

Fact sheet

About the Gold Coast Desalination Plant



The Gold Coast Desalination Plant turns sea water into drinking water for the Gold Coast, Logan and Brisbane. The plant is a climate-independent source of water that can be used in times of extreme weather and if our conventional water treatment plants need to be offline.

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What is desalinated water?

The desalination process separates dissolved salts and other minerals from seawater to produce drinking water.

It uses an advanced technology called reverse osmosis to remove the salt. The water produced is called permeate and is similar to distilled water. Permeate is then re-mineralised so it can be blended with other treated water or directly distributed to homes, businesses and industries in the region.

Unlike the majority of drinking water produced in South East Queensland, desalination does not rely on rainfall and is a critical, climate-resilient water source during drought and flood.

Why do we need desalinated water?

Water is a precious resource, with less than 2% of the world's water available for drinking. Currently, the majority of water provided to more than three million South East Queenslanders is dependent on rain.

We live in a climate of extremes, and with a growing population, desalination offers an alternative source of drinking water in times of flood and drought.

Desalinated water can be pumped to the Robina Reservoir at Clover Hill, where it is mixed with treated water from Hinze Dam or Little Nerang Dam. The blended water is distributed to many areas of the Gold Coast and can also be pumped north to Brisbane through the Southern Regional Water Pipeline.

Fast facts

- The plant produces up to **133 million litres** of pure drinking water a day - equivalent to 50 Olympic-sized swimming pools.
- It generally **operates in standby mode** (33%) and, if required, can reach 100% capacity in 72 hours to supply up to 600,000 people with drinking water
- The plant uses **energy recovery devices** to improve the energy efficiency of producing drinking water.



Is desalinated water safe to drink?

Yes. Desalinated water meets public health regulation standards and the *Australian Drinking Water Guidelines 2011*. It is regularly tested to ensure it is clean and safe. The plant can produce between 44 and 133 million litres of desalinated water a day.

As at 2015, there were more than 90 desalination schemes across Australia with the capacity to produce 879,461 million litres of desalinated water each year.

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The desalination process

- Sea water is filtered through a four metre mushroom-like inlet structure on the seabed, one kilometre off the coast. Fish and marine animals are not drawn in, as the flow into the inlet is slower than the current.
- The sea water then travels through a pipeline to the desalination plant.
- Particles more than three millimetres in size are screened out before the water is put through a finer filter which removes smaller particles.
- Pre-treatment occurs in large tanks using filtration and flocculation. A coagulant, ferric sulphate, is mixed with the sea water to bind small suspended particles into clumps so they are removed by sand filters at the bottom of the tanks. Large pumps are used to move the filtered water to the next stage.
- Reverse osmosis (RO) forces the filtered sea water, at high pressure, through thousands of pressure vessels that contain semi-permeable membranes to remove all impurities, including salt and other minerals.
- Energy recovery is achieved by reusing the high-pressured salty water, or brine, produced in the first pass of the reverse osmosis process, to continue to force water through the RO membranes. This process recovers about 97% of energy that would otherwise be lost.
- The water produced after the RO process is very pure. Small amounts of chlorine, fluoride, carbon dioxide and calcium in the form of lime are added to desalinated water to make it suitable to drink long-term.
- The treated water is stored in two, 15 million litre tanks at the plant before it is pumped into South East Queensland's water grid supply network, mixed with the regular supply and piped to the Gold Coast, Logan and Brisbane.
- The sea water not converted into drinking water is returned to the ocean through an underground pipe. A 200 metre long diffuser system releases the water in an area about the size of eight football fields.

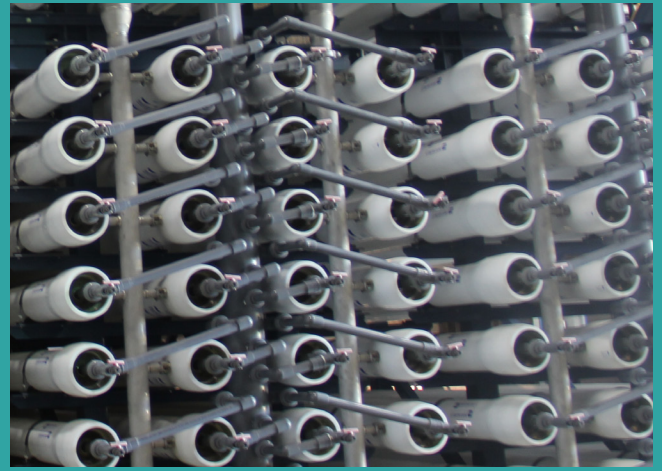
Desalination plant intake structure



Reverse osmosis forces salt water onto thin, semi-permeable membranes at high pressure. Pure water molecules pass through the membrane but salt, and a wide range of impurities, do not.

High pressure pumps increase the pressure of the sea water to between 50 and 60 bar (more than 50 times atmospheric pressure). This enables salt to be trapped on one side of the membrane and pure water to pass through the other side.

Sea water makes two passes through the pressure system. There are more than 16,000 membrane elements inside.



Is the desalination plant affecting the marine environment?

A long-term independent marine monitoring program, designed in conjunction with the State Government and independent marine experts, is in place. It shows that the plant is operating in compliance with licence conditions which have been developed to prevent environmental impacts.

Results show small plants and animal organisms are thriving on and around the underwater infrastructure. Footage shows that the sea water intake is providing a habitat for a diverse variety of marine organisms, effectively creating an artificial reef.

Real-time monitoring of the quality of the brine discharged back into the ocean includes measurement of pH, chlorine, dissolved oxygen, temperature, turbidity and salinity.