



Mandurah Wastewater Treatment Plants

Background

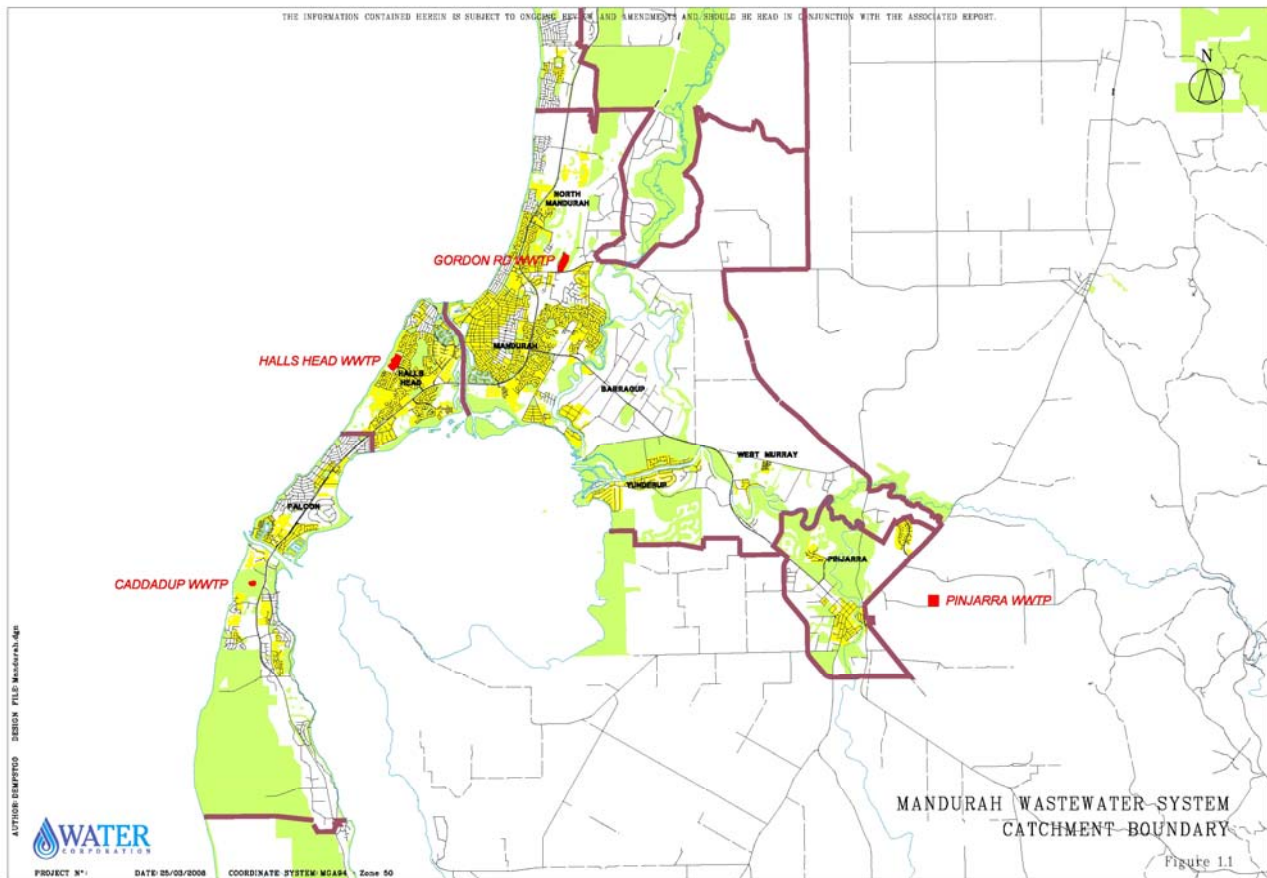
What is wastewater?

On average, people produce about 200 litres of wastewater every day. This wastewater comes from our homes, our schools, our places of work, hospitals and other services and is more than 99.7% water.

Most comes from our homes - from showers, baths, sinks and washing machines as well as the toilet. It contains some pollutants, mainly of human origin. These are in the form of suspended and dissolved matter, oil and greases, detergents, nutrients, heavy metals and potentially harmful bacteria and viruses.

Wastewater also comes from commercial and industrial premises. Limits are placed on pollutants from discharges from industries so that the wastewater quality is similar to that coming from a home.

Wastewater treatment plants remove much of the pollutant material from the wastewater. The wastewater that has been treated in a wastewater treatment plant and is suitable for discharge into the environment is called treated wastewater.



Prior to the 1970s, Mandurah did not have a community water supply system or a community wastewater scheme. Until that time the area enjoyed a plentiful supply of good quality groundwater that was easily accessible at shallow depths by individual households. Septic tanks were used for wastewater disposal.

Increasing development in the Mandurah area saw the need to develop scheme water and wastewater services to meet the needs of this rapidly growing town.

The development of wastewater treatment plants in the area reduced the risk of contamination to groundwater from septic tanks.

There are now four wastewater treatment plants in the Mandurah area:

- Gordon Road
- Halls Head
- Caddadup
- Pinjarra

Current Situation

Gordon Road Wastewater Treatment Plant

In 1972, construction of the Mandurah wastewater scheme commenced with the Mandurah Pumping Station and the Gordon Road Wastewater Treatment Plant. In 1979 work commenced to upgrade the Gordon Road Wastewater Treatment Plant to cater for an estimated population of 6,000.

In 1998 the Gordon Road wastewater treatment plant was upgraded.

The Gordon Road Wastewater Treatment Plant is located approximately 3 km north east of the Mandurah town centre. The treatment plant is presently designed to service a population of 40,000 and receives wastewater from the suburbs from Madora to Mandurah and east to Yunderup. The treated wastewater is disposed on-site via infiltration basins which are operating well. Indirect reuse of the treated wastewater from the Gordon Road plant occurs from groundwater extraction used to irrigate the Meadow Springs Golf Course and the nearby primary school.

At this plant, wastewater is treated in oxidation ditches, a form of the activated sludge process, to produce a treated wastewater with very low solids and nitrogen levels.



Halls Head activated sludge in oxidation ditch.

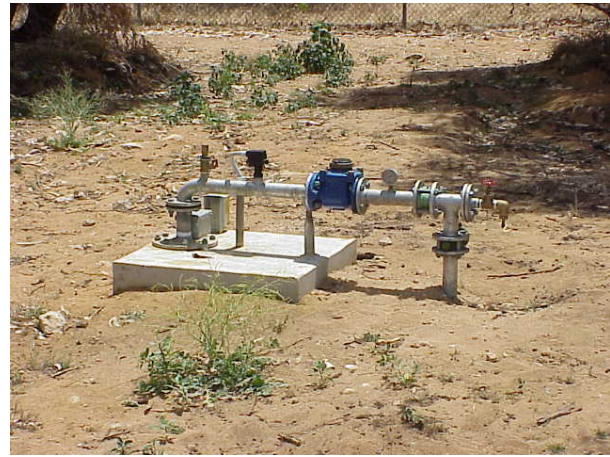


Clarifier settling out solids and producing clear treated Wastewater

The infiltration process filters out pathogens, absorbs phosphorous, and replenishes groundwater so it is suitable for irrigation for areas such as golf courses and parks.



Treated wastewater being discharged to infiltration basins.



Bore recovering treated wastewater from the groundwater for recycling.

Halls Head Wastewater Treatment Plant

In 1979 a temporary wastewater treatment plant was commissioned in Halls Head to cater for the new subdivision. This was a transportable package plant, which treated and disposed of wastewater locally.

Due to the rapid development of Mandurah's southern suburbs, a wastewater treatment plant was constructed in 1986 at Halls Head to replace the temporary package plant.

In 1998 the Halls Head wastewater treatment plant was upgraded. The Halls Head Wastewater Treatment Plant is located immediately southwest of the city of Mandurah bounded by the Indian Ocean and the Peel Inlet. The plant was designed to service a population of 16,000 from the suburbs of Halls Head and Erskine. Like Gordon Road Wastewater Treatment Plant, the treated wastewater is disposed on site via infiltration basins. The disposed treated wastewater moves towards the ocean following the groundwater flow. Groundwater nutrient levels are monitored in this area.

Caddadup Wastewater Treatment Plant

The continued development of Mandurah's southern suburbs necessitated the design and construction of the Caddadup Wastewater Treatment Plant in 1995.

The Caddadup Wastewater Treatment Plant is located on a 4.4 ha site within the Caddadup Reserve, immediately south of the Dawesville Channel and serves the area from Falcon to Dawesville. Again, disposal of treated wastewater occurs on-site, via infiltration basins. This plant uses the same treatment process as the Halls Head plant.

Pinjarra Wastewater Treatment Plant

The Pinjarra Wastewater Treatment Plant is located northeast of the Pinjarra town site. The total volume of treated wastewater is delivered by a pipeline into an on-site dam at Alcoa's Pinjarra site, and is all re-used in Alcoa's Pinjarra Refinery.

This plant uses pond treatment as a natural process to remove solids and stabilise the organic material in the water. The raw wastewater takes 30 days to be processed through three ponds. The solids are separated and organic materials stabilised in the first pond. Nitrogen, phosphorus and pathogens are removed by both sunlight and the duration of the pond treatment.

All the treated wastewater from the Pinjarra Wastewater Treatment Plant is used by Alcoa and all of it is recycled. It partially replenishes water lost to evaporation in Alcoa's red mud lakes and so reduces the amount of ground water use by Alcoa.



Pinjarra WWTP pond before it goes to Alcoa.



Pinjarra WWTP adjacent to the Alcoa ponds (top left)

Odour management

Wastewater naturally produces some odour. Generally, the greater number of pumping stations and pressure mains, the greater potential there is for odour generation. Because of the undulating terrain and high groundwater levels the area has almost 80 pumping stations.

Emission control and suitable buffers are the only ways to adequately protect adjacent land uses from odours from wastewater treatment plants. Unfortunately the land planning process has allowed development in some of the buffer areas for these plants. This may impact the long term future of these wastewater treatment plants.

The Future

With its scenic location and improved access provided by the freeway and the railway service from Perth to Mandurah, the Western Australian Planning Commission has forecast the population of the Greater Mandurah catchment to almost double to 158,000 people by 2030.

This forecast population has exceeded previous planning estimates of 150,000 people for the region. As a result, the Water Corporation is reviewing wastewater planning for the Mandurah area, to determine the long term approach to wastewater treatment, recycling and discharge to meet the needs of these growing communities.