



Because there is so much air being pumped in the water, the water has negative buoyancy which means everything will sink to the bottom.

to survive.

organisms need air, food and water. Like all living creatures, micro-organisms live on, and spread through the bottom of the tank to create small bubbles.

Oxygen is pumped into the tanks and spread through the bottom of the tank to create small bubbles.

The second process involves the dirty water from the primary tanks being trickled over beds of stones. The circular tanks are two metres deep and filled with stones. The microorganisms then, in a similar way to the activated sludge, remove anything harmful left in the water.

BIOLOGICAL FILTERS



Biological treatment is a natural process to break down and remove substances that might harm the environment or human health. There are two main methods of biological treatment used at Chelmsford Water Recycling Centre to help speed up the natural process.

ACTIVATED SLUDGE PROCESS

The first method is to pump the sewage through huge tanks called aeration lanes where microorganisms are added. The harmful materials like ammonia (NH₃), which comes from urine, because it is poisonous to fish and other living things in rivers.



3 PRIMARY SETTLEMENT



The sewage then flows into large round, funnel shaped tanks where the primary settlement takes place. Soil and poo sinks to the bottom of the tank because it's heavier before being piped away from the bottom.

Storm tanks normally remain empty. They fill when there is heavy rainfall to help manage the increased flows and to help prevent the treatment works flooding.

STORM TANKS

Once the large objects have been sieved out, the sewage flow is slowed down to let small heavy materials sink to the bottom - things like stones, gravel and sweetcorn. This is then pushed out into a skip by a machine called the 'nodding donkey', or 'Detroit', to be reused to repair and level new roads.

2 GRIT REMOVAL



The incoming used water is made up of 99% water and 1% solids. It's important to remove the solid material as soon as possible to prevent blockages and damage to the machinery.

The screen is like a giant sieve: the water passes through it and removes the solids. Objects like wipes, toilet paper, nappies, as well as less obvious things like mobile phones and false teeth are all removed at this stage.

1 SCREENING

Approximately three skip-fuls of these objects are filled each week before being safely disposed of at a landfill site.

CHELMSFORD WATER RECYCLING CENTRE



A GUIDE TO THE WATER RECYCLING PROCESS



The world's water is a finite and precious resource. It is continually being used and reused in the water cycle. Used water, like sewage, is treated and recycled for the benefit of us all and the sustainability of our environment. To make sure we get the best out of this resource, we need to manage and protect it.

in flatter areas, pumping stations are sometimes needed to help move the flow. In older parts of towns and cities, sewers also collect rainwater from roofs and roads.

Rivers and seas have the natural ability to clean up 'organic' pollution, such as human, food and industrial waste. But as cities have expanded, so has the volume of waste increased, making more treatment necessary to prevent pollution.

Chelmsford Water Recycling Centre has been treating the city's sewage since the Victorian era. Chelmsford Water Recycling Centre treats sewage from around 140,000 people who live in Chelmsford and nearby villages. Used water from 11,000 businesses, including factories and restaurants, is also treated here.

Used water is carried from houses and businesses in underground pipes and sewers. It normally flows by gravity but

The average flow is 600 litres per second. During heavy rainfall the site can treat up to 860 litres per second.

5 FINAL SETTLEMENT

The water from the biological filters or the activated sludge then passes into the final settlement tanks, where any remaining solids are removed as sludge. This sludge is then added to the sludge from primary settlement tanks ready to be treated.



6 OUTFALL

The cleaned water, now known as final effluent, flows to the outfall and then goes back into the natural water cycle. The water flows in pipes for 18 miles to return to the River Blackwater.

But before it does, the water is tested to make sure it is clean enough to go back into the river. The water is tested for ammonia, oxygen levels and turbidity (the amount of tiny particles).



7 SLUDGE TREATMENT

Sludge collected from the primary and final settlement tanks must be treated to make it safe and useful.

We use anaerobic digestion: the sludge is passed through a well-mixed container (digester) and held at a temperature of 35 degrees Celsius. The process takes 15 to 20 days. As organic material (poo) breaks down in the digester, it produces methane gas and carbon dioxide. The methane gas is used to heat the digesters. The material which is created from this process is called recycled poo cake, which is then sold to farmers to be used as a fertiliser. The cake is checked to make sure it passes strictly controlled standards before it leaves site.

