

EFFECTIVE GROUNDWATER MONITORING USING DEDICATED PUMPING TUBES

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This article describes a groundwater monitoring procedure that does not require decontamination of pumping equipment, eliminates the chance of cross contamination between wells, and uses a surface pump. Two surface pumps are described, one for water level depths less than 25 feet and one for water level depths greater than 25 feet.

● **Install Dedicated Pumping Tubes**

A dedicated pumping tube (1/2" black irrigation hose) with a bottom check valve (Brady 3/4" check valve) is installed in each monitoring well for use with a surface pump. For water level depths less than 25 feet, the recommended surface pump is a SHURflo 12 VDC suction pump, Model 2088-422-444. The check valve installed at bottom of the pumping tube allows easy priming of the pump by moving the tube up and down. For water level depths greater than 25 feet the recommended surface pump is a Rotapump inertial lift pump driven by a DC motor. An inertial lift pump paired with a properly sized and supported pumping tube can pump water from hundreds of feet.

● **Measure Water Levels and Purge Wells in Sequence**

Initially, the well caps are removed the day before to allow water levels to equilibrate overnight to atmospheric pressure. This step is not necessary if the well caps are vented. The next day, water level depths are measured in all the wells before groundwater pumping is done to insure that water level depths are not affected by well pumping. After water level depths are measured, the wells to be sampled are purged in a chosen order using the dedicated pumping tubes and the surface pump. At each well, after the indicator parameters pH, conductivity, temperature, etc., have stabilized, the pumping tube is removed from the well to allow the water level to recover unimpeded, and purging of the next well is begun. This procedure minimizes down time because water levels in the purged wells recover while each remaining well is purged.

● **Sample Wells in Sequence**

After the wells are purged, and after water levels recover to more than 90 percent of their measured depth, the wells are sampled with a bailer in the order they were purged. In each well, after the water samples have been taken, the pumping tube is stored in the well for use during the next sampling event. Using this procedure, the possibility of cross contamination between wells is eliminated because the dedicated pumping tubes are never in contact with sampled water and the surface pump does not contact the sampled water between wells. For these reasons decontamination of equipment is eliminated.

● **Applicability to Low Flow Sampling**

Where the water level depth is less than 25 feet, the end of the pumping tube is positioned at the sampling depth and the pump rate of the SHURflo pump is precisely controlled at a low value using a Rotapump speed controller. This set up is shown in the photograph. In this case the interior of the SHURflo pump is decontaminated before use in another well. How low flow sampling is done where the depth to groundwater is greater than 25 feet is described in *Low Flow Groundwater Sampling Using Rotapump Inertial Lift Pump*.



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