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The Commissioners
Queensland Floods Commission of Inquiry
PO Box 1738
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Dear Commissioners,

Submission to Queensland Floods Commission of Inquiry

Commissions of Inquiry Act 1950

Thank you for the invitation to provide a submission to this extremely important Inquiry.

I wish to take this opportunity to advocate the use of direct potable reuse (DPR) of purified recycled water as a means of enabling water storage reservoirs to be maintained at lower levels without impacting water availability. Such an approach would have facilitated the use of additional storage capacity in Lake Wivenhoe for the purpose of flood mitigation.

During the decade 2000-2010, provision of urban drinking water supplies grew to becoming one of the key environmental, social and political issues in Australia. As traditional water sources began to reach sustainable limits, the use alternative supplies including planned indirect potable reuse (IPR) was initiated.

It is apparent that a broad consensus has developed among the Australian water industry and its regulators regarding the ability to protect public health by a well-planned, carefully designed and properly managed IPR scheme. In IPR schemes, reclaimed water is returned to an environmental 'buffer' such as a river, lake or aquifer, where it mixes with other environmental waters before being re-extracted for drinking water treatment and potable use. IPR differs from DPR where highly treated reclaimed water is introduced 'directly' into the drinking-water system (or to the inlet of a conventional drinking water treatment plant) without environmental or reservoir retention.

Many reservoirs used for drinking water supply also play an important role in preventing or mitigating downstream flooding events. Unfortunately, these two roles are somewhat conflicted since optimum use for flooding control requires reservoirs to be maintained at relatively low levels, whereas a drinking water supply requires large volumes of water to be stored to buffer seasonal and annual variations in supply and demand.

Unlike IPR, careful management of DPR could enable reservoirs to be maintained at a lower level, thus enhancing flood control, while maintaining certainty of supply for drinking water.

When operating at full capacity, the existing Western Corridor Recycled Water Project (WCRWP) can produce up to 232 ML/day of recycled water. During 2009, average total water consumption across all of South East Queensland was 634 ML/day (QWC, 2010).

Full supply capacity of Lake Wivenhoe is 1,165,238 ML (SeqWater, 2011), which is approximately 1840 times the average daily consumption volume. If 232 ML/day were supplied by DPR, the remaining average daily water demand would be (634-232=) 402 ML/day.

In order to maintain maximum storage of 1840 times the average daily consumption volume, only (402 x 1840 =) 739,680 ML would be required. The remaining 425,558 ML of storage volume could then be preserved for flood mitigation.

The current volume reserved for flood mitigation in Lake Wivenhoe is 1,450,000 ML. Accordingly, DPR would enable this to be increased by around 30%. Such additional storage volume may have had significant ramifications during the Brisbane River flooding event of January 2011.

This approach is equivalent to immediately constructing a new 425 billion litre reservoir, without the cost of construction and without having to relocate a single home or farm. In addition to completely avoiding the environmental impacts of new dams, it would enable less water to be captured by the existing dam enhancing natural flow regimes in the river. But most importantly, the freed-up storage space is there to help capture and control major flooding events when they occur.

An additional benefit of a DPR scheme is that it could provide an invaluable emergency supply of drinking water in situations where reservoir water quality is compromised.

When reservoirs become contaminated after high rainfall events, the water can be unsuitable for drinking and very difficult to treat. There are other situations where reservoirs can be contaminated with disease-causing organisms such as giardia or cryptosporidium. Warm-weather can lead to algal blooms and bush-fires, both of which can seriously compromise water quality. In the future, we may need to pay careful regard to the possibility of terrorist attacks whereby drinking water supplies could be intentionally contaminated. All of these situations would benefit from a secure alternative emergency water supply, which could be easily and affordably offered by DPR.

In January 2011, the primary raw drinking water supply to Brisbane suffered a major quality impact due to the extreme flooding event. In addition to the direct risk posed by potential contaminants in the raw water, the ability of the drinking water treatment plants to effectively treat the water was impacted by the high organic carbon load and high turbidity levels.

Furthermore, the rate of production of water was reduced due to the need for extended treatment time. A fortnight after the major flooding event, it was estimated that 1000 tonnes/day of silt continued to flow over the Mt Crosby Weir, where the intakes for the regions two main treatment plants are located (Robertson, 2011). In this case, the shortfall was partially made up by seawater desalination from the Gold Coast. However, a DPR scheme that delivered water directly to these drinking water treatment plants

would have enabled continuation of operation at close to full capacity, blending smaller quantities of the impacted river water as necessary.

Finally, I wish to point out that current Australian risk management guidelines for managing water quality are as applicable to DPR as they are to IPR. The Framework for Managing Drinking Water Quality underpins the Australian Drinking Water Guidelines (NHMRC, 2004) and also forms the basis of the risk management framework adopted in the Australian Guidelines for Water Recycling (NRMMC & EPHC, 2008).

This Framework is intentionally non-prescriptive regarding the design of water supply systems and does not impose specific requirements such as treatment technologies that should be employed. Part of the philosophy of the Framework is to acknowledge that all drinking water supply systems are unique and that one of the keys to safe drinking water management is to 'know your system'.

The framework promotes a risk assessment and risk management process that involves understanding how key barriers of a multiple barrier water supply and treatment system function, as well as their potential vulnerabilities in face of 'hazardous events'. There is no fundamental characteristic of a well-designed and managed DPR scheme that renders the Framework less applicable relative to any other conceivable water supply system. Accordingly, there appears to be no serious ideological or philosophical leap required in Australia in order to step from an acceptance of IPR to an equal acceptance of DPR.

I trust that the suggestions that I have provided will be given due consideration. I wish the Commissioners the greatest success in identifying scientifically sound approaches for the improved management of water resources in Australia.

Yours sincerely,

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