A Guide To What Is Involved To Have A Water Bore Drilled

Disclaimer
The information contained in this brochure is designed to provide a general overview of bore construction, development and testing, and outline guidelines for those considering installing a bore.
**SITING A WATER SUPPLY BORE**

The siting of a bore usually involves the consideration of a range of factors in the course of providing a cost-effective and reliable supply of water of acceptable quality.

**OBTAINING INFORMATION**

The initial location selection and investigation are very important in the overall construction and performance of a bore. The depth, cost and relative importance of a production bore will usually dictate the amount of investigation required.

Information from the data base and neighboring landholders helps with the location, depth to water, amount of water pumped, type of water bed or formation, and water quality.

The production bore site should allow ready access for heavy machinery for drilling and subsequent servicing of the bore and pumping equipment.

Sometimes licensing authorities may have a bore licence or permit condition that requires that a bore should be located not less than a specified distance from the property boundary and /or from a bore on a neighboring property, channel, stream, or source of pollution such as a septic tank.

This requirement is to minimize the possibility of interfering with the flow and water levels in nearby bores.
**ROTARY MUD DRILLING**

Rotary mud drilling functions on the same principle as air drilling except that the circulation medium is aqueous. The technique was developed for handling soft, unconsolidated formations which would collapse if air was used. The mud forms a membrane which inhibits flow through the walls of the hole. The internal pressure of the mud provides structural support to the hole wall. Drilling fluids are also used for capacity of air compressors.

In the rotary mud system, drilling fluid or mud is pumped down through the drill pipe and out through nozzles in the bit.

The cuttings are removed by continuous circulation of a drilling fluid as the bit penetrates the formation material. The fluid also serves to cool and lubricate the bit. The mud fluid then flows upward in the annular space around the drill pipe to the surface, carrying the cuttings with it in suspension. At the surface, the fluid is firstly channeled into a settling pit, where most of the cuttings settle out, and then into a storage pit, where the mud pumps picks it up again for recirculation.
CASING

Bores must be lined with an adequate length of appropriate casing to prevent the collapse of strata penetrated. The casing also acts as a safe housing for any pump installed in the hole.

The selected diameter of the bore casing complies with the minimum requirements of the licensing authority and is adequate to accommodate the size of pump to meet supply requirements.

The only PVC piping suitable for use as bore casing is pressure rated pipe manufactured to AS 1477 standards. The piping is swell-jointed and solvent-welded. The only solvent and primer used is Type ‘P’ conforming to AS 3879.

The wall thickness or class of the bore casing selected is in accordance with good design practice.

SCREENS/SLOTTED CASING

Bore water obtained from loose, unconsolidated formations such as sands or gravels, which must be supported if the bore is to remain open.

Slotted casing is used at the bottom of a fully cased hole and has slots cut into the casing opposite the water-bearing zone(s) to allow water to enter the bore casing.

Screens are normally manufactured from stainless steel and consist of wedge-shaped wire wound around a frame of AX101 rods. The gap or slot between adjacent turns of the winding is adjusted during manufacture to provide the desired aperture size to hold out the sands from entering the bore casing. The screen is placed into the bore hole adjacent to the water bearing formation.
**BORE DEVELOPMENT**

Bore development consists of the application of appropriate techniques which are designed to bring a bore to its maximum production capacity by optimizing the bore efficiency, specific capacity, stabilization of aquifer material, and control of suspended solids.

The development involves the use of mechanical agitation method. Mechanical methods applicable to a rotary drilling rig include the use of compressed air or an air-water mix to jet the screen and carry water from the bore.

The aim is to remove from the annulus, between screen and hole wall, clays or compacted material resulting from the drilling operations as well as the fine material from the water bed itself. This results in a rearrangement of the remaining water-bearing material to form a coarser but stable filter which retains the aquifer.

As well as increasing the production capacity of a bore, development also stabilizes the formation which acts as a filter to prevent the pumping of sand which would otherwise result in serious damage to pumps and fittings.

Where the aquifer material is very fine, a compromise may have to be reached in achieving an acceptable flow rate and a relatively sand-free supply.
Bore siting

Mix of drilling fluids

Start of drilling

Collection of Samples

Circulation of Drill mud
To remove cuttings

Collection of Samples

Site Preparation

Casing of bore

Development of bore / flow test

Pump Installation

Water Supply