



# Opportunities for the Recycled Water Strategy

A wide range of recycled water opportunities are currently under consideration for inclusion in the Recycled Water Strategy. Some opportunities can help us save our drinking water, while others will help the environment by reducing the volume of recycled water being released into our waterways.

This fact sheet provides a summary of the various recycled water opportunities under consideration by the Recycled Water Strategy Advisory Committee. It also provides information on some associated benefits and issues involved with each opportunity.

This fact sheet is divided into three parts:

- **part 1** provides an overview of how the different options are categorised and explains some of the benefits and issues that need to be considered with each recycled water opportunity
- **part 2** provides a summary of what options will help reduce our reliance on drinking water by substituting drinking water for recycled water where appropriate
- **part 3** provides a summary of what options will help reduce the volume of recycled water being released into our waterways by finding new uses for recycled water

## Evaluating the different options

The Recycled Water Advisory Committee will review and assess each recycled water opportunity using a systematic and transparent evaluation process. Evaluation criteria will include, but not be limited to:

- the primary function of each option (see category A or B below)
- the level of treatment required for specific uses
- technical issues
- environmental sustainability
- social impacts
- economic impacts

After investigating and reviewing the various recycling opportunities, the Committee will develop and assess various strategies and recommend their proposed Recycled Water Strategy for community feedback in late 2007.

## Categories for recycled water use options (the primary function of each option)

The recycled water opportunities under consideration by the committee have been grouped into two categories. These categories identify the primary and most valuable function of each option, which can be either to:

- A. reduce drinking water usage** – by substituting recycled water use where appropriate

This refers to the use of recycled water instead of drinking water in appropriate circumstances. For example, recycled water can be used for various irrigation purposes where drinking water is currently used. This would reduce consumption of existing drinking water supplies.

- B. reduce average release into waterways** – by finding new uses for recycled water to maximise its use

At present, most wastewater that comes from Gold Coast homes and businesses is treated and whatever can't be used is released into our waterways. This situation is not ideal for our environment and does not recognise recycled water as a valuable resource. Any additional use of recycled water will reduce the volume of water currently released into our waterways. Examples of uses that would reduce average recycled water release, but not necessarily reduce the amount of drinking water we consume, are wetland regeneration and irrigation for new industries, where drinking water is not currently used.

As the recycled water opportunities in this category do not conserve drinking water, which is a priority for the Recycled Water Strategy, they have been grouped separately to assist the Advisory Committee and the community in selecting the best possible Recycled Water Strategy for the Gold Coast.

## Level of treatment required for specific uses

In Queensland the quality of recycled water is defined in classes (currently A+ to D with Class A+ being the highest quality) as outlined in the Environmental Protection Agency's (EPA) *Queensland Water Recycling Guidelines (December 2005)*. The class of recycled water required is generally dependent on the level of potential human contact for each specific use. For example, toilet flushing and residential outdoor use requires Class A+ recycled water, whereas commercial uses, such as wholesale nursery irrigation, generally require lower classes as procedures can be put in place to minimise human contact.

Advances in treatment technology means that it is now also possible to produce recycled water that is of drinking water quality. This extremely high standard of recycled water is considered to be beyond Class A+, and is known as 'purified recycled water' (as described by the Queensland Water Commission). Recycled water of this quality is not covered by the EPA's current guidelines.

New national guidelines for water recycling are currently being developed. Phase 1 of the guidelines, which has already been published, prescribes a proactive risk management approach to protecting public health and the environment for traditional water recycling schemes around Australia. Phase 2 of the guidelines which are still in the drafting stage, will include guidance on storm water reuse and for producing recycled water of a drinking water quality.

As the class of recycled water required for specific uses increases, the cost to produce recycled water also increases. This is because more technical and expensive treatment processes are required to treat recycled water to a higher standard.

Recycled water is only treated to the class required to meet the 'fit for purpose' guidelines within the EPA's *Queensland Water Recycling Guidelines (December 2005)*. To produce recycled water of a higher standard than is required by the guidelines for a specific use would incur unnecessary costs and waste other resources.

## Technical issues

Reliable quality control procedures are required to achieve consistent recycled water quality.

New infrastructure such as wastewater treatment plants or modifications to existing plants will be required for most opportunities.

Some opportunities such as residential outdoor use (dual reticulation) and irrigation schemes are affected by climatic conditions such as heavy rain, when less recycled water is required

by users. While the Recycled Water Strategy will seek to significantly reduce the amount of recycled water released to the environment, release will be required when demand for recycled water drops due to high rainfall.

Recycled water treatment processes that utilise membranes (eg. reverse osmosis) also generate a concentrated by-product known as 'brine stream'. This would require the use of appropriate methods for the disposal of this brine with minimal environmental impact.

## Environmental sustainability

The level of greenhouse gas emissions generated in the construction of recycled water infrastructure and ongoing treatment, pumping and operation for each project will be taken into consideration.

Potential impacts on the local natural environment and ecosystems from the construction of any pipelines and other infrastructure also need to be considered.

Where recycled water is to be used for irrigation or other outdoor or environmental uses, the salt and nutrient content of the recycled water and potential long-term impacts on the soil and/or specific natural environments will need to be considered.

## Social impacts

A key element of the Advisory Committee's objective is to develop an equitable strategy. The cost to the community or end user will be considered as the committee weighs up the potential benefits of each opportunity against the costs that will be paid by the community.

Positive social impacts could be generated where the use of recycled water will help to maintain a high level of visual amenity (a greener city with healthy gardens and recreational areas).

Any disruption to the community caused by building and maintaining new pipelines and infrastructure will be considered.






## Economic impacts

A cost assessment will be completed for each opportunity to assess the cost of implementing the project and the overall benefit provided, particularly regarding the amount of drinking water substituted or reduction in average release.

Possible additional cost to the users of recycled water, such as property owners, farmers or industries also need to be considered.

Parts 2 and 3 of this fact sheet provide further information on the different recycled water opportunities under consideration for inclusion in the Recycled Water Strategy.





Category A – recycled water opportunities that reduce drinking water use

Symbol	Recycled water opportunity	Class required	Potential drinking water saved
	<p><b>Environmental river flow replacement</b></p> <ul style="list-style-type: none"> <li>Currently water from the Hinze Dam is periodically released into the Nerang River to ensure adequate river flows. Replacing part or all of this release with highly treated recycled water would increase available drinking water in the Hinze Dam.</li> <li>The release of the recycled water would be varied to mimic natural flows.</li> </ul>	<p>A+ or above</p>	<p>7 – 14 ML per day</p>
	<p><b>Large scale greenfield dual reticulation *</b></p> <ul style="list-style-type: none"> <li>Greenfield areas are new urban development areas on previously undeveloped land and include residential subdivisions and/or medium-rise development.</li> <li>Highly treated recycled water could be piped to these areas in addition to drinking water through a separate purple pipe network. An example of a greenfield dual reticulation scheme is the Pimpama Coomera Master Plan area where Class A+ recycled water will be used in homes for toilet flushing and external use from the end of 2008.</li> </ul>	<p>A+</p>	<p>15 – 70 ML per day</p>
	<p><b>Brownfield dual reticulation</b></p> <ul style="list-style-type: none"> <li>This is similar to greenfield dual reticulation but distributes highly treated recycled water to existing areas that are undergoing redevelopment. Highly treated recycled water could be piped to these areas via a separate purple pipe network for toilet flushing and external uses.</li> <li>This opportunity would require the installation of a new separate pipe system.</li> </ul>	<p>A+</p>	<p>unknown at this stage</p>
	<p><b>Opportunistic and localised dual reticulation</b></p> <ul style="list-style-type: none"> <li>This is similar to greenfield and brownfield dual reticulation but would be installed into a small number of new residential and high rise development within existing urban areas.</li> <li>The construction of a dual reticulation system within an existing development area would be complex.</li> </ul>	<p>A+</p>	<p>0 - 20 ML per day</p>
	<p><b>Industrial recycling *</b></p> <ul style="list-style-type: none"> <li>Recycled water would be distributed to industrial areas for specific industrial uses such as for processing purposes and boiler feedwater.</li> <li>A dual reticulation system would deliver the recycled water via a second purple pipe network in addition to drinking water.</li> <li>The class of recycled water required would depend on the specific purpose of the water and the potential for human contact.</li> <li>The demand pattern for this option is likely to be relatively constant.</li> </ul>	<p>C to A+</p>	<p>0 – 7 ML per day</p>

\* These recycled water opportunities are already in use on the Gold Coast.





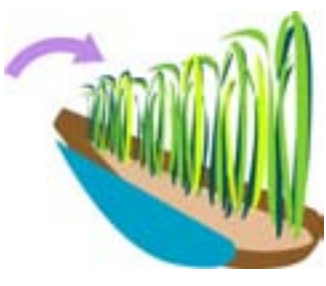
**Category A – recycled water opportunities that reduce drinking water use**

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Symbol	Recycled water opportunity	Class required	Potential drinking water saved
	<p><b>Horticultural recycling *</b></p> <ul style="list-style-type: none"> <li>Recycled water would be used for horticultural use such as crop production and irrigation at nurseries.</li> <li>The class of recycled water required would be dependent on the level of processing prior to use for food crops and level of potential human contact for retail and wholesale nurseries not producing food crops.</li> </ul>	D to A+	0 - 1 ML per day
	<p><b>Water supply replenishment</b></p> <ul style="list-style-type: none"> <li>The highest standard of recycled water, known as purified recycled water, would be released in the Hinze Dam catchment area to increase drinking water available from the dam. The purified recycled water would then blend with raw dam water, and be treated again in the normal process at Council's treatment plants ready for distribution to homes and businesses via the existing drinking water network.</li> <li>Additional treatment processes are required to treat the water to the highest standard. The treatment processes remove pathogens, salts, nutrients and other contaminants so that the water is of a higher standard than drinking water.</li> <li>With these higher treatment levels, approximately 25% of recycled water treated is a brine or 'waste stream' which would be disposed of in an environmentally efficient manner.</li> <li>Additional infrastructure would be required to pump the purified recycled water to the Hinze Dam catchment.</li> </ul>	beyond A+	35 – 200 ML per day plus significant reduction in volume of recycled water released to waterways
	<p><b>Additional onsite treatment *</b></p> <ul style="list-style-type: none"> <li>This involves already-treated recycled water, which is then further treated to a higher class at onsite treatment plants for specific uses such as irrigation, toilet flushing and machinery wash down.</li> <li>Extra treatment processes include filtration and disinfection.</li> <li>This option requires access to an existing or nearby recycled water source.</li> <li>An example of this option is the recycled water scheme operating at Conrad Jupiters Casino and Hotel complex at Broadbeach.</li> </ul>	site specific	less than 1ML per day
	<p><b>Irrigation of high use recreation areas *</b></p> <ul style="list-style-type: none"> <li>Highly treated recycled water is used for irrigation of high use recreation areas such as parks and esplanades. Recycled water may be used in water features and for irrigation to maintain the quality of grass for recreational activities.</li> <li>An additional pipeline network is required for each selected location to implement this opportunity.</li> </ul>	A+	0 - 10 ML per day

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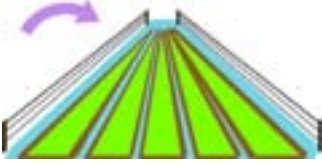




Category B – recycled water opportunities that reduce average release into waterways

Symbol	Recycled water opportunity	Class required	Potential reduction in average release
	<p><b>Open space irrigation *</b></p> <ul style="list-style-type: none"> <li>Highly treated recycled water would be used to irrigate open space areas. These areas could include playing fields, golf courses, public reserves and other similar areas.</li> <li>Open space irrigation has been in practice on the Gold Coast for over 35 years.</li> <li>New recycled water pipelines would be required to distribute recycled water to new sites.</li> <li>The level of treatment depends upon the type of irrigation system that is being used (above or underground irrigation) and the level of public access permitted at each site.</li> </ul>	<p>C to A</p>	<p>15 – 24 ML per day</p>
	<p><b>Water mining</b></p> <ul style="list-style-type: none"> <li>This involves extracting the cleaner portion of wastewater from the local wastewater system before it reaches the treatment plant; the extracted portion is then treated in a small-scale treatment plant.</li> <li>The recycled water produced is distributed through a local and dedicated recycled water system.</li> <li>The cleaner part of wastewater is easier and less expensive to treat to a required 'fit for purpose' standard.</li> </ul>	<p>dependent upon proposed use</p>	<p>less than 1 ML per day</p>
	<p><b>Wetland regeneration</b></p> <ul style="list-style-type: none"> <li>Recycled water would be released to degraded existing remnant wetlands to supplement natural flows.</li> <li>The recycled water would be distributed via an existing or new dedicated pipeline system.</li> <li>Specific technical and environmental issues need to be taken into consideration due to the sensitive environmental nature of wetland communities.</li> </ul>	<p>C</p>	<p>less than 1 ML per day</p>
	<p><b>Sand dune aquifer recharge</b></p> <ul style="list-style-type: none"> <li>An aquifer is an underground geological formation that is made up of porous materials such as sand that allows the storage of significant volumes of water.</li> <li>Highly treated recycled water would be injected into local sand dune aquifers for storage and later extraction. Spear pump equipment can be used to later extract the recycled water for specific uses.</li> <li>Specific risk assessment would be required due to environmental sensitivities.</li> </ul>	<p>dependent upon proposed use</p>	<p>0 - 14 ML per day</p>
	<p><b>Cane Irrigation *</b></p> <ul style="list-style-type: none"> <li>Recycled water would be treated to the minimum required standard (depending on whether public access can be controlled) and distributed to cane fields for irrigation purposes. This would enhance growth of sugar cane and increase productivity. Recycled water is already used to irrigate some cane fields on the Gold Coast - this could be expanded to other areas.</li> <li>Existing or new infrastructure would be used for distribution.</li> </ul>	<p>C or above</p>	<p>dependent upon the extent of uptake in new areas</p>

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**Category B – recycled water opportunities that reduce average release into waterways**

(continued from page 5)

Symbol	Recycled water opportunity	Class required	Potential reduction in average release
	<p><b>Agricultural use within the Gold Coast</b></p> <ul style="list-style-type: none"> <li>Recycled water would be treated to the minimum required standard and distributed to agricultural land for irrigation purposes. This would enhance the growth and productivity of various agricultural industries.</li> <li>Distribution of recycled water would be via a new recycled water system. Lengthy pipeline systems may be required for remote locations.</li> <li>The required class of water depends on the type of irrigation (above or below ground) and whether used on food or non-edible crops.</li> </ul>	<p>D to A+</p>	<p>dependent upon extent of uptake</p>
	<p><b>Aquaculture</b></p> <ul style="list-style-type: none"> <li>Aquaculture is the controlled cultivation and harvest of aquatic animals or plants for commercial purposes.</li> <li>Highly treated recycled water would be used to provide a secure long-term water supply for aquaculture operations.</li> <li>A specific risk assessment would be required for aquaculture operations that produce food for human consumption.</li> <li>The class of recycled water required depends upon whether the product is for human consumption.</li> </ul>	<p>C to A+</p>	<p>dependent upon extent of uptake</p>
	<p><b>Pasture within the Gold Coast</b></p> <ul style="list-style-type: none"> <li>Recycled water would be distributed to agricultural land within the city for pasture irrigation. This would enhance the growth of pasture and cereal crops used to feed grazing animals such as cattle.</li> <li>Distribution of recycled water would be via a new recycled water system.</li> </ul>	<p>C or B depending upon use</p>	<p>dependent upon extent of uptake</p>
	<p><b>Silvicultural irrigation</b></p> <ul style="list-style-type: none"> <li>Silviculture is the growing of trees for commercial purposes.</li> <li>Recycled water would be used for silviculture irrigation to enhance the growth of trees and the productivity of timber industries.</li> <li>Recycled water would be distributed from a recycled water treatment plant via existing infrastructure and new systems as required.</li> <li>The class of recycled water required depends on whether public access is permitted.</li> </ul>	<p>D or above</p>	<p>dependent upon extent of uptake</p>
	<p><b>Inter-catchment transfer</b></p> <ul style="list-style-type: none"> <li>This involves the distribution of highly treated recycled water to other catchments outside of the Gold Coast region for irrigation of commercial crops.</li> <li>Recycled water would be distributed via a dedicated recycled water network.</li> <li>There is potential for the recycled water to have an impact on soil structure if the salinity of recycled water is not controlled.</li> </ul>	<p>B or above</p>	<p>dependent upon extent of uptake</p>

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