



Introduction

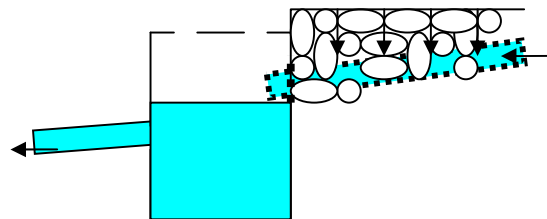
A spring is a natural flow of water from the ground into the open, where it passes a threshold of an uncontaminated environment to a high risk contamination environment. Spring catchments involves the draining of water into a concrete box near to a water spring or other surface water source to protect against contamination. From the spring box, the water is piped by gravity or by hydraulic ram pump to a reservoir storage tank located just higher in elevation to the village. From here it is distributed to faucets located just outside individual home sites, or in most cases, centralized locations (when home sites are too spread out).



Catching the water

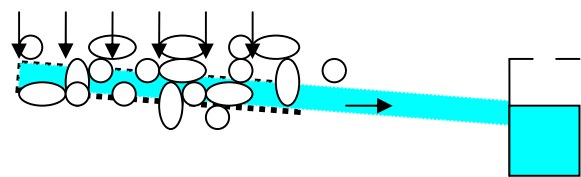
As the heading implies, the spring water is caught, and this is done by containing the water but allowing continual free gravity flow. The spring eye(s) is the visible emergence of the water into the open. Great skill and care is taken to excavate from this point so as not to damage the natural direction of flow, and mistakenly creating a new eye. A common mistake is to expect the flow of water to rise up over a walled structure. In essence, a dam like wall structure is constructed two to three feet in front of and below the eye, ensuring an impermeable concrete base, lines the floor area between the dam and the eye. A perforated pipe set on the floor will later act as a conduit for releasing the caught water. This floor area between the eye and the wall is backfilled with large boulders and stones, and covered over with cement. The water when caught like this, is

usually directed into a concrete spring box. The spring box can have two chambers if there is evidence of sediments coming through the eye. Inspection chambers must be included for the spring box, fittings and perforated pipe, and a desludge pipe should be included. If the source is open to contamination, more than one chamber is a requirement. The perforated pipe on the RHS of the diagram below, can be several metres long in some cases, and can be several in number coming from different spring eyes or from a wide area such as an emerging creek bed.



Filtration

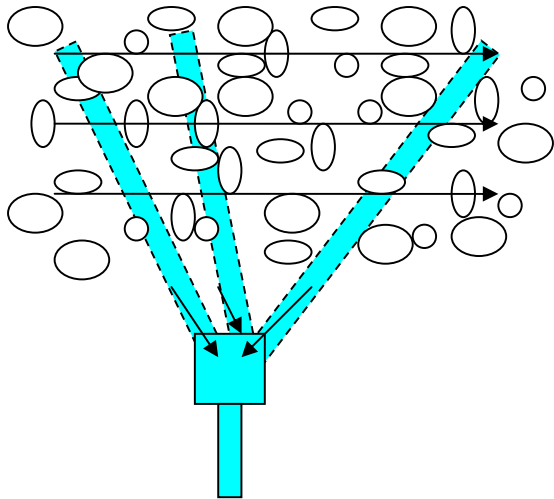
The perforated pipe can be utilised in other ways other than from a spring catchment. Sometimes it is difficult to determine the exact location of the spring eyes, as they seem to be everywhere, gradually leading into one sudden emergence of a creek. Building the dam wall in this type of scenario is effectively taking water from surface water and an open source. Therefore it is already in the high risk contamination environment. It is possible to use the same design methodology to re-create spring eye conditions, and this is also appropriate for taking catching water from creeks which are several kms from the spring eye.



The diagram is depicting a perforated pipe which has been positioned through a section of creek, diverting some flow of water to a concrete box. From here it can discharge into two or three chambers for sedimentation. This is a better alternative to a dam, which has major maintenance issues because of silt and sedimentation build up around the intake.



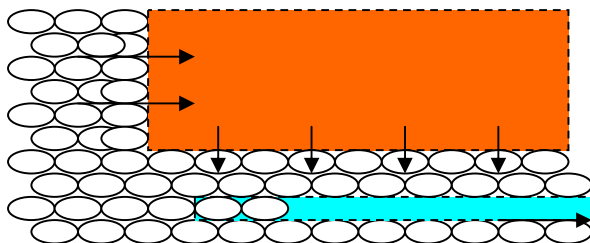
More than one perforated pipe can be laid across different sections of the creek, including creeks which have a tendency to dry up seasonally, yet still have flows below the surface.



The diagram shows an aerial view of the spring catchment with the longer arrows showing the direction of natural water flow on the creek surface from left to right. Pipes have been laid below the creek floor, and drain some water to a collecting box. The box can either pipe the water away for a GFS or to other wells, or the box itself can be used as a well.

Infiltration Galleries

Infiltration galleries function as described above. Design is basic, and has the added benefit of treating the water through the filtering process. Specific grades of sand or aggregate can be used. The diagram shows a plan view, looking through the side of the trench. The arrows from left to right show the seepage direction of water as it enters the trench through a wall of stones or aggregate. Once passed the wall, the water must filter through the block of sand, and fall to the drainage pipe.



Concluding Comments

Spring catchment is a combination of catching water and draining the flow to a spring box or sedimentation chamber. It is argued amongst engineers as to whether sedimentation is required directly from a spring as sediments are so minimal. It is instructional rather than preferable to include sedimentation chambers for all intakes from surface water, and preferable when caught directly from spring eyes.

Following an infiltration gallery, a sedimentation chamber will be necessary to remove sand and other sediment. If built correctly, infiltration galleries can be as effective as well constructed spring catchments.



Sedimentation chamber with overflow back into the main creek



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