Up a dry gully fact sheet for students

How to recycle water

What is Purified Recycled Water?

Every time we use water – showering, washing dishes or using the bathroom – we draw water out of our dams and we produce wastewater.

All over Queensland, millions of litres of water go down our drains every day and end up at a wastewater treatment plant.

These plants clean and filter the wastewater. It is released into a river and then washes out to sea. Eventually this water evaporates and comes back to earth as rain.

But we can't always rely on rain to fall where we need it to so we must find other ways of producing fresh water, just like the water cycle does.

You might have noticed at home that Mum and Dad collect things like cans and newspapers to recycle? Well, for over 40 years other countries including the USA, UK and Singapore have also been recycling drinking water.

In Queensland we have just finished building Australia's largest water recycling project, the Western Corridor Recycled Water Project.

Now, just like other countries, we are able to safely recycle water through one of three new advanced water treatment plants.

The water that these plants produce is called purified recycled water.

Where will we use Purified Recycled Water?

The Western Corridor Recycled Water Project already produces purified recycled water for major power stations at Swanbank and Tarong.

The power stations use purified recycled water for processes such as cooling. Power stations used to get their water from Wivenhoe Dam but thanks to the Western Corridor Recycled Water Project they no longer need to do this.

In the future, purified recycled water will also be available for other industrial users, agricultural users and will be supplied to the Wivenhoe Dam to supplement drinking water supplies if required.

How do we produce Purified Recycled Water?

We start the process of producing purified recycled water with wastewater that has been treated through a wastewater treatment plant.

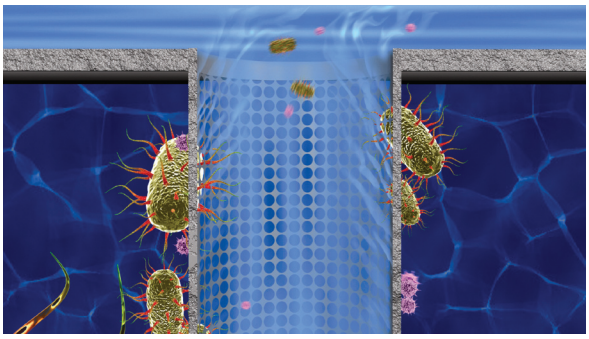
This water is then piped to one of three advanced water treatment plants at Bundamba, Luggage Point and Gibson Island. Here, three main processes are used to produce purified recycled water.

1. Microfiltration

During microfiltration water passes through bundles of tiny plastic straws and out microscopic holes.

To give you a comparison, the width of a human hair is 300 times bigger than one of these tiny holes.

Most of the bacteria and viruses are removed from the water at this stage.



Microfiltration

2. Reverse Osmosis

During this process our water is filtered through dozens of membranes, a little like sheets of plastic.

The water is squeezed at very high pressure through microscopic holes in the membranes.

A water molecule is tiny and is made up of just three atoms so it can pass through these tiny holes.

But other things that we don't want in our water, like chemical contaminants, viruses and bacteria, are much, much bigger.

- A chemical contaminant is up to 10 times bigger
- A virus is more than 100 times bigger
- Bacteria are more than 1000 times bigger

Therefore the combination of microfiltration and reverse osmosis removes all viruses, bacteria and most chemical contaminants.

3. Advanced Oxidation

Just in case some organic chemicals get through microfiltration and reverse osmosis, we use advanced oxidation to destroy them.

The water passes through a chamber where ultraviolet (UV) light, hundreds of times stronger than the sun's rays, reacts with a special chemical called hydrogen peroxide to break down and destroy any remaining chemicals or impurities.

This is what your doctor and dentist do to keep their instruments clean so that they don't spread germs.

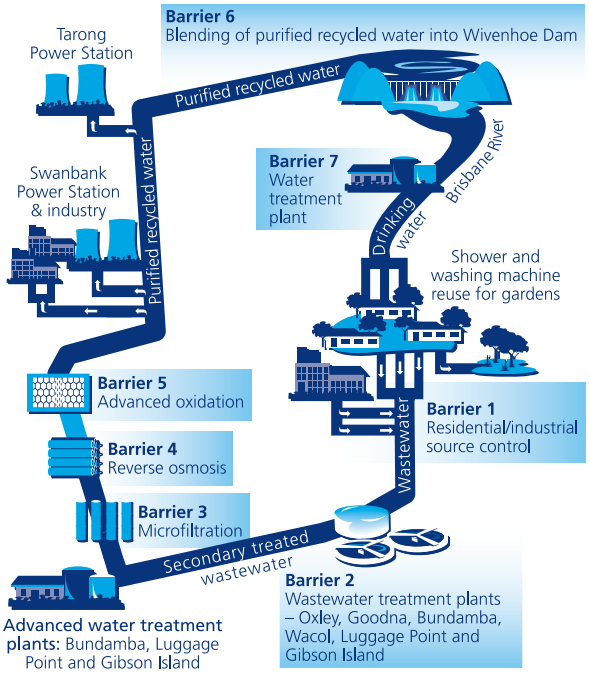
This water is now 100% purified recycled water.

It is safe to drink at this stage but we want to be absolutely sure before the water is piped to homes like yours so the water goes through another two barriers.

The next barrier occurs when the purified recycled water is released into Wivenhoe Dam where it will mix with the other dam water over time.

Later, just like the water you drink now, the water goes through its final barrier when it is taken from Wivenhoe Dam and goes to the Mount Crosby Water Treatment Plant.

There it is filtered, chlorinated and given other treatment before it is supplied to you as 100% safe and reliable drinking water.



The effect of drought in south east Queensland has had a big impact on the region's water supply. At its lowest point, the dam system dropped below 20 per cent.

The $9 billion South East Water Grid is a critical part of the government's strategy to secure water throughout the region by connecting dams, weirs and other water storages.

The water grid will transport water from areas of abundance to areas of need. It also incorporates desalinated water and purified water into the system.

Activities

1) Find out where your nearest wastewater treatment plant is.
2) Find out what type of treatment system, or barrier, is used.
3) Can purified and recycled water be used in small towns? If so, how?
4) Get a map of south east Queensland. Find out where the main dams, weirs and wastewater treatment plants are. Can you draw lines to show how they will be connected by the Western Corridor Recycled Water Project? (Hint: see the website below)
5) Do you think it is safe to drink purified and recycled water? Discuss in class.

Further reading

www.westerncorridor.com.au

www.watersecure.com.au

www.qwc.qld.gov.au

WaterSecure

Courtesy of WaterSecure