



Jandakot Groundwater System

Background

The Jandakot mound covers an area of about 540 km² extending from the Swan River in the north to the Serpentine River in the south, Darling Scarp and Southern River in the east and the Indian Ocean to the west.

The Jandakot Groundwater system comprises:

- A superficial aquifer (up to 40m deep)
- The confined Leederville aquifer (up to 500 m deep)
- The confined Yarragadee aquifer (over 700 m deep).

The superficial is a shallow sand aquifer with a saturated thickness of up to 40 metres. Large amounts of easily accessible fresh groundwater occur in the mound. As the groundwater table is often close to the surface, the aquifer supports extensive wetland systems and groundwater dependent vegetation. The superficial aquifer provides water for public water supply, agriculture, industry, market gardens, local authorities and garden bore users.

As a thick confining layer of shale is located beneath the majority of the superficial aquifer of the Jandakot Mound, recharge to the Leederville aquifer only occurs in the southern part of the mound.

The Water Corporation began development of the Jandakot groundwater scheme in 1979.

After development of a second stage of the scheme in 1993 there were 26 superficial bores and two Leederville bores in the scheme. On average around 7 gigalitres of water has been used to supply the water grid each year with around 5 gigalitres from the superficial aquifer and around 2 gigalitres from the Leederville aquifer.

The groundwater requires treatment to reduce iron, colour and turbidity levels and depending on the bore combination in use, the product water can be slightly salty. When required, water from the Jandakot treatment plant was previously mixed with lower salinity hills water before being supplied to customers. Water from the Perth Seawater Desalination Plant is now the preferred water for mixing with treated Jandakot water.

The Leederville aquifer at Jandakot has been used as a trial site for water banking. For three years, around 1 gigalitre of hills water was pumped into the Leederville aquifer for storage and retrieval at a later time. The aim of this trial was to see if this technology could have wider benefits for delivering improvements in drought security.



The Water Corporation has also used up to 1 gigalitre per year from the Yarragadee formation for use at the Melville reservoir. A bore at Attadale drilled in 1953 was replaced by a new bore located at the reservoir site in 1997.

Water from this bore is blended with better quality water supplied into the Melville reservoir to manage the elevated temperature and salinity levels of the Yarragadee water.

The Jandakot Land Use and Water Management Strategy (JLUWMS), prepared by the Western Australian Planning Commission, protects the public drinking water supply drawn from the central part of the Jandakot Mound.

Current Situation

In 2007, a new bore was drilled at Jandakot to increase capacity to abstract water from the Leederville aquifer. This has increased the output from the Jandakot Scheme by up to 3 gigalitres without affecting drawdown in the superficial aquifer.

The Water Corporation and the Department of Water jointly monitor a number of bores in the area. Some bores that used to access the superficial aquifer are no longer in operation to limit potential impact on local ecosystems.

The last of the water banked into the Leederville aquifer is being abstracted during the 2007/08 summer.

Sustainability considerations – addressed in planning

Economic	Social and cultural	Environmental
Low cost water source.	Require greater transparency of aquifer performance and information on protection of environmental values.	Drawdown in the superficial aquifer has potential to influence vegetation and levels in wetlands.
Water banking provides opportunity for low cost storage.	Source protection through JLUWMS precludes urban land development on the central part of the mound.	Groundwater requires low levels of treatment and energy.

Potential source yield (in 50 year planning horizon)



It is anticipated that with good management, and use of the Leederville and Yarragadee aquifer, the Jandakot scheme could supply an additional 3 gigalitres a year (total capacity up to 13 gigalitres a year. This is enough water for 12,500 homes.

Water stored through banking is not included in this estimate, as it would need to be sourced separately.

Potential cost



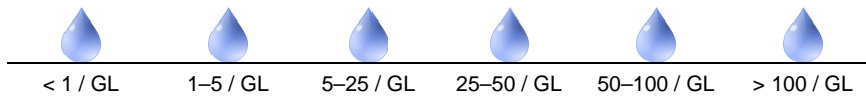
Water used to meet local area growth from the Jandakot Groundwater scheme is estimated to cost less than \$1 a kilolitre. If the scheme development is accelerated ahead of local growth, additional infrastructure to transfer the new water to other areas within the water grid would be required and costs could increase to \$1 - \$2 a kilolitre.

The Future

There is some potential to develop new superficial bores for public water supply at South Jandakot that will require expansion of the supply capacity of the Jandakot Groundwater Treatment Plant. There may also be opportunities for expanding the number of Leederville bores and to consider a bore into the Yarragadee aquifer. In addition to the need to secure a water allocation for this development, there are environmental and land planning issues that require resolution.

The evaluation of opportunities for water banking will influence the scale of the expansion at Jandakot. This scheme could be an opportunity to use existing aquifers to store water for future use. This may reduce the need for and cost of additional infrastructure, provide ecosystem benefits during the storage period and provide some natural water treatment.

Key



Potential source yield (in 50 year planning horizon)



Potential cost (2007 \$)