

Water price review 2024

Submission received through Engage Victoria

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In October 2023, we began accepting submissions on Goulburn-Murray Water's 2024 price submission via Engage Victoria (www.engage.vic.gov.au/ESC-water-price-review-2024). On this website, people were given the option to send us general feedback or respond to questions we provided.

1. What do you think of the prices proposed by your water business?

Comercial price is too low

Blackmount are ripping the tax payer off

Too much water is being extracted from the aquifers at Wheelers Hill Musk.

2. What do you think of the proposed outcomes?

The PCV: a dark art?

Permissible Consumptive Volume

A submission by David Moore Architect and 3D Virtual Model Specialist for POW Protect Our Water Musk Water Group Inc.

The permissible consumptive volume should be a scientific model based on monitoring and making incremental improvements of that model. POW's understanding of the local

PCV is that it numerically represents a very narrow historical definition. As one user on the advisory panel of the groundwater management area to the local GMA said, "it's a bit of a dark art".

In defining what the PCV should be, the ESD: Environmentally Sustainable Development definition relates to:

what water will be available to future generations and
how that water relates to retaining flora and fauna and
observing cultural heritage around water in country and
attempting to reinstate pre-colonial water flow rates.

We are moving towards federally legislated flow rates for states to implement; for example the Murray Darling Basin Plan

The concept of the PCV rather than be a total annual volume, should:

be a simple numerical water balance model of inputs and outputs and

be an estimate of Aquifer volume and flow rates to approximate observed water level behaviour in the area and

compare groundwater resource use to the natural recharge and outflows of the area and

include 3-D visualisation maps of aquifers and the areas hydrogeological features and the physical aspects of the aquifer system

to provide improved understanding and communication for groundwater users and administrators

A 3D virtual visualisation of the aquifer storage model especially if coupled with a simple water balance model will be powerful tool to resolve competing groundwater uses

GMW should use 3-D software to calculate the size of the aquifers and the area of critical cross-section to estimate the quantities of water within and moving through the area, as it has in neighbouring Springmount Kingston, Smeaton, Eganstown, Barkstead Mollongip and Creswick GMAs. In these neighbouring GMAs they have such a 3-D and numerical model

which we believe would be managed by GMW. It has demonstrated that it improves the understanding of surface and groundwater interactions to support an integrated water resource management framework and cope with climate variability.

Three 3-D software as explained by Bruce Gill & Don Cherry & Michael Adelana & Xiang Cheng & Mark Reid in their paper “Using three-dimensional geological mapping methods to inform sustainable groundwater development in a volcanic landscape, Victoria, Australia” can be used to calculate the size of aquifers and the area of critical cross sections to estimate the quantities of water within and moving through the aquifer.

GMW needs to provide a good 3-D conceptual model to supplement the PCV numerical groundwater model to reveal the otherwise invisible reservoir of groundwater under Wheelers Hill and surrounds. The 3-D model of the size or volume of the aquifer needs to be good enough so that domestic users can see what sacrifices they are making in their bores, wells, dams and streams to see the licensed ‘takes’ of the big users. GMW needs to lead in the use of 3-D geological datasets to build visualisation and virtual constructs of the aquifers in the study area, as it has done in the nearby area of Kingston Blampied, Springmount and Creswick.

VVG Visualising Victoria's Groundwater has done some preliminary work in this regard for Wheelers Hill which POW has presented in Part 2 of our submission.

There needs to be a process of feedback and incremental improvement as the physical model and the numerical model evolve together. Improved analysis of landscape and catchment scale water movement processes will give better understanding of groundwater base flow to streams and reservoirs such as Wombat and Bullarto reservoirs and the Coomoora public emergency bore. The use of this model would be beneficial in times of water stress to stop cave-ins of bores and fouling and destruction of bore pumps. There will also be a better understanding of potential risk of land salinity occurrence that can be modelled.

In the ‘new normal’ of Climate Change, the large areas of park and natural forest can be given better year round protection despite increasingly variable seasons as climate change rapidly progresses. It will also provide better protection of ecosystems dependent on groundwater, the forests, and the streams that flora and fauna rely on and the fish,

platypuses etc. The improved virtual model will reduce the drying out of the soils and forests that contribute to more severe wildfires. Hydrating the landscape is good fire protection from devastating fire storms.

There has been a steep decline in annual rainfall since 1994 (reference Kiem and Verdon Kidd 2010) caused by reduced reliability of late autumn rains that arise from changes in frequency and timing of the synoptic weather patterns that drive the Victorian climate. This is reflected in the decline in bores of the groundwater level. The water table and bore levels have dropped, corresponding to the reduced rainfall and recharge over the past decade.

However, Wheelers Hill seems to be suffering from the same fate as many other GMA's experience; there is no 3-D virtual model available from GMW to go with the PCV numerical volume in place. Rather, in about 1996 the DNRE (Dept. Natural Resources and Environment) during a water crisis put in place an urgent rapid empirical estimate of the available annual resource call the PAV now known as PCV

These calculations, confirmed by an audit by Reed and Cherry in 2004, were rough and ready. They used existing data and geological interpretations, but did not seek new data where data was missing. In other words, a crude estimate not updated since? These findings of Reed and Cherry confirm POW's own lack of confidence in the PCV

They found the following issues:

- the lack of definition of the aquifer,
- the aquifers inclusiveness,
- the adequacy of the GMA Boundary,
- the size of the aquifer storage
- rapidity and extent of groundwater declines,
- groundwater quality over the season and
- risks to infrastructure,
- insufficient groundwater monitoring and
- the lack of understanding of the link with surface water bodies.

This local PCV is an incomplete analysis of the water balance and it does not account for hydraulic connection to streams and lakes and estimates of through flow. The model at the moment does not understand the recharge areas capacity to flow either side of the Great Dividing Range, either into the Lerderberg or the Loddon river systems through cracks and fissures in the aquifer down to the bedrock below.

GMW officers we interviewed in Daylesford were not able to provide accurate information of the geology or the hydrology of Wheelers Hill and surrounds. They suggested we should fund a monitoring bore beside the Blackmount operation to determine the cone of influence of Blackmounts multiple bores because GMW itself no longer funds such exercises. Nor is GMW funded by the Vic Govt to do it!!!! Irrigation Licences fund infrastructure projects downstream but water mining does not produce a revenue stream to GMW.

The PCV at Wheelers Hill primarily relies on the determination of the recharge as an analog for sustainable yield. Many noted practitioners have demonstrated that this principle is incorrect (e.g Theis 1940; Brown 1963; Bredehoeft et al. 1982; Alley et al. 1999; Sophocleous 2000; Bredehoeft 2002; Kalf and Woolley 2005).

The preferable way is to use the concept of 'safe capture' based on how much groundwater can be safely captured by all the artificial groundwater uses i.e. development of the groundwater that is not dependent on recharge, but rather to measure how the aquifer responds to bore drawdowns. This involves using monitor bores, in enough strategic locations, to see the aquifer response.

Both surface and groundwater storages use carryover from previous seasons but the PCV should take into account the other times when these storages are sorely depleted both for surface and groundwater. The combined 3D Virtual Model and the safe capture model must take account of that rather than be an annual figure. Surface water storages are able to be easily visualised and monitored whereas groundwater in the aquifer needs a similar visual 3D virtual model rather than just a volume number (PCV)

This PVC amount should vary from year to year with climate and dynamic status of the groundwater resources. It is essential to understand the whole of the volumetric dimensions

of the aquifer. There will be places of disconnection at lower levels in the aquifer similar to the uneven beds in surface storages. The aquifers' recharge and discharge process, its inertia (resistance of flow), its connection to sensitive environmental areas, surface water resources and other users bores.

Until the PCV takes account of these features and a proper 3-D conceptual model is built to go with the PCV for the Wheelers Hill GMA, it will remain a dark Art Not much changed from 1996 (creating a loophole in the Water Act of 1989 amended) through which much water is escaping. The licensed bores must have flow meters installed enabling accurate usage figures to be recorded publicly and transparently.

References: provided by Associate Professor Peter Dalhaus, Federation University

1 Bruce Gill & Don Cherry & Michael Adelana & Xiang Cheng & Mark Reid in their paper "Using three-dimensional geological mapping methods to inform sustainable groundwater development in a volcanic landscape, Victoria, Australia"

2 Professor Jennifer McKay "Sustainable Development of Cross - Boundary Aquifers in Australia - the Modern Legal and Institutional Tools UNESCO-IAH-UNEP Conference, Paris, 6-8 December 2010". Professor of Business Law, and Director of the Centre for Comparative Water Policies and Laws, University of South Australia, jennifer.mckay@unisa.edu.au

