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Quentin Cooke
Team Leader
Development Assessments
EPA Victoria
200 Victoria Street
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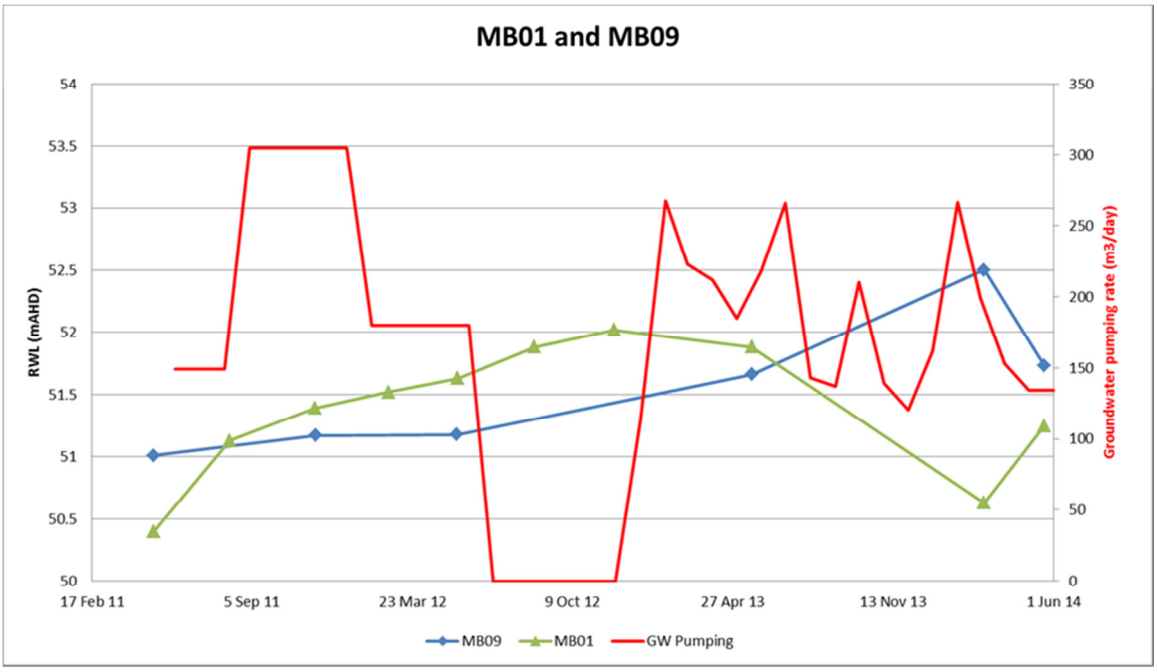
Dear Mr Cooke

Melbourne Regional Landfill
Works Approval Application 1002191
Section 22 Notice Additional Information – Groundwater Levels

Following our meeting on Wednesday 30th November, I have prepared this response dealing with the issue of impact of pumping on groundwater levels and what might occur when groundwater extraction on the site ceases.

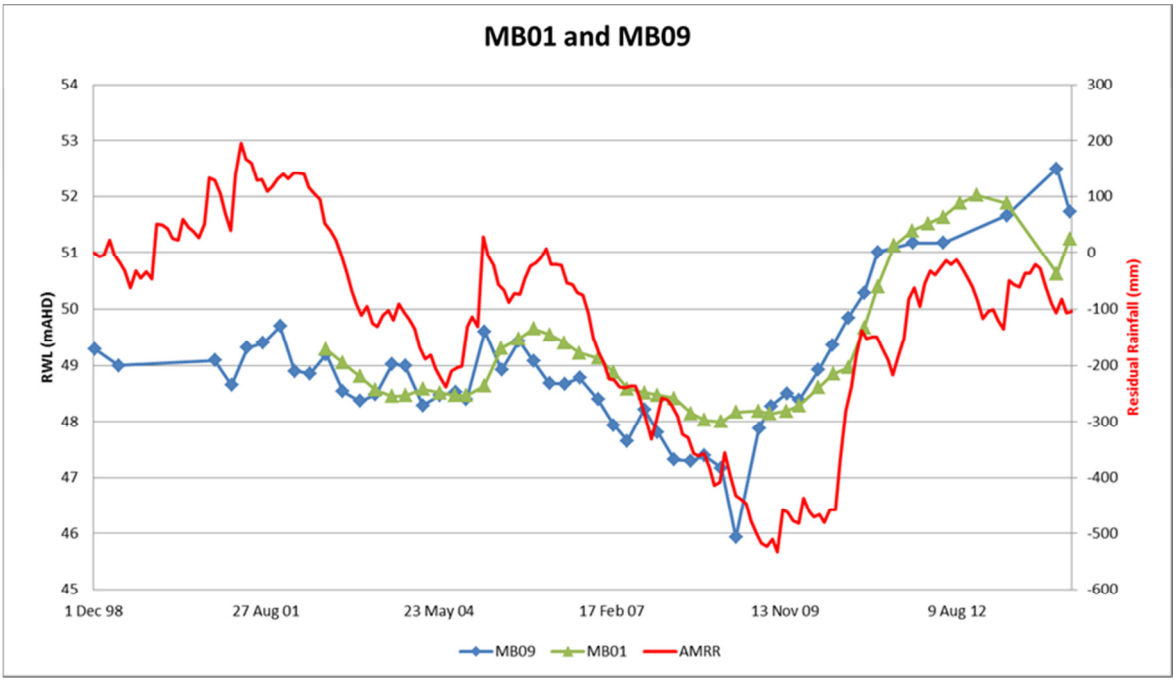
The monitoring record for groundwater levels and pumping is very coarse - bores are read every 3 months and groundwater pumping records have been read monthly since the start of 2013 but before that the average data seems to be lumped into 3 month or 6 month intervals. Plotting the combined daily pumping rate against the levels in bores MB01 and MB09, which are close to the pumping bores, provides the following graph.



According to the pumping records I've been given, there was no pumping between June 2012 and Jan 2013, but I suspect that this is because no data was available. Regardless, this is a very non-conclusive plot. It shows that groundwater levels in MB01, tapping 18.5 to 30.5m depth, rose from early 2011, even though pumping was occurring and continued to rise until March 2013, when levels started to decline. In MB09, however, which is tapping a deeper aquifer (51 to 57m) at the same location, groundwater levels showed a continual upward trend, in spite of the pumping.

The groundwater extraction bores labelled Bores 1 to 4 are constructed at depths of 55, 36, 52 and 37m depth respectively. The plots show there is not a significant relationship shown between the operation of the bores and the levels in the deep aquifer from which they extract.

In contrast, when you consider the longer record of groundwater levels plotted against residual rainfall mass, there is a much stronger relationship (refer plot below). This plot shows the dominance of seasonal recharge over pumping in impacting groundwater levels.



I therefore suggest that the analytical data provides a better indication of what is occurring on the site and the relative importance of seasonal impacts on groundwater levels compared with local groundwater extraction.

If you apply the Theis equation of groundwater flow, using a transmissivity of the aquifer of 200 m^2/day, storativity of 0.0002 (these values were from the pumping test on water supply bores) – then after 17 years of continuous pumping at a rate of 189 m^3/day (average from the pumping records) – you get a drawdown of 0.7m at the proposed new Cell 1.

The 17 year time period was chose as it reflects the time period over which a landfill has been located on the site. If a time period of 50 years is applied (i.e. the time period of quarrying at the site) then the predicted drawdown is 0.8m. This is considered a very conservative upper limit.

I consider that this analysis provides a better range of drawdown estimates and should be adopted by the EPA as the maximum recovery level if pumping stops.

Submitted for your information and deliberation.

Yours sincerely

David Ife

Technical Director, Environment

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