Water treatment

We all take for granted that the water we drink is safe, but **what is the process** that enables water to be suitable for our standard of living?

The Bundaberg Regional Council utilise two forms of raw water used for the production of potable water. These are surface water originating from a river or creek and/or water from an underground aquifer.

Raw surface water for the city of Bundaberg is drawn from the Ben Anderson Barrage on the Burnett River, whilst underground water is supplied from a number of bores located throughout the city. Once extracted, both forms of raw water are then treated to a potable standard at the various water treatment plants.

The Burnett River also provides raw surface water for the southern coastal townships. This water whoever is pumped from the Burnett River through the Sunwater Woongarra main irrigation channel system and is extracted at the Kalkie Water Treatment Plant (WTP) for treatment to a potable standard.

Raw water used for the provision of potable water for the northern coastal townships is sourced either the Sunwater Gooburrum irrigation channel system of from a number of bores located in or near each township or community.

The town of Gin Gin has two sources of raw water available for treatment for its potable water supply, these are Gin Gin Creek, when available, and the Sunwater Gin Gin main irrigation channel system.

The townships of Childers and Woodgate plus a number of small communities in between utilise surface water drawn from the Gregory Weir on the Gregory River.

Surface water treatment

The treatment process is essentially a five stage process defined as: coagulation; flocculation; sedimentation; filtration; and disinfection. This process provides a multi-barrier to ensure water is safe both chemically and bacteriologically for human consumption.

The process is monitored by conducting regular laboratory tests to ensure each treatment stage is performing to maintain optimum conditions and water quality. The plant has a number of online instruments that continuously monitor process streams.

Water treatment plants

Council operates 14 surface and ground water treatment plants across the region.

Surface water treatment plants:

- Branyan
- Kalkie
- Vercellios
- Wallaville
- River Park
- Gin Gin
- Gregory
- Lake Monduran

Ground water treatment plants:

- Heaps
- Peatey
- Rocky Point
- Lovers
- Works Depot
- Murdochs Road

The plant processes

One form of plant process that the Bundaberg Regional Council utilises has been developed to suit various water types (hard or soft) and treatment varies depending on the different weather condition and variations in local activities affecting run-off in the catchment.

The river water is highly coloured from natural organics such as tannin and other organic debris. This river water colour is made up of small particles referred to as a colloidal suspension which is removed in the coagulation and flocculation stages. Powder activated carbon is added prior to the coagulation stage primarily for the removal of taste and odours. This process is also useful in the removal of toxins from blue green algae as well as the elimination of herbicides and pesticides.

The coagulation and flocculation stages are essentially clarification stages where a coagulant is added in the flash mixer to cause the small particles to clump together to form floc particles and then a flocculant is added to these floc particles to make them big enough so they settle to the bottom of the tank by gravity in the sedimentation stage.

The sedimentation stage is made up of large tanks that allow gravity settling of floc to occur to produce a clear water stream and a liquid sludge stream. The liquid sludge is removed via a piping system where it is sent to a thickener tank. The thickened sludge then passes through a dewatering device to produce a dry sludge cake which is disposed of to landfill. The clear water stream is decanted from the top of the tanks to the filtration stage.

Filtration occurs when the clear water passes through fine sand filters to produce clear clean filtered water. The filtration process removes carryover particles from the sedimentation stage. The accumulation of particles on the filter sand is removed by a backwash sequence. The dirty backwash water is combined with the liquid sludge and incorporated in the thickener tank.

The filtered water has a final pH check and if necessary sodium hydroxide or soda ash is added to correct the value.

Disinfection stage is the final stage of treatment and involves the addition of chlorine to the clean filtered water prior to storage in the reservoir. Chlorine is used to disinfect and kill organisms that may carry disease. The water from the reservoir is then pumped into the town's pump station where it is distributed throughout the reticulation system.

Underground (bore) water treatment

The city of Bundaberg, along with some surrounding townships and communities, have bores as a supply source. These bores provide raw water to their associated groundwater treatment plant which ultimately produces a potable water supply. Because of the pristine quality of the bore water used, little treatment is needed.

Water is drawn from sand and gravel aquifers between 20 and 40 metres below ground level and pumped to the surface using either turbine or submersible borehole pumps.

The water is then applied to limestone aeration beds. This process removes carbon dioxide and other gases in the aeration sprays. Iron and manganese are also removed in the aeration process.

The water then filters through limestone for pH correction prior to being gravity-fed to ground level storage reservoirs.

As the water is required, it is pumped to water storage reservoirs and chlorinated before then pumped to the reticulation system and finally to the household services.

Bundaberg Regional Council takes pride in providing quality water to all residents within our region.

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