fertility measured as sperm counts have dropped by an alarming 50 per cent." [1]***

He blames ***"industrial chemicals, solvents, cleaning products, that sort of thing"*** (Source ABC Online, The World Today. 14 May 2004.)

In Australia, Dr. Long Duc Nghiem, lecturer in Environmental Engineering at the University of Wollongong who is an authority on the latest technology in cleaning wastewater does not recommend recycled water for drinking. Dr. Long Duc Nghiem recently completed his Ph.D on "Removal of trace contaminants using membrane technology" which included one year at Yale University. Dr Nghiem has said:

> ***"Driven by a desire for a better water quality and the need for augmentation of water supplies with wastewater reuse trace contaminant removal has become an important feature of nanofiltration and reverse osmosis membrane filtration processes. The list for further research is not exhaustive and a lot more research will be needed at both fundamental as well as practical levels. New contributions to this progress for the betterment of our water supply and the environment will be warmly welcomed.." [10]***

In Australia, Colin Creighton, CSIRO scientist, who is in favour of recycling, admits that as new pharmaceuticals are being developed, devising tests for them was a challenge in reuse. "

In Australia, Dr. Sophia Dimitriadis in a 2005 research brief, from Science, Technology and Resources Section of the Parliamentary Library for the Parliament of Australia, entitled **"Issues encountered in advancing Australia's water recycling schemes" said,**

> **"Australia takes the position of using the best source of water possible and using recycling to free up drinking water in preference to directly replenishing water supplies. Reasons for this approach include the unknown long-term outcomes from ingesting recycled water and the expense involved in programs that monitor the quality of treatment to avoid the possibility of adverse effects."**
>
> ***"A conclusion from a recent conference of the Australian Water Association exploring the topic, 'Contaminants of Concern' was that it would be prudent to wait before producing recycled water for direct drinking use."***

"At present, experts are rarely able to agree on risk levels. More research is required about the way in which contaminants operate." [12]

Draft National Guidelines for Water Recycling 2005 included the following,

"Drinking water reuse is not considered in these guidelines." - "Endocrine disrupting chemicals have been detected in recycled waters and in water bodies receiving recycled water discharges and have been shown to affect aquatic biota. At this stage, there is no evidence that environmental exposure to low levels of potential endocrine disrupting chemicals affects human health. However, more research is needed on potential human health impacts of endocrine disrupting chemicals, their distribution in reclaimed waters and their removal by treatment process." [13]

In Australia, a study of the Hawkesbury-Nepean River system by Batty, J and Lim, Richard found,

"The potential effects of exposure of fish to reproductive endocrine disruptors (REDs) are of major concern. This study reports of the effects of sewage effluent exposure on morphology of male mosquito-fish in a tributary of the Hawkesbury –Nepean River system in NSW." [14]

(Source: Archives of Environmental Contamination and Toxicology) it found that the anal fin, a secondary sexual characteristic in males, was reduced in size in mosquito fish downstream of a sewage treatment plant.

During the Toowoomba debate, the Prime Minister's Parliamentary Secretary for water, Malcolm Turnbull, said communities on the Hawkesbury such as Richmond were drinking high levels of recycled sewage in an unplanned manner. He used this example to try to justify that Toowoomba people should drink sewage water as well.

Australian Academy of Science news release 7 April 1998. "Is there something in our water?",

"there are significant levels of the female hormone, estrogen in some sewage outfalls. In inland Australia, this water is returned to water for irrigation, stock and drinking." "The health risk of these very low levels of hormone is still a matter of heated scientific debate." [15]

The book, "Our Stolen Future" by Sheldon Krimsky, Professor, Department of Urban and Environmental Policy & Planning, Tufts, University U.S.A., 1996.

"Laboratory experiments show that exposures have impacts at levels far lower than had been considered possible in traditional toxicology." [16]

Proponents of recycling sewage water for drinking constantly use London and Europe as examples of unplanned use of sewage water for drinking as if it justified deliberate use of sewage water. For example there are a large number of sewage treatment plant outfalls into the catchment of the Thames River from which London sources its water. **The following six studies suggest some serious concerns and doubts from respected scientific people, agencies and research Councils.**

In London in 1994, Dr. Jean Ginsberg from Royal Free Hospital School of Medicine in London headed a scientific research project that linked decreasing sperm counts to men living in the Thames water supply area. The research investigated,

"the disturbing trend in the past 50 years of decreasing sperm count and seminal volume and the concomitant increase in cryptorchidism (undescended testes) and testicular cancer which have been attributed to oestrogenic environmental pollution." [17]

A letter to the editor by Dr Jean Ginsberg et al "The Lancet". p230 Vol 343 Jan 22 1994 "Residents in the London area and sperm density"

THINK BEFORE YOU AGREE TO DRINK

UK 1998, Environmental agency and scientists from Brunel University found that a large proportion of male fish in some British rivers were changing sex through exposure to pollutants. Chemicals from sewage treatment plants and factories were causing male fish to produce eggs. (Source BBC news. Jan 22, 1998 "Pollution causing sex change.")

In 2004, in the UK, research into UK rivers showed that,

> ***"riverine sediments are a major sink and a potential source of persistent estrogenic contaminants."*** [18]

(Authors, Peck, Mika; Gibson, Richard W; Kortenkamp, Andreas; Hill, Elizabeth M. Source: Environmental Toxicology and Chemistry.)

In 2004, in the UK, The Environmental Agency reported that a third of male fish in English rivers were changing sex due to 'gender bending' pollution and called for urgent action to ensure that sewage and waste water are disposed of safely. One in 6 British couples now have trouble conceiving- an increase of 55% in the past 5 years. [19]

In a study of European rivers in 2000, the **UK Natural Environment Research Council's Centre for Ecology and Hydrology** found that freshwater fish in 5 out of 7 northern European countries surveyed showed signs of exposure to endocrine disrupting chemicals, which mimic female hormones and are present in sewage effluents. The effects on the fish ranged from relatively minor changes, to fish developing both male and female reproductive organs. [20] Source – News in Science – Feminised fish throughout Europe 8.9.00.

In Scotland, November 2004, scientists at the government's **Macaulay Land Use Research Institute in Aberdeen** discovered that male lambs exposed to low level environmental contamination start behaving like females, (5 year study feeding sewage sludge pellets which contained low levels of thousands of contaminants).

> ***"These results combined with many other studies, suggest that exposure to low levels of a mixture of pollutants could result in subtle alterations to human and animal behaviour, immune and reproductive function." ... "Even extremely low levels of contamination by a range of chemicals, which individually should give no cause for concern, adds up to a real effect in these sheep"*** [21]

U.S., Dr. Dan Okun- retired University of North Carolina environmental engineer, says recycling for water consumption is an unnecessary risk. [22] He has served as a consultant on reuse projects throughout California since the 1970's. He opposes reuse for human consumption. (Source: 'Use of recycled water for drinking questioned' June 2000 U.S. Water News Online.)

U.S. National Research Council report said,

> ***"conventional toxicology tests developed by the food and drug industries are not appropriate for evaluating the risks from complex chemical mixtures than can be found in reclaimed water."*** [23]

It suggests using new alternatives such as growing fish in reclaimed water to study long-term effects. Source: Issues in Potable Reuse: The Viability of Augmenting Drinking Water Supplies with Reclaimed Water Committee to Evaluate the Viability of Augmenting Potable Water Supplies with Reclaimed Water, National Research Council ISBN: 0309064163.

THINK BEFORE YOU AGREE TO DRINK

Salk Institute Researcher in the U.S. fears pollutants could survive water treatment in sewage treated for drinking water.

> ***Biochemist and Alzheimer's researcher at The Salk Institute, Dave Schubert, said a plan to add purified wastewater to tap water could fail to detect dozens of compounds toxic medical waste, such as neurotoxins and radioactive isotopes. He warned the long term health effects could be quite significant regarding a plan for purified wastewater to be mixed with Colorado River water in the San Vicente Reservoir.[24] Source. AAP 10/10.98.***

The Hon Greg Hunt MP, Parliamentary secretary to the Minister for the Environment and Heritage, on 12.10.05 said in a letter to the editor in the *Brisbane Courier Mail* 1.8.05,

> ***" I nor the Federal Government wants Australians to drink treated sewage effluent. Our objective is to recycle this water for use in industry and agriculture." [25]***

Again in a letter to Rosemary Morley of Toowoomba,

> ***"As water is a limited resource, the Australian Government support the recycling of this valuable commodity. Our priority however is for recycled water to be used in industry and agriculture." [26]***

John Poon – Bachelor of Engineering (Hons) Monash University, Manager of Strategy and Planning in Water Recycling, Melbourne Water worked in Singapore for CH2M Hill, a US based global full-service engineering, consulting, construction and operations firm on the NEWater scheme and is cautious about recycling for potable use because of contaminants.

The following is from "The Source" –a magazine by Melbourne Water March 2006 Issue 37.

> *In Singapore, John Poon oversaw a 3 year study of human health risks and chemical and microbial risks.*
>
> ***He said no single technology is foolproof, and potable reuse is not a silver bullet. It should be considered alongside other water conservation measures and alternative measures.***
>
> ***"When we begin to think about using recycled water for drinking, questions are raised about the longer-term health impacts from unknown contaminants at such extremely low concentrations that we are unaware of them" [27]***

He said Singapore had gone to great lengths to try to address these problems.

> ***"New compounds are being invented and discovered every day and understanding the health implications of thousands of chemicals and emerging pathogens is an enormous and ongoing scientific challenge" [27]***

A U.S. cancer expert, Professor Steven B. Oppenheimer Ph.D., has warned that drinking recycled water was like playing Russian roulette as there was no way to test if it was safe.

Professor Steven B. Oppenheimer, Director of the Centre for Cancer and Developmental Biology at California State Northbridge University at Los Angeles said,

> ***"It may be fine for years until an unknown agent makes it through the process and kills people. Anytime one deals with medical and industrial wastes in such large quantities, it is likely that such a scenario will eventually materialize."***

Professor Oppenheimer has a long list of awards for his cancer research, had numerous papers published on cancer and was instrumental in stopping a project for the city of Los Angeles to top up an aquifer with recycled wastewater.

Professor Oppenheimer said,

> ***"The fact that some communities in the U.S and elsewhere have been drinking reclaimed water does not make it safe. It often takes decades to detect the damage done by such projects that tinker with public health and welfare."***

He said it had taken decades to prove that smoking caused lung cancer and smoking was now regarded as the number one cause of cancer. He said this situation with recycled water was much worse in that many people did not have a choice.

Professor Oppenheimer said while there was probably no solid documented evidence to prove that ingesting recycled water harmed health, one of the most respected research groups in the world, the U.S. National Research Council, which is a branch of the National Academy of Science, had warned against it in its study. Professor Oppenheimer said this was the most definitive report of this subject ever done.

He said,

> ***"The study found that it was highly likely that some compounds would get through, highly likely that those compounds would be toxic and highly likely that nobody would know about it because there were no tests available."***

The National Research Council also warned that just because indirect potable water reuse had been around for decades and studies had been done,

> ***"Negative results from such studies do not prove the safety of the water in question."***

As there are currently no guidelines for drinking recycled water, federal guidelines are currently being fast tracked. Professor Oppenheimer said,

> ***"The world's scientific community does not and will not know all the toxic agents and carcinogens that may be able to make it through the indirect reclaimed water process to drinking water. Also, there is simply no technology to detect them."***

and

In 1996, a Rand Corporation study found that there was an almost 100% (average of 73%) increase in rates of liver cancer in areas using reclaimed water. The authors, however, down play the finding by stating there is no evidence to associate liver cancer with reclaimed water; therefore the liver cancer is most likely explained by other factors. In my opinion, and in the opinion of others who read this statement, it is flawed reasoning. [2]

Dr. Steven Oppenheimer, Augmenting Drinking Water with Reclaimed Water, http://www.beachwoodvoice.com/WaterIssue/augmentingdrinking.htm

Because regulations for safe drinking water were not developed with reclaimed water in mind, they may not be the best standard for testing its quality, the committee said. Reclaimed water may contain sources of contamination that cannot be determined through current testing or treatment processes.

After reviewing the few studies that have examined the health implications of drinking reclaimed water, the committee said that different approaches are needed to test the safety of reclaimed water. Conventional toxicology tests developed by the food and drug industries are not appropriate for evaluating the risks from complex chemical mixtures that can be found in reclaimed water. Alternative studies, such as tests using fish in source water, should be undertaken to provide a broader range of data about possible harmful

effects to living organisms. Research also is needed on the level of viruses and parasites in all waters and the effectiveness of both conventional and advanced water treatment processes in removing these pathogens. The federal government should undertake population studies that compare the disease rates over time among individuals exposed to reclaimed water to the disease rates among individuals who use a different water source. [29]

Ref: http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=6022

The Prague Declaration on Endocrine Disruption (http://www.edenresearch.info/declaration.html) arose from a European conference of scientists in 2005 and has been reaffirmed in May 2006.

It is a key document for scientists concerned about **Endocrine Disruption Compounds** in the human environment.

It is not soley concerned with water supplies although considerable input has been made by scientists concerned with the reuse of sewage water. **194 scientists, however, have signed off on this paragraph: (see appendix A.)**

"Considerable progress has been made in identifying new endocrine active chemicals. These include chemicals used as UV filters and antioxidants in cosmetics and chemicals used as preservatives in food. It is clear that European citizens are simultaneously exposed to large numbers of endocrine disruptors. **However, we do not know the full range that we are exposed to through our diets, drinking water, air and consumer products. This lack of knowledge severely hampers efforts to explore a link between exposure and resultant effects in humans."**

This begs the question if there is such a lack of knowledge about endocrine disruptors, why would any community go to the most concentrated source of Endocrine Disrupting Compounds (eg, the sewage treatment works) to source part of that communities drinking water?

22 ISSUES AND QUESTIONS

1. We should remind ourselves about what goes into a sewer. Domestic, commercial and industrial toxic chemicals together with both prescription and illicit drugs from human waste or from dumping unwanted or out of date drugs down toilets, tubs and kitchen sinks. This joins liquid waste from morgues, hospitals and any other place connected to a sewer as well as paints, solvents and acids. Sewers are used to dispose of all manner of substances which arrive at the city's sewage treatment plant as one massive, horrendous toxic cocktail.

2. The Federal Government is presently financing an advertising campaign to convince people not to smoke cigarettes, part of which is a statement that cigarettes contain a large number of chemicals. It is strange, at a time when the Queensland Government is advocating the recycling of sewage water for drinking in South East Queensland, that the community in general is not receiving the same amount of concern as is being afforded to smokers, by alerting them to the 100,000 chemicals and drugs potentially present in sewage and that tests do not exist to detect if most of them have or have not been removed during the recycling process. Why is this? Surely there is no fundamental difference between the two? After all the U.S. Environment Protection Agency has identified 87,000 chemicals that are potentially in sewage water[7]. [p.4]

3. If recycled sewage water is added to the water supply what will be the consequences of such an action to the food processing and manufacturing industries that use water for and in the manufacture of their products? Many, if not all, strive to export a significant amount of the product. Businesses such as poultry, meat and smallgoods manufacturers, fruit and vegetable canneries, ice cream, soft confectionary and soft drinks, the list would be almost endless and the consequences could be of inconceivable magnitude.

4. Associate Professor Greg Leslie from the University of N.S.W., was the only scientific person who publicly supported Toowoomba City Council's Water Futures Brochure which was their single most important document in their failed campaign to convince the community to support recycling of sewage to drinking water, was quoted in this brochure as saying, "Waste water [sewage water] that is purified through ultrafiltration, reverse osmosis and ultraviolet disinfection is very safe to drink".
He now supports the Queensland Government's proposal to recycle sewage water for drinking in South East Queensland.

5. How does he know it's "very safe to drink"? Why does he say this? Does he have access to tests eminent and famous scientists and The U.S. National Research Council, [a branch of the U.S. National Academy of Science] say do not exist? Is there a non scientific reason he says this?

6. There will always be educated supporters of radical proposals such as drinking recycled sewage water. We should be mindful that when cigarette manufacturers disagreed with the early suspicions and fear that smoking could harm your health, they produced expert opinion that it did not. The world knows differently now.

7. Many high profile environmentalists, journalists, television presenters and politicians appear to be the main people that promote the *'absolutely safe'* theory when it is simply not proven. Why do they do this? How do they know?

8. How can any 'genuine' person, scientist, medical practitioner, politician, celebrity or just an ordinary citizen claim drinking recycled sewage water is safe when the technology is not available for proper testing? See page 20.

9. As we drink only around 1% of our reticulated water why is the State Government. so 'hell bent' on having the community drink recycled sewage water? Why not for other purposes other than drinking, with exemptions for relevant food manufacturing and processing industries? Any response is predictable; 'too expensive, no time to put in dual reticulation pipe lines'. 'Armageddon is upon us'. The usual 'snow job'. Why 'penny pinch' when the job can be done properly in the first place and please all sections of the community?

10. Isn't it time the State Government stopped being selective in listening to advice, eliminate the risk of unknown long term health consequences, by not forcing people to consume recycled sewage water in various ways and spend money on Queensland infrastructure for the benefit of all Queenslanders for a change. In any event, the time that giant recycling plants take to construct, plus the time taken for testing, regardless of health and scientific authorities' inability to test for all the chemicals and drugs known to be in big city sewage, will be many, many years, probably up to a decade. It will not solve the present water crisis.

11. Are the risks of using recycled sewage water for drinking really worth the possible consequences that may not be known for decades?

12. If scientific warnings on drinking recycled sewage water prove to be true over decades, would the Government of the day accept responsibility? Would it claim the community is responsible, because it was their decision when they voted yes in 2007? Would it be a politically sensitive issue to be covered up and denied, leaving the responsibility of proof on the victims?

13. If we feel inclined to drink samples of recycled sewage water at a promotional tasting we should remember that even though it looks clear and doesn't taste unpleasant it certainly does not mean it is pure or free from drug or chemical contamination.

14. Federal Parliamentary Secretary for Water, Malcolm Turnbull, while in Toowoomba prior to the Toowoomba water poll was reported to affirm the need to trust science on health risks of drinking recycled sewage (*Toowoomba Chronicle* April, 2006). Mr Turnbull appears to be an avid supporter of recycled sewage water for drinking. After reading the scientific comments in this book, a reader may be excused for asking what scientists are briefing Mr Turnbull to cause him to make the statements he does on drinking recycled sewage water.

15. Why can't the relevant politicians focus on recycling for uses other than drinking? Is the real agenda to sell off Queensland's water utilities to private enterprise? It would certainly remove any responsibility from authorities and return enormous cash windfalls to government. With recycled sewage water added to existing pipelines, the government saves on constructing expensive dual pipeline infrastructure one for recycled sewage water and one for normal water. After the construction of giant sewage recycling plants, has the Government set up Queensland's major water utilities at the cheapest cost, to sell to the highest multinational bidder? Private water corporations would have a licence to print money. Imagine being able to sell the same water, over and over again? Would communities be given guarantees on health concerns, water quality, safety and cost to consumers? If it was, who would do this? Could they be believed?

16. Are politicians considering the full range of scientific opinion on drinking recycled sewage water? Some statements like: "It is safe to drink", indicate they are not.

17. Is cheaper better? Or are pipelines from areas in the north of the country - where massive surpluses go out to sea each year - and new dams not politically advantageous to pursue? It would appear so.

18. Could it be that advice is being accepted that suits a politically expedient agenda while scientific warnings to the contrary are being ignored for political expediency?

19. How can the word 'purified' be used to describe recycled water when tests for all the chemicals and drugs known to be in sewage are not available? The same applies to those chemicals and drugs that can potentially be in sewage.

21. Beware the question we are asked to vote on. All things are not always what they seem to be.

22. Shouldn't we think very carefully before we agree to drink?

"The World's Scientific Community does not and will not know all the toxic agents and carcinogens that may be able to make it through the indirect reclaimed water process to drinking water. Also, there is simply no technology to detect them."

Professor Steven Oppenheimer,

Director of the Centre of Cancer and Development Biology

California State Northbridge University

REFERENCES

[1] HACCP 2006. Retrieved October 6, 2006, from http://www.haccp.com.au/

[2] Simpson, Jenifer 'From Waste-d-Water to Pure Water–Water Quality Star Rating'

[3] Singapore NEWater http://www.pub.gov.sg/NEWater_files/faq/index.html Last accessed November 30, 2006.

[4] Windhoek problems Vonhoff, R 2006, 'H2O upset–Namibian city plant flawed', Toowoomba's Mail, 11 May, p.1

[5] Orange County Groundwater Replenishment Sytem http://www.gwrsystem.com/about/overview.html Last accessed November 30, 2006.

[6] Email from the Toowoomba City Council Director of Engineering Services

[7] United States Environmental Protection Agency 2006. Retrieved October6, 2006, from http://www.epa.gov/scipoly/oscpendo/pubs/edspoverview/primer.htm

[8] Reynolds, M 2006, "Gender bender water warnings', Australian Financial Review, 2 May, p.61

[9] Men inherit sperm damage: reports',2004, ABC Online, The World Today, 14 May. Retrieved October 6, 2006, from http://www.abc.net.au/worldtoday/content/2004/s1108469.htm

[10] Nghiem,L.D., Schafer, A.I. 2004, 'Trace contaminant removal with nanofiltration' in A.I. Schafer, A. Fane, and D Waite, (eds) Nanofiltration – Principals and Applications, Elsevier Science, Sydney, pp. 479-520.

[11] Reynolds, M 2006, 'Recycling receives a Spray', The Australian, 24 Feb Retrieved October 6, 2006 from http://waterfutures.blogspot.com/2006/02/australasian-friday-feb-24-2006.html

[12] Dimitridiadis, Dr S 2005, 'Issues encountered in advancing Australia"s water recycling schemes', Parliament of Australia–Parliamentary Library. Retrieved October 2, 2006, from http://www.aph.gov.au/LIBRARY/Pubs/rb/2005-06/06rb02.htm

[13] Draft National Guidelines for Water Recycling 2005, Environment Protection and Heritage Council. Retrieved October 6, 2006 from http://www.ephc.gov.au/ephc/water_recycling.html

[14] Batty, J. Lim, R. Morphological and Reproductive Characteristics of Male Mosquitofish (Gambusia affinis holbrooki) Inhabiting Sewage-Contaminated Waters in New South Wales, Australia Journal Archives of Environmental Contamination and Toxicology Publisher Springer New York ISSN 0090-4341 (Print) 1432-0703 (Online) Issue Volume 36, Number 3 / April, 1999 Pages 301-307

[15] Australian Academy of Science 1998, 'Is there something in our water?. Retrieved October 6, 2006, from http://www.science.org.au/media/endopr.htm

[16] Krimsky authored Hormonal Chaos "Our Stolen Future" by Sheldon Krimsky 1996

[17] A letter to the editor by Dr Jean Ginsberg et al "The Lancet". p230 Vol 343 Jan 22 1994 "Residents in the London area and sperm density"

[18] Mika Peck, Richard W. Gibson, Andreas Kortenkamp and Elizabeth M. Hill. 2004. 'Sediments are major sinks of steroidal estrogens in two United Kingdom rivers', Environmental Toxicology and Chemistry, Vol.23, No. 4, pp. 945-952

[19] UK Environment Agency

[20] Feminised fish throughout Europe' 2000, News in Science, 8 September. Retrieved October 9 from http://www.abc.net.au/science/news/stories/s173226.htm

[21] Edwards, Rob Environment Editor 'Alert as gender bending sewage alters lambs' sex' Sunday Herald 21 November 2004 Retrieved October 17 2006 http://www.sundayherald.com/46214

[22] U.S. Water News Online 'Use of recycled water for drinking questioned' June 2000 Retrieved October 10 http://www.uswaternews.com/archives/arcconserv/tuseof6.html

[23] Issues in Potable Reuse: The Viability of Augmenting Drinking Water Supplies with Reclaimed Water Committee to Evaluate the Viability of Augmenting Potable Water Supplies with Reclaimed Water, National Research Council ISBN: 0309064163

[24] San Diego Union Tribune. October 18, 1998. Toilet-To-Tap Plan Worries Salk Researcher

[25] 12.10.05 said in a letter to the editor in the Courier Mail 1.8.05

[26] In a letter to Rosemary Morley of Toowoomba

[27] Young, Leith 2006, 'Drastic Action' , The Source – a magazine by Melbourne Water, Issue 37, March 2006, p.4. Retrieved October 10 from http://library.melbournewater.com.au/content/publications/the_source/the_source_issue_37.pdf

[28] Dr. Steven Oppenheimer, Augmenting Drinking Water with Reclaimed Water, http://www.beachwoodvoice.com/WaterIssue/augmentingdrinking.htm

[29] Ref:/www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=6022

THINK BEFORE YOU AGREE TO DRINK

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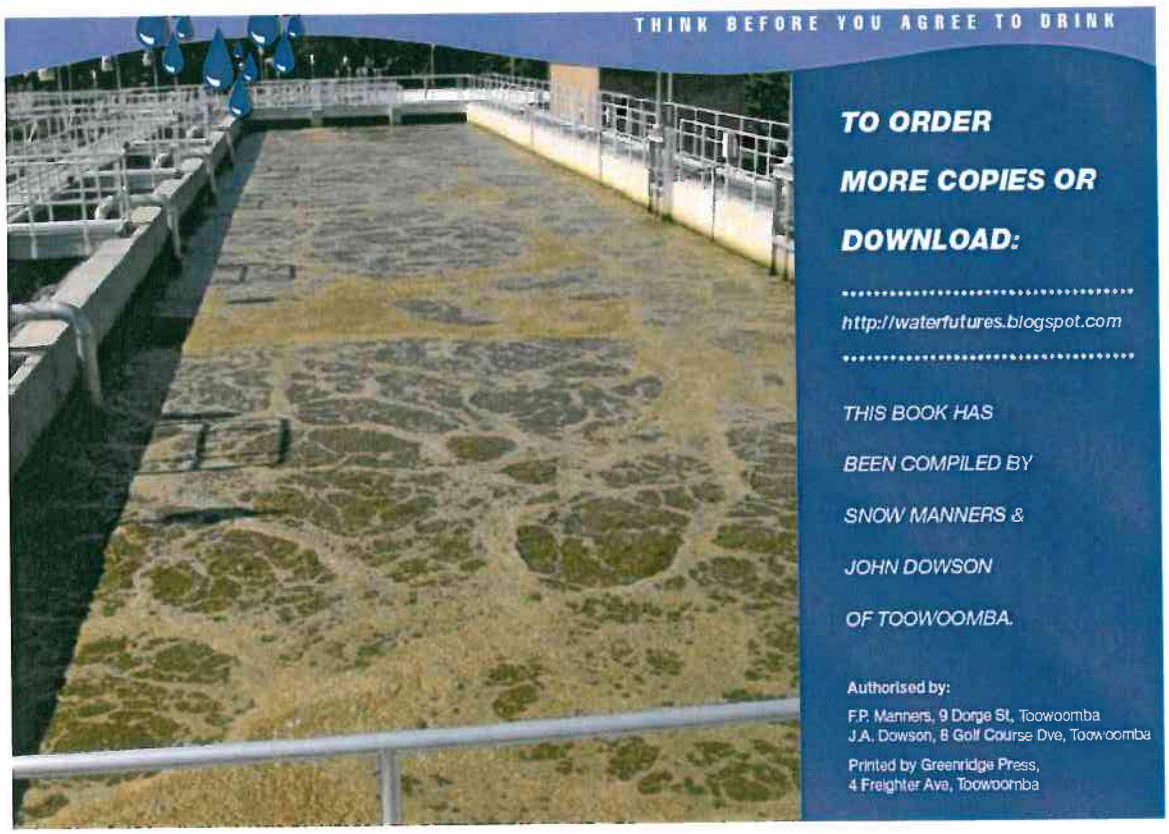
The scientific statements, studies, findings and opinions in this publication are freely available to anyone who wishes to research.

It must be assumed an elected body like the Toowoomba City Council would conduct the most comprehensive, extensive and intensive investigation possible before proposing such a radical scheme to deliver a domestic water supply, part of which was to be recycled sewage water.

With the resources available to them, it beggers belief that the Toowoomba mayor, councillors and senior officers involved did not know about the scientific statements, findings and opinions mentioned in this book, or did not want to tell the community.

The community was told the water from this process would be safe to drink. How could this honestly be stated? Will other authorities do the same to other communities or perhaps the whole of South East Queensland?

It is therefore vital for all people to "Think before you agree to drink".



8.2 – Queensland Water Commission brochure

Purified Recycled Water
A vital part of our future



What is Purified Recycled Water?

Purified recycled water is wastewater that has been treated to the highest standard. The system planned for South East Queensland (SEQ) involves a 7-barrier treatment process.

To eliminate impurities, the water is passed through a range of biological reactors, separators and filters – including microfiltration and reverse osmosis membranes. It also undergoes advanced oxidation to further disinfect and remove chemical and biological traces. The final product is cleaner than the water that's currently in our dams.

We are building on world's best practices, drawing on the combined experience from communities all over the world who use purified recycled water – some of whom have been recycling safely and successfully for decades.

Why do we need it?

THE CONTINUING DROUGHT: SEQ's water supply is almost totally dependent on dams, which are susceptible to long droughts like this one. With an already highly variable climate and increasing uncertainty from global climate change, we can no longer rely solely on rainfall for our water supply.

INCREASED DEMAND FOR WATER: Our region continues to experience the fastest growth rate in Australia. Our population has already swelled to 2.8 million and is set to almost double over the next 50 years. Even if we all significantly reduce our consumption, our current supplies cannot meet this increased demand.

Is it safe?

Long-term health studies confirm the safety record of purified recycled water.

There are rigorous quality testing procedures at every stage of the process and a new regulatory regime will ensure it meets strict health and safety requirements. These procedures will be monitored by an independent panel of scientific experts.

Who else drinks it?

Purified recycled water has been used to safely replenish drinking water supplies in North America and Africa for decades and more recently in Europe and Asia.

LOS ANGELES, USA

Orange County, which feeds Los Angeles water supplies, has been replenishing its groundwater with purified recycled water since 1976. By mid 2007, it will make up 25% of its groundwater supplies. SEQ will use the same purification technology.

WASHINGTON DC, USA

Upper Occoquan, Virginia supplies water for 1 million people around Washington DC. It has been replenishing its reservoirs with purified recycled water for 25 years. The quality of their recycled water exceeds that from other inflows and, at times, contributes up to 90% of all water entering their reservoirs.

SINGAPORE

Since 2003, Singapore has been producing 135 million litres of purified recycled water a day. Most goes to high-tech industries and the rest makes up 1% of their drinking water.

BELGIUM

Veurne-Ambacht, a tourist region on the coast of Belgium, replenishes its groundwater with purified recycled water making up about 45% of its overall water supplies.

Queensland water Commission

Securing our water, together.

Where does it fit in our long-term strategy?

Purified recycled water is a vital part of our long-term water supply. We'll be using it to replenish our drinking supplies and for industries and power stations which currently use our dam water.

Purified recycled water will complement a range of major state and local government infrastructure projects currently underway.

These include:

- Building a regional water grid linking all the major water supplies within SEQ
- Constructing a desalination plant at the Gold Coast to convert seawater into drinking water
- Drilling for additional groundwater supplies
- Repairing pipes and managing pressure to reduce leakage across our vast underground water networks
- Creating new dams and recommissioning old dams.

On top of this, we'll continue to find savings through a range of water conservation strategies such as:

- Ongoing water efficiency measures required from businesses, industry and government
- Government rebates for installing water efficient devices such as low-flow showerheads, taps and toilets, front-loading washing machines and rainwater tanks
- The Business Water Efficiency Program which provides incentives for industry to improve overall water efficiency.

Purified recycled water is not our only strategy, but a vital part of the solution. It's one of many practical responses to our ongoing drought and the long-term effects of climate change.

How is Purified Recycled Water made?

The purification system proposed for South East Queensland involves a 7-barrier treatment process. It will take advantage of proven technology and equipment and will incorporate world's best practice technology and testing protocols.

URBAN USE

DRINKING WATER

WASTE WATER

BARRIER 1:
Source Control

The first step involves preventing harmful chemicals from entering the wastewater system. Strict regulations prohibit the discharge of certain non-domestic wastes into the wastewater system. These include business, industry, hospital, pharmaceutical, clinical, biological and chemical wastes.

BARRIER 2:
Wastewater Treatment Plant

This step involves a biological reactor that destroys and removes most solids, organic matter, nutrients, regulated chemicals and some micro-organisms from the wastewater. At this stage the water is purified to a level where after disinfection it can be used for outdoor irrigation, such as on golf courses.

Bundamba Wastewater Treatment Plant.

BARRIER 3:
Microfiltration

Microfiltration is a low-pressure membrane filtration process that takes small suspended particles, bacteria and other materials out of the water. This process provides the most efficient preparation of water for reverse osmosis. Microfiltration technology is already used to make everyday products like food, beer, fruit juice, bottled water and soft drinks, as well as to sterilise medicines.

Microfiltration pressure vessels at an advanced water treatment plant.

BARRIER 4:
Reverse Osmosis

Reverse osmosis is a high-pressure membrane filtration process that forces water through the molecular structure of several sheets of thin plastic membranes to filter out minerals and impurities, including salts, viruses, pesticides and other materials. The membranes are like microscopic strainers – bacteria, viruses, inorganics and most organic molecules cannot pass through them. The same technology is used for desalination, bottled water and home water filtration units.

Reverse osmosis pressure vessels at an advanced water treatment plant.

BARRIER 5:
Disinfection and Advanced Oxidation

During disinfection, water is exposed to ultra violet light, just like the process for disinfecting instruments in medical and dental surgeries. Additionally, light combined with hydrogen peroxide creates an advanced oxidation reaction that eliminates any remaining organic compounds. After this barrier, the water is ultra-pure.

Advanced oxidation unit to be used in the Western Corridor Recycled Water Project.

BARRIER 6:
Natural Environment

This thoroughly cleansed water is then blended into a natural water supply such as a dam where it mixes with the water, and is exposed to natural sunlight and other natural processes.

BARRIER 7:
Water Treatment Plant

This is where all our drinking water is currently treated after it leaves the dam. SEQ's process involves a combination of flocculation, sedimentation, filtration and disinfection with ozonation, chlorine or chloramine. The drinking water may also be treated to improve colour, taste and smell, just as we do now.

Frequently asked questions & answers

How do you ensure it is safe?

Long-term health studies confirm purified recycled water's safety record. At all stages of the 7-barrier treatment process, the water is subject to rigorous quality monitoring and testing. In SEQ it will be subject to a new regulatory regime to ensure it meets strict health and safety requirements.

What are the benefits of using purified recycled water?

Purified recycled water is actually cleaner than the water entering our dams via streams. It will provide a climate independent new water source to overcome drought and meet increased demand. Purified recycled water will reuse a resource we would otherwise lose. It will also improve the water quality in Moreton Bay by significantly reducing nutrient discharges from our wastewater treatment plants.

What percentage of our water supply will be purified recycled water?

The percentage will depend on dam levels. It will be higher in dry times and lower when rain is plentiful. The percentage of purified recycled water will have no effect on the quality of water – whether it is mixed at a rate of 1% or 50%, the water will meet the highest quality standards.

What will purified recycled water taste like?

The water will not taste or smell any different from our current drinking water. It will mix with dam water, travel further downstream and be collected and treated again by our existing drinking water treatment plants before being supplied to the consumer.

What system will be used to deliver purified recycled water?

The Western Corridor Recycled Water Project involves the recycling and advanced treatment of wastewater from existing wastewater treatment plants in Brisbane and Ipswich. An underground pipeline will take purified recycled water from the advanced water treatment plants and deliver it to power stations, industries and dams which supply our drinking water.

How much additional water will purified recycled water create?

Purified recycled water will provide us with a significant alternative water supply. The Western Corridor Recycled Water Project will provide about 115 million litres per day to Wivenhoe Dam by the end of 2008. It will also provide purified recycled water direct to industries and power stations. The amount will vary over time depending on rainfall, dam levels and water usage.

What guarantees will be in place to protect against human error or barrier failure?

The 7-barrier treatment process ensures that if an error occurs, it's solved at the next barrier. Real time monitoring also means water is diverted out of the treatment system if it doesn't meet strict quality guidelines. This testing at every barrier will be required by regulation. The testing procedures will also be monitored by an independent panel of scientific experts.

Are there any long-term effects?

Purified recycled water has been used to safely replenish drinking water supplies in North America and Africa for decades and more recently in Europe and Asia. Long-term studies have shown no adverse affects.

For a comprehensive list of FAQs, please visit our website at www.qwc.qld.gov.au

Our expert advisory panel

We've set up an expert advisory panel to provide independent advice on technical issues associated with purified recycled water. The panel comprises world leaders in ecotoxicology, environmental science, microbiology, health and advanced water treatment.

The panel members are:

Chair-Professor Paul Greenfield AO: Deputy Vice Chancellor, University of Queensland. Biochemical engineer.

Dr Zelle Hodge: President, Australian Medical Association of Queensland.

Professor Ian Frazer: Director, Diamantina Institute for Cancer Immunology and Metabolic Medicine, University of Queensland. 2006 Australian of the Year.

Professor Mike McLaughlin: Environmental chemist, CSIRO.

Professor Brian Priestly: Ecotoxicologist. Australian Centre for Human Health Risk Assessment, Monash University.

Professor Richard Bull: Toxicologist, Washington State University.

Professor David Hamilton: Environmental scientist, University of Waikato.

Mr Harry Seah: Advanced water treatment expert. Singapore Public Utility Board.

Professor Joan Rose: Microbiologist, Michigan State University.

Queensland water Commission

Securing our water, together.

Find the answers to all your questions
visit www.qwc.qld.gov.au or call 1300 789 906

9.0 References

1 The Federal Government approved the Cooroy Bypass and Highway re-alignment in early 2007 and will finance it under Auslink National Highway Funding.

2 Ministerial Media Statement Tues Oct 31 2006 by the Hon. Anna Bligh, www.cabinet.qld.gov.au

3 GHD Desktop review June 2006 South East Queensland Regional Water Supply Strategy. Refer page 638.

4 SEQ Regional Plan 2005-2006 issued by the Office of Urban Management, Dept of Local Government, Planning, Sport and Recreation, Queensland Government. pages 92 to 97 Infrastructure; PAGES 98 TO 106 Water Management.

5 Mary Basin Water Resource Plan (Sept 2006) Consultation Report by Dept of Natural Resources and Water. Page 29 of 52.

6 "Think before you agree to Drink". See Appendix 1 in Section 9.0; by Snow Manners, spokesman in Toowoomba for the recent Toowoomba referendum to Vote Yes or No to drinking of IPR, recycled sewerage water.

7 The Hon. Anna Bligh in Ministerial Media Statement 31/10/2006. See Note 1 above.

8 Graph taken from "Water for South East Queensland – a long term solution: page 42

9 Graph taken from "Water for South East Queensland – a long term solution" page 41

10 Map 5 taken from "Water for South East Queensland – a long term solution" page 50

11 ACIL Tasman Feb 2007 – Scoping Economic Futures Traveston Crossing Region – Future economic and business development scenarios. A report for the Queensland Government, Dept of State Development and Trade.

12 Queensland Water Infrastructure Pty Ltd

Photographs attached

Aerial Photographs of Gympie during 1999 flood

A

Gympie – Looking North West
with Railway shown in centre
1999

Aerial Photographs of Gympie during 1999 flood

GYMPIE – Looking North
Mary River downstream
Bruce Highway on right.
Truck stop at centre.
1999

Refer page 12 of Report

Aerial Photographs of Gympie during 1999 flood

C

GYMPIE – Flooding.
Looking South
Upstream from Gympie on the Mary River.
1999

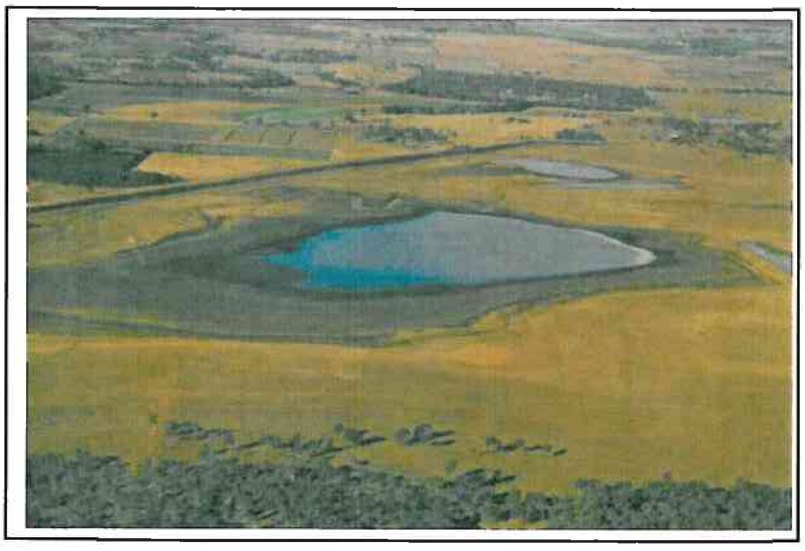
Aerial Photographs of Gympie during 1999 flood

D

GYMPIE – Flood showing the extent of the flooding
Looking South
Showgrounds on Right
1999

Amamoor Creek
proposed dam site

Euan Maddock Dam,
Sunshine Coast –
Good capacity
11/06



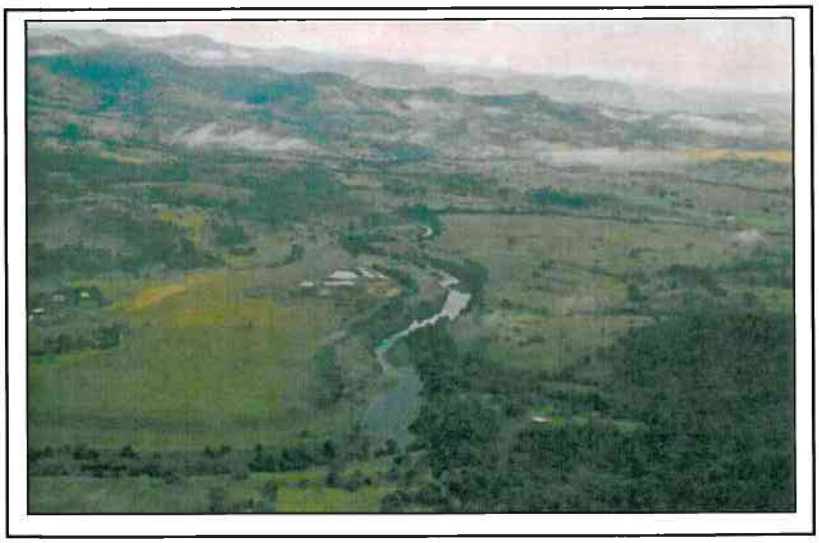
Atkinson Dam,
West of Ipswich
Very low capacity
11/06

Cooloolabin Dam –
Good capacity 11/06

Traveston Farmland

Traveston Dam wall
site looking west

Traveston Dam Dairy Industry to be inundated



Traveston Dam showing the Proposed Dam Wall site looking upstream of the Mary River

Moy Pocket Dam Wall Site hinterland of the Mary River

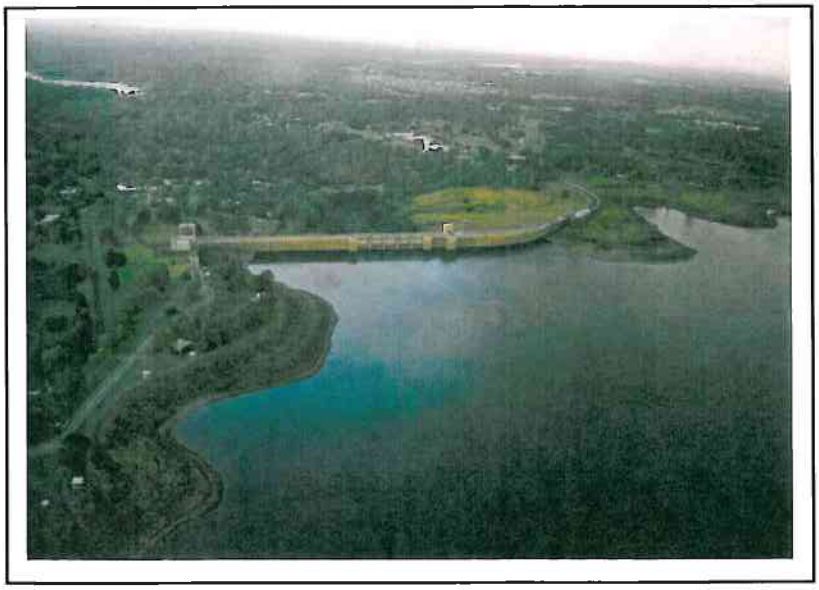
Wurtulla Sewerage Treatment Plant - Toowoomba

Cressbrook Dam – Part of Toowomba's water supply
Very low capacity
11/06

Somerset Dam
Very low capacity
11/06

Refer page 3 in Report

Lake Manchester,
West of Brisbane
Brought back into use
recently
11/06



North Pine Dam
11/06

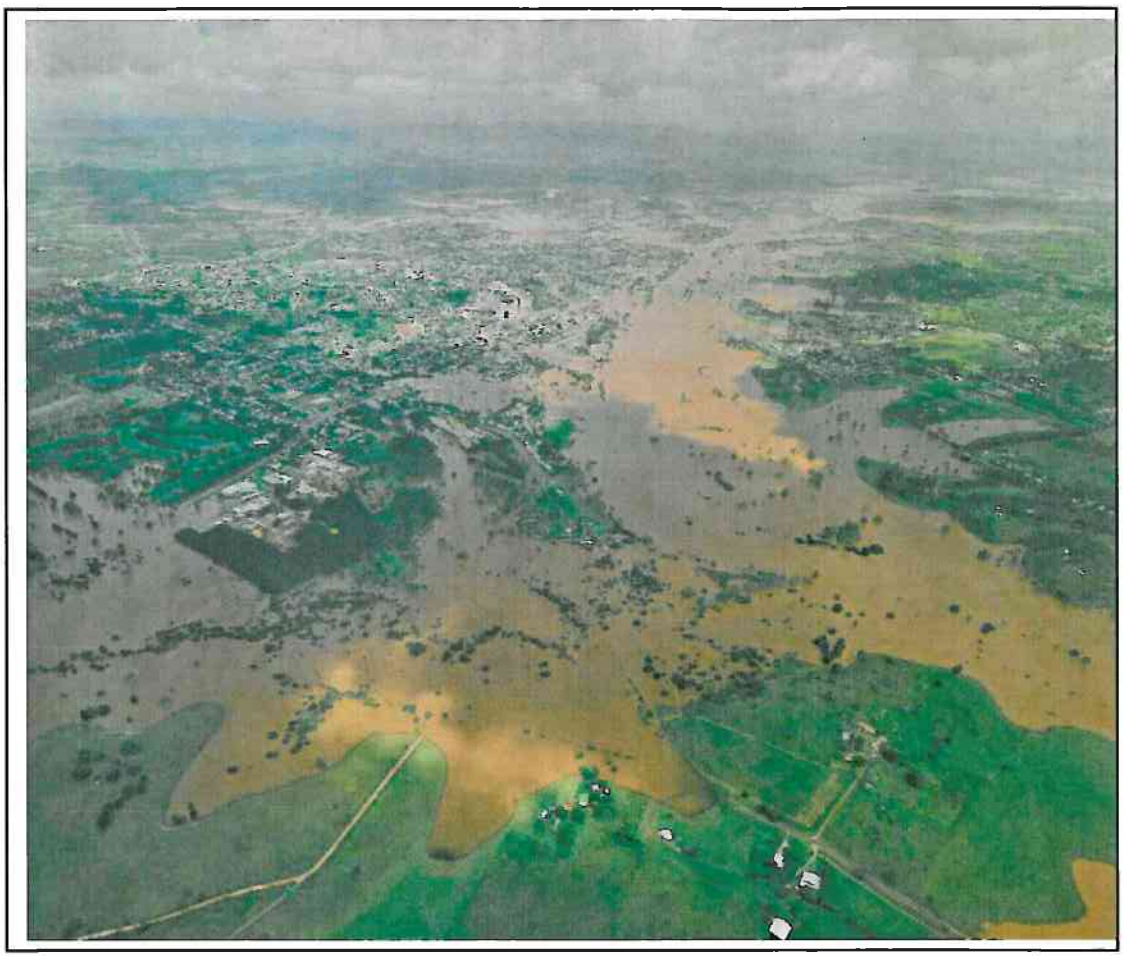
Proposed Cambroon
Dam Wall Site looking
upstream

GYMPIE – Looking North West with Railway shown in centre
1999

GYMPIE – Looking North
Mary River downstream
Bruce Highway on right.
Truck stop at centre.
1999

Refer page 12 of Report

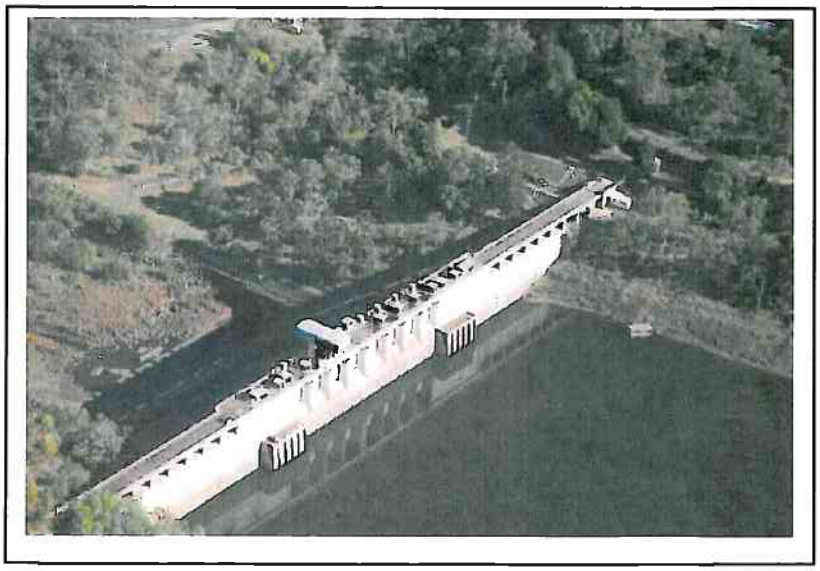
GYMPIE – Flood showing the extent of the flooding
Looking South
Showgrounds on Right
1999



GYMPIE – Flooding.
Looking South
Upstream from Gympie on the Mary River.
1999

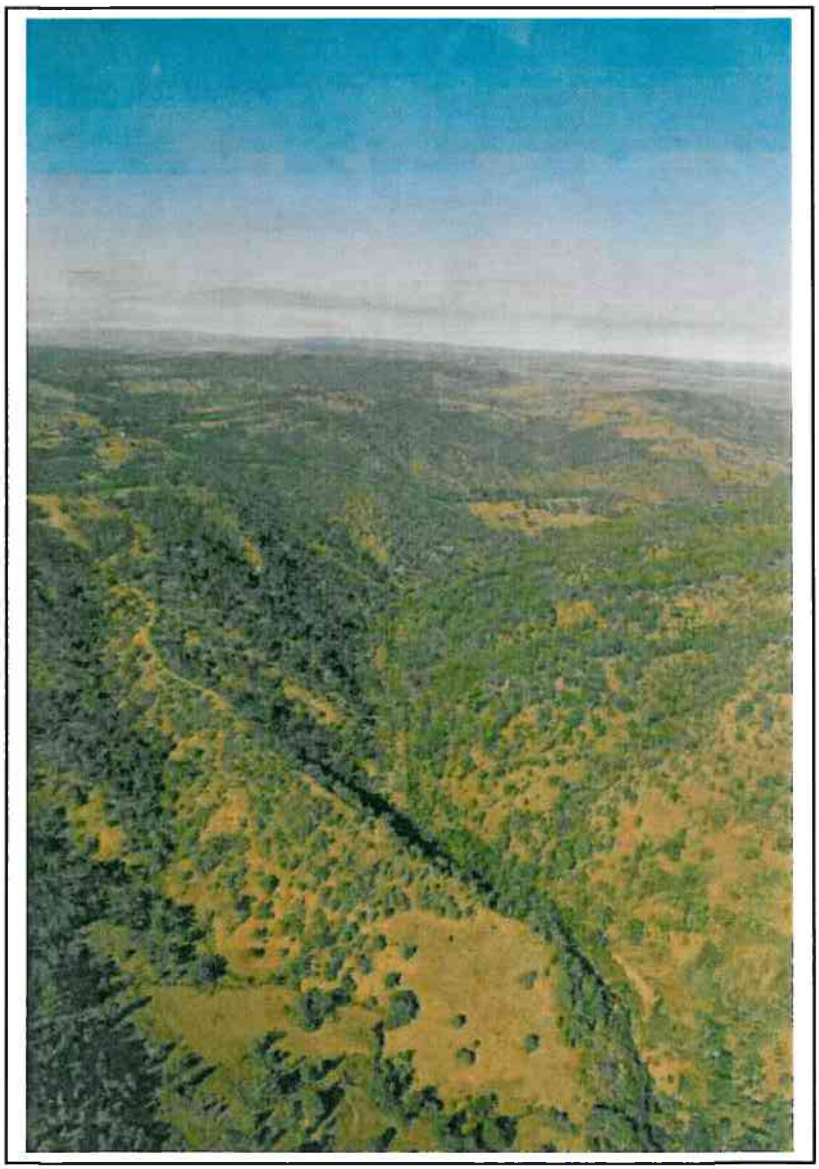
Lake Macdonald,
Sunshine Coast
In reasonable
condition
11/06

Wappa Dam,
North of Nambour
Good supply
11/06

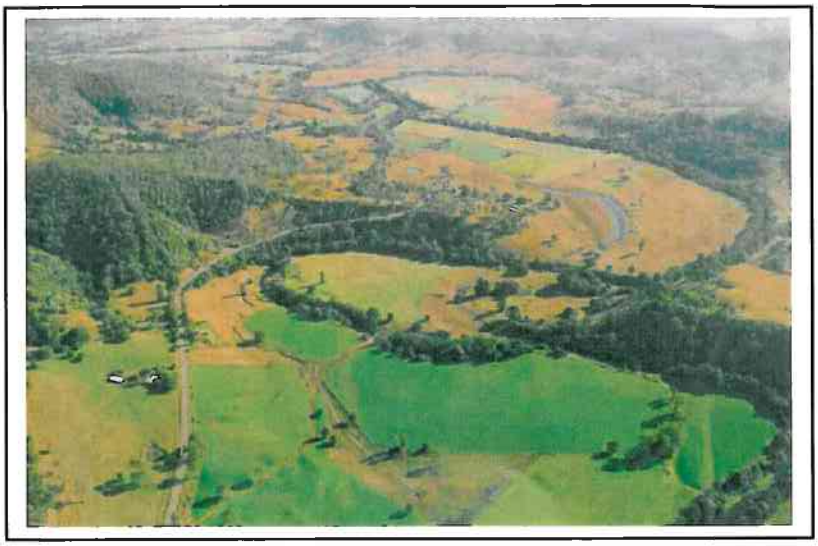


Somerset Dam
11/06

Somerset Dam
11/06



Emu Creek Dam Site -
Proposed Dam Wall in
foreground



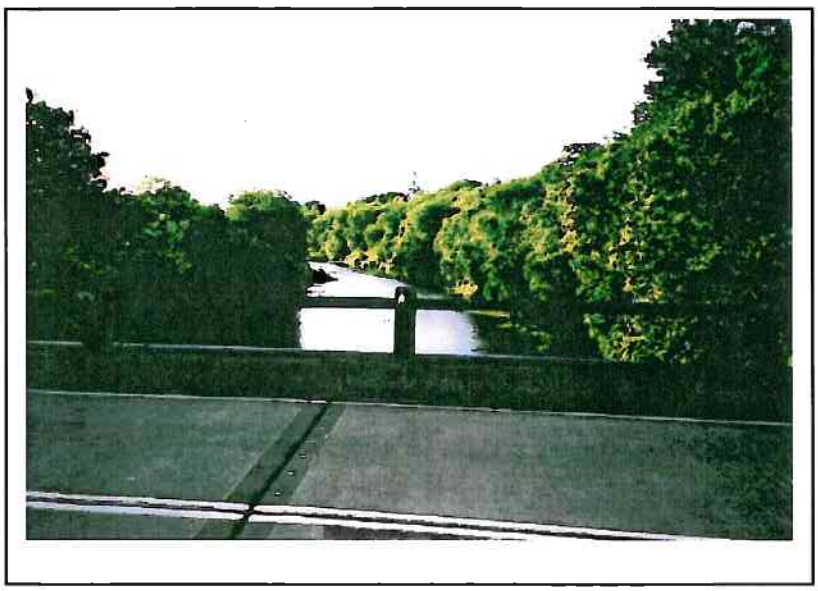
Kiddaman Creek
Proposed Dam Wall
Site – looking
downstream

Cooby Dam near
Toowoomba –
Water is now unsuitable
for domestic supply

Wivenhoe Dam
Very low capacity
Main water supply for
South East Queensland

Refer page 3 /4 in
Report

Traveston Dam will cover this section of the Bruce Highway



Mary River at Gympie

Refer page 7 in Report

Typical country downstream from Traveston Dam

Mary River downstream

Refer page 7 in Report

Mary River just below Dam Wall location

Bridge from where above 2 photos were taken

Flood level in Main Street Gympie 1999

Refer page 9 in Report

ANTI-DAM SIGNS ALL along Bruce Highway

This one says:

Bushman Beattie
big hat
no cattle
big dam
no brains
no horse
no saddle

Bruce Highway
Turnoff to Traveston
Dam Wall

Bruce Highway

Farming property to be covered by Traveston Dam

Photo taken on Carlson Road looking East

Farming land to be covered by the Traveston Dam – Photo taken on Carlson Road looking West