WELL WATER CONNECTION, INC.
Water Well Design & Project Management

How Artesian Wells Work

To understand how bedrock wells work, imagine you have 2 - 5 gallon buckets and 2 large rocks. In each bucket, you place one of the rocks. One rock is solid, with no cracks or fractures in it. The other rock has several fractures running through it. Each bucket is then filled to the top with water. Imagine if we drilled a small hole a couple inches into the top of each rock. Imagine we then insert a straw through the water, into each boulder to the bottom of each hole we drilled, and created a watertight seal between the inside of the rock and the outside of the straw.

Would we be able to draw up any water through the straw from the rocks? Obviously, the rock with no cracks in it would have no water in it, right? In the other bucket, the rock with the fractures running through it would contain water, but only in its cracks. But because the straw seals off cracks as it passes through each one, no water would be able to flow into the straw from a crack. Any water that moves through these cracks will flow around the straw, not into it. If we were able forced the straw down deeper through the middle to near the bottom of this same rock, no water could be drawn from the rock. That is unless the tip of the inserted end of the straw somehow ended up on a crack and the chances of that are remote. So how do we get water from the rocks? The solid rock, because it has no cracks will never allow water to flow freely through it. The other rock, however has plenty of cracks and therefore allows water to flow through it. We just need to get at it.

Now imagine if we left the straw in place just a couple inches in the fractured rock. Then we took a slightly narrower, but much longer drill bit and inserted it inside the straw down to the rock below. Then we started drilling. Because the rock is hard, the hole drilled through it will stay open as the drill bit travels through. As the drill bit eventually passes small cracks in the fractured rock, water would begin to flow into the drilled hole. If we pulled out the drill bit and watched, what would happen? We would see water flowing from the cracks that were intersected by the drill bit. The flowing water would begin to fill up the drilled hole.

The water level in the drilled hole would continue to rise, past the bottom tip of the straw and up to the same level as the water in the bucket. This occurs because the water in the submerged rock is under *hydrostatic pressure.* Hydrostatic pressure (psi) is created by the weight of the water above the fracture and is the force that pushes the water through the fracture into the drilled hole and up to the same level as the water surrounding the rock. Anyone who has been more than a few feet below the surface of water has felt it.

PO Box 158 * Tewksbury, MA 01876 * Tel: 978-640-6900 * Fax: 978-640-6901 * www.WellWaterConnection.com