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The bore is well-sited at the base of a shallow slope adjacent to a wide valley. The aquifer is mudstone and siltstone of the Ferntree Group. The present bore is about 20 m deep.

The stratigraphic position of the bore within the mudstone is from 60-80 m from the top of the formation which is some 180 m thick.

#### HISTORY

Records of the drilling and modifications to the bore are incomplete. The quoted yield of 900 l/h was obtained on completion of drilling in October 1965. Subsequent blasting and cleaning operations in 1966 improved this yield. Since that time the yield has steadily diminished until it is now 180 l/h. The pump intake is near the bottom of the hole.

Like so many bores it is automatically pumped for relatively short intervals to top up storages. This means that drawdown, and hence exposure of the rock to air and water is intermittent.

#### DISCUSSION

Due to intermittent exposure of rocks and their contained water to the atmosphere:

- (1) The exposed rock decomposes and small fragments of rock and clay may fill and seal the openings which allow water to enter the hole. Silting may also occur.
- (2) The change in pressure of the water causes dissolved compounds to precipitate from solution. These deposits contribute to the sealing process.
- (3) Biological growths are induced on the bore walls. This may be very important depending on the chemistry of the water.

The net effect is to prevent water from the exposed section of the hole reaching the supply readily and the yield is reduced compared to the initial behaviour of the hole. If then, the initial pumping rate is maintained then that volume must reach the hole through a lesser column than originally. The level draws down still further and the sealing process follows. This process then accelerates and continues until no part of the hole is left in a state able to supply water. Normally after the first stages it is noticed that the hole will not yield the same supply and the pump is cut back, but usually not enough to preserve the bulk of the bore, the process already having gone too far.

As the hole is also only about 20 m deep, there is only about 12 m of effective aquifer penetration which is inadequate to provide a good yield.

#### RECOMMENDATIONS

It is suggested that the hole be rebores and extended, which will entail removal of the pump-housing and casing (3 m). To be sure that the hole is clean, the hole should be reamed from 5 in to 6 in. Eight-inch casing will then be required for the top 3 m.

The hole should be extended to about 35 m. This should give 27.5-30 m

of saturated hole and allow a good margin for drawdown. Water ingress points must be noted whilst drilling.

Blasting may help improve the yield but must be in a part of the bore not to be exposed to processes detailed previously. Blasting is to be regarded as a last resort.

On termination of reaming, the hole should be given a brief test (1 day) to gain some idea of yield. On completion of the extension the bore must be thoroughly cleaned and several hours of surging (and chemical cleaning) should be spent on this.

The bore must now be fully and thoroughly tested. The pump must not be stopped for a week although the pumping rate may be adjusted.

Measurements must be made of drawdown throughout the week. For the first 10 minutes of pumping they must be made at intervals of 1 minute and then every 5 minutes for the remainder of the first hour. Half hour to one hour intervals are necessary for the rest of the first day. Eight hour intervals would be adequate for the remainder unless a change in rate is effected in which case the detailed procedure is required again.

From the test a suitable yield and drawdown can be selected, the pump intake fixed and the hole should then be reliable for a long time with appropriate care in its use.

CONCLUSIONS

The club will probably need about 170,000-200,000 l/week. The thin gravels could not be expected to hold large quantities of water and the fact that they are elevated above sea level suggests that they would drain unless there are local deep areas. The underlying rocks are similar to rocks which have given regular supplies in other areas and at the rate desired by the soccer club 1.5-2.0 l/s. Some bores have given more than this quantity and with deeper drilling even more might be obtainable. It might be necessary to drill a hole as deep as 50 m which would make the bottom of the bore about 15 m below sea level. Because of the narrowness of the stratum there is a possibility of saltwater intruding inland with sustained pumping from such a depth. It is also unknown whether the supply would be maintained for long periods of continuous pumping. Most bores in similar rock types have been drilled for use as stock supplies and pumping only takes place over periods of a few hours at a time.

REFERENCES

Rocks similar to those underlying the soccer club's land have yielded supplies of the quantity required by the club. Whether sustained pumping will cause the supply to become depleted or cause salt water intrusion in dry periods is unknown. As it is almost certain that the water would have to be pumped from the bore, the costs of pumping together with costs of drilling and pump maintenance should be carefully compared with the cost of getting a supply from the Riverstone town supply. If it is decided that a hole is to be drilled, a site in the north-east corner of the property is suggested.

REFERENCES

BURNS, M.A. 1963. Geological atlas 1 mile series. Zone 7, Sheet 29 (815M). New South Wales Department of Mines, Tasmania.