

# Infiltration galleries

An infiltration gallery is a horizontal drain made from open jointed or perforated pipes, or a block drain, which is laid below the water table and collects groundwater. Infiltration galleries need soils that are permeable to allow sufficient water to be collected. The gallery should be surrounded with a gravel pack to improve flow towards it and to filter any large particles that might block the perforations.

Infiltration galleries can be used to collect sub-surface flow from rivers. Water is taken to a collection well, or sump, and then either withdrawn directly or pumped to a storage tank.

Galleries are often used in conjunction with other water supply systems as a means of increasing the quantity of water intake in areas of poor water yield. In this instance one or more galleries are built which drain into a central point, such as a hand-dug well or spring box. These are called collector wells. When an infiltration gallery is built, it is important to protect it from contamination by locating it uphill and the minimum safe distance from any latrines. This distance is site specific, although a figure of 30 metres has been suggested as a general guideline. The gallery should also be constructed to ensure that unfiltered surface water cannot enter.

Infiltration galleries vary in size, from a few metres feeding into a spring box, to many kilometres forming an integral part of an urban water supply.

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## *Sanitary inspections of infiltration galleries*

Sanitary inspections of infiltration galleries follow a similar format to inspections of springs (see Fact Sheet 2.1). A suggested frequency of inspection is once a year by each group: the community, the water supply agency and an external surveillance agency. Particular attention should be paid to the catchment area of the gallery, especially with shallow galleries. The water collected in infiltration galleries has often not had as much filtration as well or spring water, thus may be more vulnerable to contamination.

Water quality testing should be done twice a year, once in the wet season and once in the dry season. The water at various points in the gallery, at the collector well or sump if present, and water in the distribution system should all be tested.

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## *Construction of infiltration galleries*

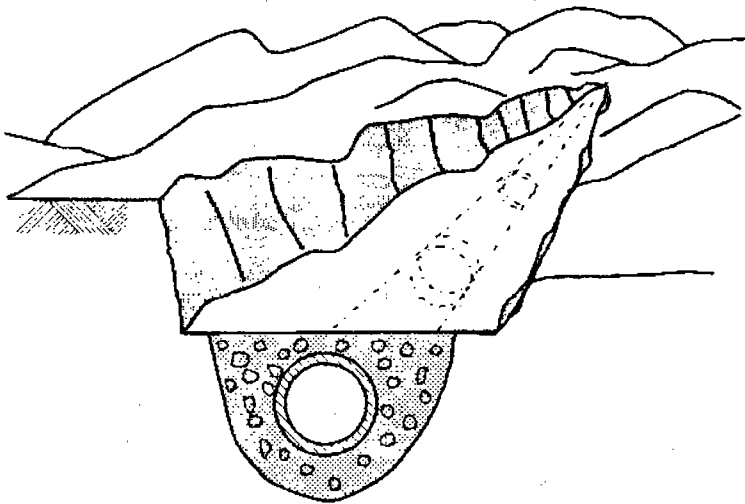
To ensure a continuous supply of water, infiltration galleries should, if possible, be built at the end of the dry season and should be at least one metre under the dry season water table. The sides of the gallery will need to be supported by props and formwork during excavation.

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### **Infiltration galleries can be built in the following way :**

- Excavate a trench to at least one metre below the water table, supporting the sides to prevent collapse.
- Lay graded gravel on the base of the trench.
- Lay the pipe or drain blocks on top of the gravel. Cover the top and sides with more graded gravel.
- Cap the gravel with an impermeable layer of puddled clay to prevent surface water entering the gallery.

This method will require a de-watering pump whilst the drain is being laid and can be dangerous, especially where the soil banks are prone to collapse. This method is most appropriate when collector galleries are laid alongside rivers where the groundwater is close to the surface. Figure 1 shows a trench infiltration gallery.



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**Figure 1. A trench infiltration gallery**

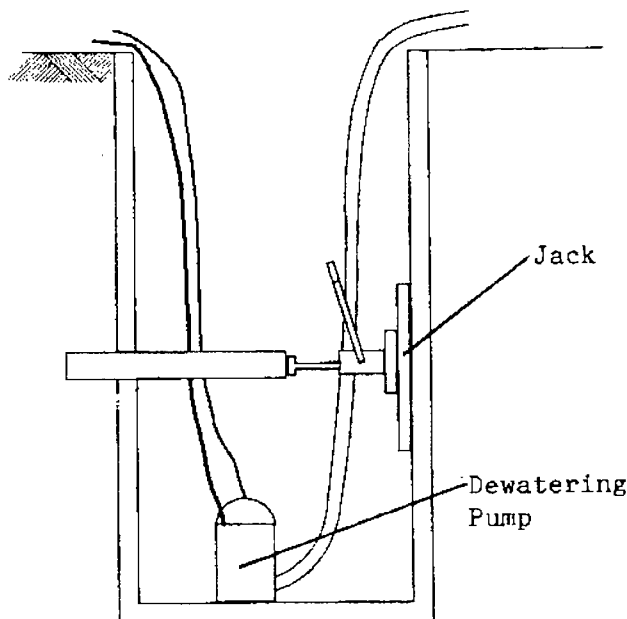
## Collector wells

### To improve the yield of a well, collector wells can be constructed as follows :

- A pipe is laid horizontally through the side of a well with a well point on the end of the pipe.

This method is used when the gallery is needed at depth to improve the yield of a dug well. It is usually not possible, however, to position a gravel pack around the gallery. Clogging of the perforations is thus more likely, and careful design is needed to avoid this difficulty. A drainage pump will be necessary to keep the well dry as the pipe is driven into the well wall.

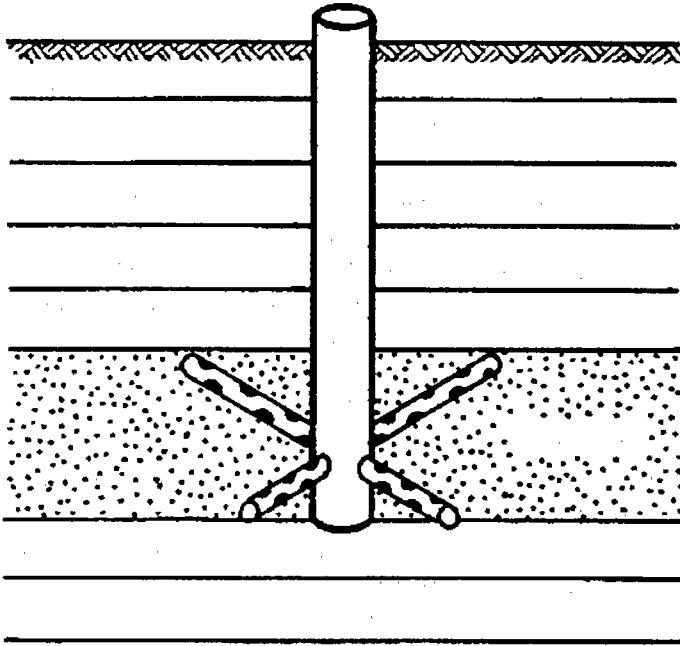
The pipes should be driven into the well so that they slope down to the well. To ensure continuous flow, the well point should be well under the dry season water table. Collector wells are not easy to maintain and if driven off course are not easily removed or realigned. During driving, if the well point hits a rock it may break and allow soil particles to enter the gallery. A survey of the area to be driven through should therefore be made using an auger to find out if there are rocky areas. The galleries can be driven in a number of ways - by direct hammering, "jacking" or jetting. Figure 2 shows a jack driven gallery.



**Figure 2. An infiltration gallery driven through the side of a well**

**Fact Sheet 2.5**

Where the yield of a well is very low, several collector wells can be constructed, as shown in Figure 3.



**Figure 3. Several collector wells feeding a central dug well**

Infiltration galleries should be regularly inspected, where possible, and the perforations and joints cleared of any debris. This can be done by jetting high pressure water along the pipe or drain. Care should be taken not to damage the gravel pack by forcing water through it at too high pressure.