



**PATRICK BRIODY  
& SONS LTD**

### **DECOMMISSIONING REDUNDANT BOREHOLES**

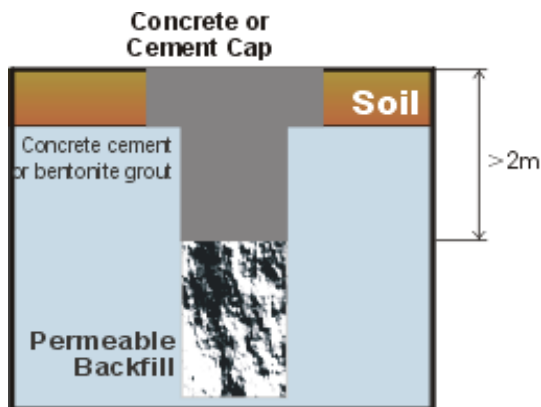
**Unsupervised abandoned boreholes and wells may act as the path of least resistance leading to the contamination of groundwater or contributing to the loss of aquifer yield.**

Boreholes and wells which are no longer required need to be made safe, structurally stable and backfilled or sealed to prevent groundwater pollution and flow of groundwater between aquifer units.

For best results to decommission redundant boreholes, it is important to employ a competent Well Drilling Contractor with a good knowledge of the geology and well abandonment procedures.

- 1) In many cases a CCTV survey of existing well for decommissioning will reveal geology profile, depth to casing, any obstructions etc prior to carrying out decommissioning.
- 2) Remove headworks and where appropriate remove casing. Ensure removal of well casing does not result in the collapse of borehole walls. It is likely casing will be removed after backfilling completed.
- 3) Backfilling the hole. For the most purposes the ground should be restored as closely as possible to its pre-drilled condition. The borehole or well should be backfilled with clean (washed), uncontaminated, excavated materials such that the permeability of the selected materials are similar to the properties of the geological strata against which they are replacing. The backfilled borehole will then mimic the surrounding natural strata and groundwater flow and quality will be protected.
- 4) Restoration will require a variety of materials to be used so that permeable aggregates (e.g. pea gravel, sand) are positioned adjacent to aquifer horizons, whilst low permeability materials (e.g. clay bentonite or cement grout, concrete) are positioned adjacent to low permeability horizons.

**SEALING THE TOP OF THE BOREHOLE.** In order to prevent potentially contaminated surface run-off or other liquids entering the backfilled borehole, it is necessary to complete the backfilling of all boreholes with an impermeable plug and cap. The final two metres (from ground level down) should be filled with cement, concrete or bentonite grout and a concrete or cement cap of suitable strength should then be installed over the top of the borehole and surrounding ground, such that its diameter is at least one metre wider than the diameter of the backfilled borehole. The grout should have a minimum density of 10lbs/gal. If concrete cap extends from -2mtr to -1mtr below ground level, native soils and clay could be place in top 1 mtr .



**Note: Artesian Boreholes.** (i.e.: Boreholes where groundwater under hydraulic pressure continuously overflows at or above ground level). For artesian boreholes, the decommissioning process should aim to confine the groundwater to the aquifer from which it came in order to prevent loss of confining pressure, and the loss of water resources to the surface or other formations.

There are a number of ways to accomplish control of an artesian flow depending, in part, on the water pressure in the confined aquifer and the depth to which the water level must be lowered for instance;

- a) Pumping the borehole to produce the necessary drawdown.
- b) Pumping nearby boreholes.
- c) Extending the casing above level beyond the potentiometric surface.
- d) Introduce a pre-cast plug at an appropriate level within the hole.
- e) Using an inflatable packer, pressure grout the void space below the packer.

Decommissioning of artesian boreholes is likely to be easiest in late summer, when groundwater levels and artesian flows are at their lowest. Decommissioning artesian boreholes is a specialist job and requires expert advice.

**Recording details of well decommissioning procedure.** Complete and accurate records should be kept of the abandoned procedures for possible future reference.