

Drinking water filtration

We filter your drinking water, so you don't have to.

At Sydney Water, we supply about 5 million people daily with clean, safe drinking water. We filter about 1.5 billion litres of water a day using dual media filters. This allows us to achieve the high standards set by the *Australian Drinking Water Guidelines*.

Dual media filters

What are dual media filters?

A dual media filter consists of two types of tightly packed filtering materials: a layer of anthracite coal, and layers of fine sand and gravel.

Anthracite coal

Anthracite coal is a sedimentary rock naturally found in mountain regions. It is made almost entirely out of carbon (91-95% pure carbon).

The granules of anthracite have an irregular shape, so they don't pack as tightly as sand. This enables sediment to penetrate deeper into the bed and makes it the perfect medium for filtering large amounts of water. The floc that is formed during chemical mixing as well as free hydroxide ions (OH⁻) adsorb (stick to) the positive charge of the anthracite.

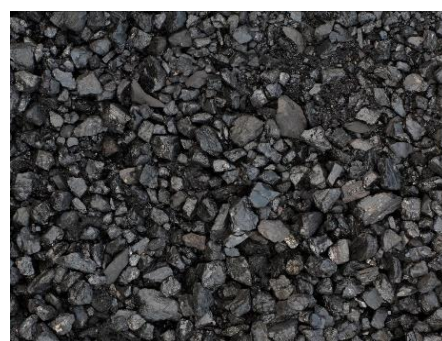
Fine sand

The second media we use is a variety of different sized sand grains. The fine, tightly packed grains ensure that smaller particles are captured in the filter bed. The larger sand and gravel particles at the bottom stop the filter sand from being washed away.

How do dual media filters work?

Filters use gravity. Water to be filtered enters the top of the filter and flows down through to the bottom. This downward flow allows us to capture different sized particles in the different filter media.

The two-metre deep dual media filters provide all the advantages of single-media filtration but require less backwash water than sand or anthracite alone. The larger pieces of gravel at the bottom of the filter stop the sand from being washed away during filtration.



This shows the composition of the dual media filter media used at Orchard Hills Water Filtration. The filter is 2 m deep with a 1.2 m layer of anthracite and 25 cm layer of filter sand grains and a base of larger sand and gravel.

How do we clean our filters?

We clean our filters several times a week by backwashing. We drain the filter bed and pump air up from beneath the filter to break up the media and dislodge trapped particles. Finally, we pump water up through the filter bed to flush out the trapped particles. This backwash water is then pumped into backwash lagoons for further treatment.

What does a drinking water treatment plant look like?

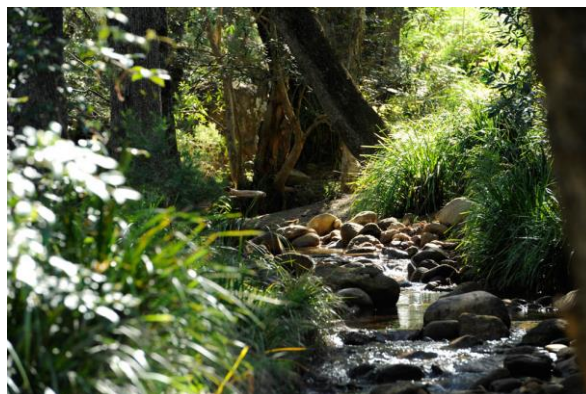
Sydney Water has nine drinking water filtration plants. Each one looks a little different, we use modern water filtration plants and tailor the processes to the source water. This ensures we achieve a consistent, high standard.



Orchard Hills Water Filtration plant

Did you know?

Water is naturally filtered through our landscape. This is called infiltration in our natural water cycle. See our [Natural water cycle](#) webpage and watch our Sydney Water Cycle Animation for more information.



Water is also naturally filtered through a sandstone landscape. Using natural products, such as anthracite and sand, we replicate this natural process.

How do I build a simple water filter?

We filter your water, so you don't have to. But you can try by watching our Make a simple water filter experiment video. This won't make a drinking water but is a fun way to see how filtration works.



Want to know more?

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