



10.3.5 CONCLUSIONS

Artificial groundwater recharge ensured the sustainability of the Atlantis water supply for over two decades and will continue to play a key role. A major component of the scheme has been the separation of the source water into different fractions, as this has allowed recharge of the highest

quality water in the areas of greatest importance.

The Atlantis groundwater scheme provides a cost-effective water supply option when coupled with careful management of the water sources and the aquifer.

10.4 RECYCLING POLOKWANE'S TREATED WASTEWATER



Photo: Nick van Rensburg

Polokwane's business area

Polokwane, with a population in excess of 400 000 and water requirements of about 12 million m^3/a , is largely dependent on surface water. However, the town also has an elaborate groundwater abstraction infrastructure that can supply domestic water in times of surface water shortages and during periods of peak demand. During the 1992 to 1994 drought, groundwater accounted for a large proportion of the city's needs (3.7 million m^3/a).

The reliability of this source is largely due to the infiltration of treated municipal wastewater into Polokwane's alluvial and gneissic aquifers.



10.4.1 HYDROGEOLOGY

Treated wastewater is discharged into the ephemeral Sand River, which flows over a ~20 m thick by 300 m wide layer of alluvium. Underlying the alluvium are

granite-gneiss rocks that are weathered and fractured to depths of 60 m. The production boreholes penetrate this deeper, hard-rock aquifer.



Abstraction borehole near the riverbed

10.4.2 THE WASTEWATER INFILTRATION SCHEME

Water handled at Polokwane's Waste Water Treatment Works (WWTW) goes through both primary and secondary treatment prior to retention for 2 to 3

weeks in a series of maturation ponds. The quality of the wastewater discharge is maintained within the national effluent quality standards.



Photo: Nick van Rensburg

Polokwane's Waste Water Treatment Works

Each year about 6 million m³ of water is released from the WWTW. Of this, about 2 million m³ is lost through

evapo-transpiration, leaving about 4 million m³ for recharging the gneissic aquifer.



One of Polokwane's three maturation ponds



Treated wastewater discharging into the Sand River

10.4.3 WATER QUALITY ISSUES

The quality of the water discharged from the WWTW does not pose serious health risks to consumers. During certain periods of the year, nitrate in the treated

wastewater may pose a low risk to infants, but this is overcome by blending with the town's surface waters, which also lowers the relatively high total dissolved solids.

10.4.4 CONCLUSIONS AT POLOKWANE

About 4 million m³ of the 6 million m³ of treated wastewater discharged into the normally dry Sand River can infiltrate the sandy and gneissic aquifer, and be available for reuse. This constitutes approximately one third of the city's current water requirements. If this water was not recycled through artificial recharge and subsequent abstraction, it would either be lost to evapotranspiration or it would be pumped from the river or aquifer by other users downstream of the discharge point. In order for the

Polokwane municipality to recycle as much of this water as possible, it needs to continuously abstract from the gneissic aquifer. In this way space is created in the aquifer, and the recycling process is made possible.

As with all artificial recharge schemes that rely on treated wastewater, regular monitoring and management of the wastewater and the abstracted groundwater is required to ensure high quality water is supplied to the consumers.