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Report to Environment Committee
from Andrew Jones, Groundwater Scientist

Review of the Minimum Operating Level for the Waiwhetu Artesian Aquifer

1. Purpose

To inform the Committee of the results of a review of the minimum operating level for the Waiwhetu Artesian Aquifer.

2. Why is a Critical Level Required?

Because the Waiwhetu Artesian Aquifer is hydraulically connected to the sea, careful management is required to ensure seawater is not drawn into the aquifer as a result of over-pumping. The aquifer is connected to the sea close to the harbour entrance and through submarine springs on the harbour floor. The intrusion of seawater would have a significant detrimental effect on the high quality water in the aquifer. Enforcement of an appropriate management level ensures there is sufficient pressure in the aquifer to exclude seawater.

In 1977 a critical groundwater level of 1.4 m above mean sea level (amsl) measured at the McEwan Park monitoring bore on the Petone foreshore was defined to protect the Waiwhetu Artesian Aquifer from seawater intrusion. This level was subsequently included as a regional rule in the Regional Freshwater Plan.

3. Why Has the Critical Level Been Renewed?

Since 1977 the abstraction regime in the valley has changed significantly with the establishment of the Waterloo wellfield in 1981. Moving the principal abstraction point further up the valley has reduced the drawdown caused to the water level measured at the foreshore. Furthermore, a considerable amount of additional groundwater information has been collected. In particular, information from large pump tests in 1993 and 1995, and the drilling of a deep investigation bore in 1999/2000. Analysis of this information has greatly improved our understanding of the Lower Hutt aquifer system.

4. Results of the Review

The additional information and analysis on the aquifer system has been used in four lines of investigation to review the critical level. These lines of investigation and the corresponding management levels for the McEwan Park bore are tabled below:

Line of investigation	Recommended 24 hour mean level
Calculation of the cessation of throughflow in the aquifer at the Petone foreshore.	2.5m amsl
Calculation of the cessation of discharge from submarine springs close to the Hutt River mouth.	2.3m amsl
Calculation of the reversal of the hydraulic gradient under the harbour floor.	2.3 – 2.5m amsl
Estimation of the location of the freshwater/seawater interface in the aquifer system.	2.0m amsl

Our review of the critical level recommends that the following management levels should be adopted at the McEwan Park monitoring bore:

Warning level: 2.5m amsl (calculated as a 24-hour mean value)
Critical level: 2.3m amsl (calculated as a 24-hour mean value)
Minimum level: 2.0m amsl (calculated as a 24-hour mean value)

5. What are the Implications of the Increased Level?

The water permits of all users of the Lower Hutt Groundwater Zone contain a condition that requires all users to cease abstraction if the 24-hour mean level reaches 1.4m amsl. Furthermore, the water permits of the Utility Services Division contain a condition that requires their abstraction to be reduced if the 24-hour mean water level at McEwan Park reaches 1.9m amsl. Therefore, the recommended management levels will restrict abstraction earlier than is the case under the current management regime. The permits of aquifer users will need to be modified to adopt the recommended management levels. However, it is worth noting that during the dry period experienced at the beginning of this year the recommended warning level of 2.5m amsl was not reached.

The safe yield for the aquifer system is defined in the Regional Freshwater Plan as 90 megalitres per day. This value is the amount of water that may be taken on long-term basis without compromising the 1.4m level at McEwan Park. The adoption of the recommended management levels will require a review of the safe yield for the Lower Hutt Groundwater Zone. This work is in progress using a numerical model of the aquifer system that was developed during 2000/2001. The safe yield analysis is scheduled for completion in October 2001.

6. Communication

The Utility Services Division and other users of the aquifer system have been advised of the results of the review. The results of the review will be passed to the Consents Management Department and the Resource Policy Department so that the water permits of groundwater users and the rule in the Freshwater Plan can be modified.

7. Recommendation

That the report be received and its contents noted.

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