

Water Well Basics

There are approximately 100,000 domestic water wells in New Brunswick. The two main types of wells found are drilled wells and the less common dug well. Historically, dug wells were dug by hand but today, they are usually dug with the use of a back hoe. Because they are shallow, dug wells are more vulnerable to contamination and to drying up during periods of drought therefore most of the wells we see today are drilled wells. One of the ways to identify the type of well you have is to look at the outer casing and the cover that can be seen at ground level (See below). Older drilled wells may be buried underground which makes them more vulnerable to potential sources of contamination via surface water infiltration. If your well head is buried, you should have it extended to 18 inches above ground by a licensed well driller and make sure it is fitted with a watertight, vermin proof cap. It is now illegal to bury a well head.

Drilled Wells:

Casing on drilled domestic wells generally have a diameter of 4–8 in (most commonly 6 inches in newer wells)

A drilled well consists of a hole bored into the ground, with the upper part being lined with casing. The casing prevents the collapse of the borehole walls and (with a drive shoe or grout seal) to prevent surface or subsurface contaminants from entering the water supply and a well screen is placed at the bottom of the well to prevent inflow of sediment into the pump. The casing also provides housing for a pumping mechanism and for the pipe that moves water from the pump to the surface.

Drilled wells are constructed by either percussion or rotary-drilling machines. A well that is constructed with a rotary drilling machine incorporates the use of circulating drilling fluid or compressed air to remove drill cuttings from the well hole. To serve as a water supply, a drilled well must intersect bedrock fractures containing ground water.

Most modern wells are drilled, which requires a fairly complicated and expensive drill rig. Drill rigs are often mounted on big trucks. They use rotary drill bits that chew away at the rock, percussion bits that smash the rock, or, if the ground is soft, large auger bits. Drilled wells can be drilled more than 1,000 feet deep but domestic wells are usually between 100-200 feet in depth and 6 inches in diameter. Often a pump is placed near the bottom to push water up to the surface.

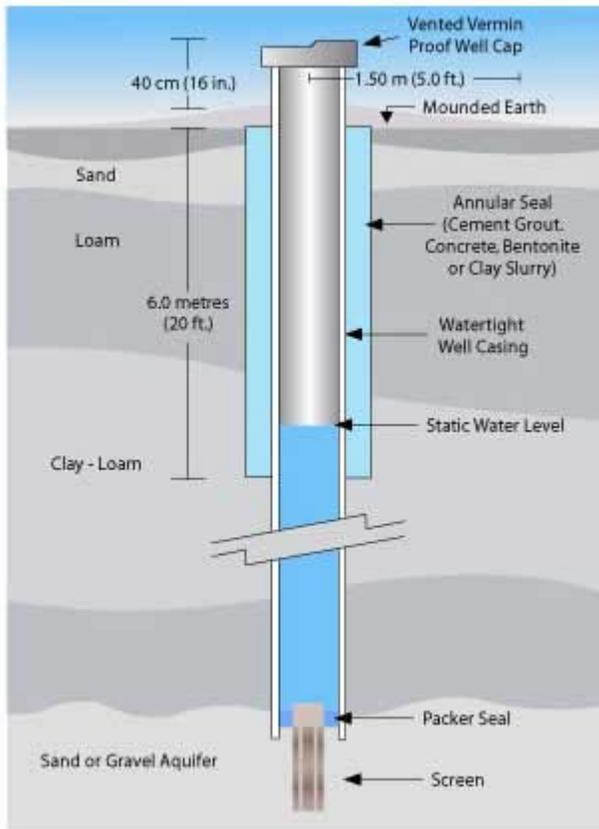


Diagram: Drilled well in sand or gravel aquifer

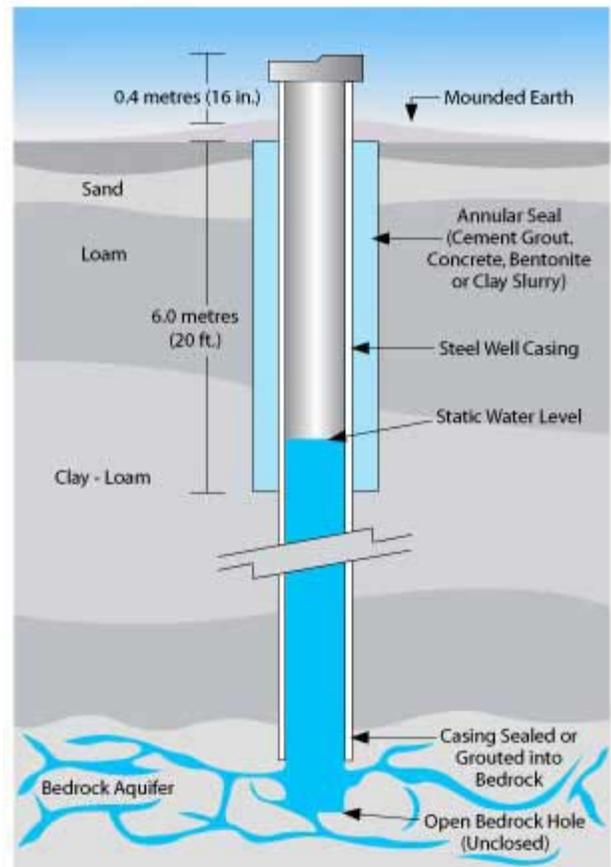


Diagram: Drilled well in bedrock aquifer

Dug wells:

Casing on dug wells generally have a diameter of 60–120 cm (24–48 in)

Dug wells are holes in the ground dug by shovel or backhoe. Historically, a dug well was excavated below the groundwater table until incoming water exceeded the digger's bailing rate. The well was then lined (cased) with stones, brick, tile, or other material to prevent collapse. It was covered with a cap of wood, stone, or concrete. Today, there are specific requirements for casing materials. For more information on the construction requirements of a dug well, please see the [Water Well Regulation](#). Since it's so difficult to dig beneath the ground water table, dug wells are not very deep. Typically, they are only 10 to 30 feet deep and 1 meter in diameter. Being so shallow, dug wells have the highest risk of becoming contaminated and they often go dry during periods of drought if the water table becomes lower than the depth of the well.

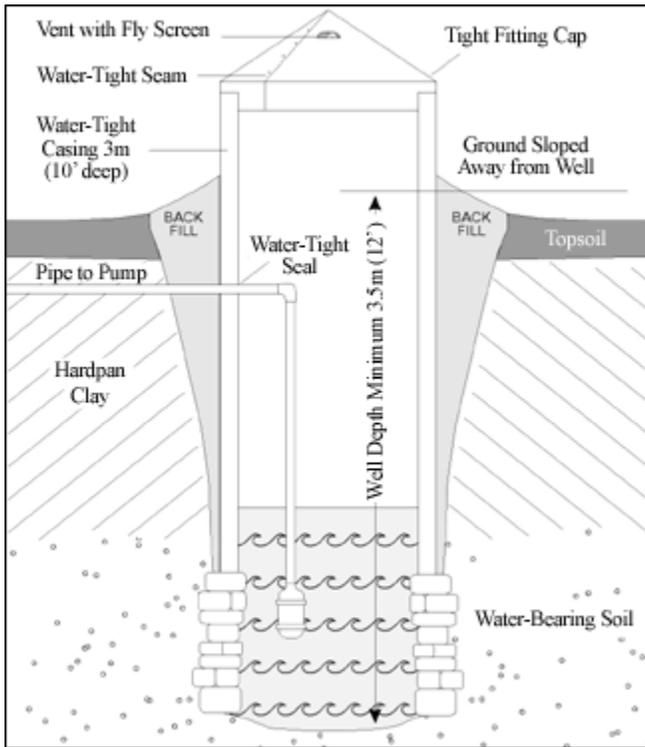


Diagram: example of a dug well

Sandpoint Wells: Sand-point or driven-point wells consist of a small-diameter casing ranging in size from 2.5-5 cm (1-2 in.). Sand-point wells are constructed in sand and gravel aquifers and are either driven or jetted (inserted using high-pressure water) into the ground. Sand-point wells are usually only installed where the aquifer has a shallow water table and the ground is of sandy composition. They are normally no deeper than 25 feet. The diagram below shows the construction of a typical sandpoint well. Because of the type of construction (driven or jetted into place) and the type of aquifer (unconfined, shallow, sand or gravel), sand-point wells are considered highly vulnerable to contamination. Contaminants on the ground surface have only a short distance to travel before reaching the water table and the well inlet.

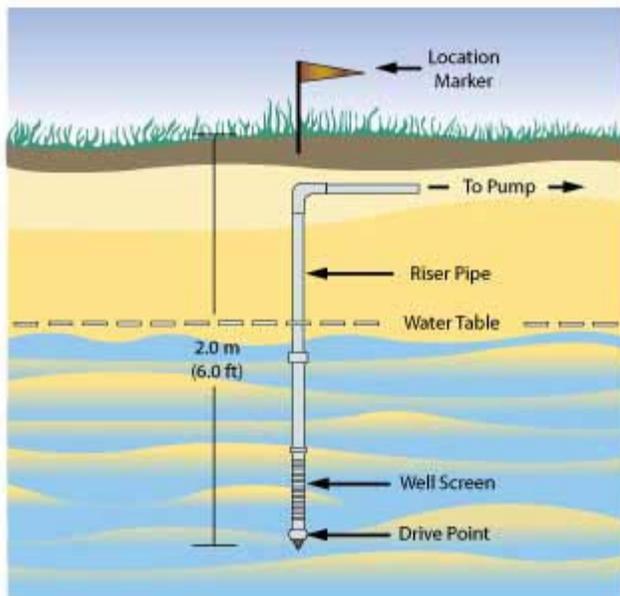


Diagram: example of a sandpoint well

Artesian Wells:

In ordinary conversation, people often mis-use the term artesian well. Deep wells drilled into rock to intersect the water table and reaching far below it are often called artesian wells but this is not a correct use of the term. Great depth alone does not necessarily make a well artesian.

The correct definition of an artesian well is: a well that is drilled through impermeable strata into strata that receives water from a higher altitude so there is pressure to force the water to flow upward. If the water level rises above ground level, the well is referred to as a flowing artesian well. Artesian pressure can be mild resulting in a slight trickle of water rising above the well head or it can be very strong resulting in a geyser of water shooting upwards. Flowing artesian wells can result in the wasting of the water resource since much of the overflowing water likely runs off and therefore does not make it back into the aquifer of origin. For water conservation purposes, it is required as per the Water Well Regulation – Clean Water Act that the flow be controlled by a device approved by the Minister of Environment. If you would like more information on how to control a flowing artesian well, please contact your local office of the Department of Environment.

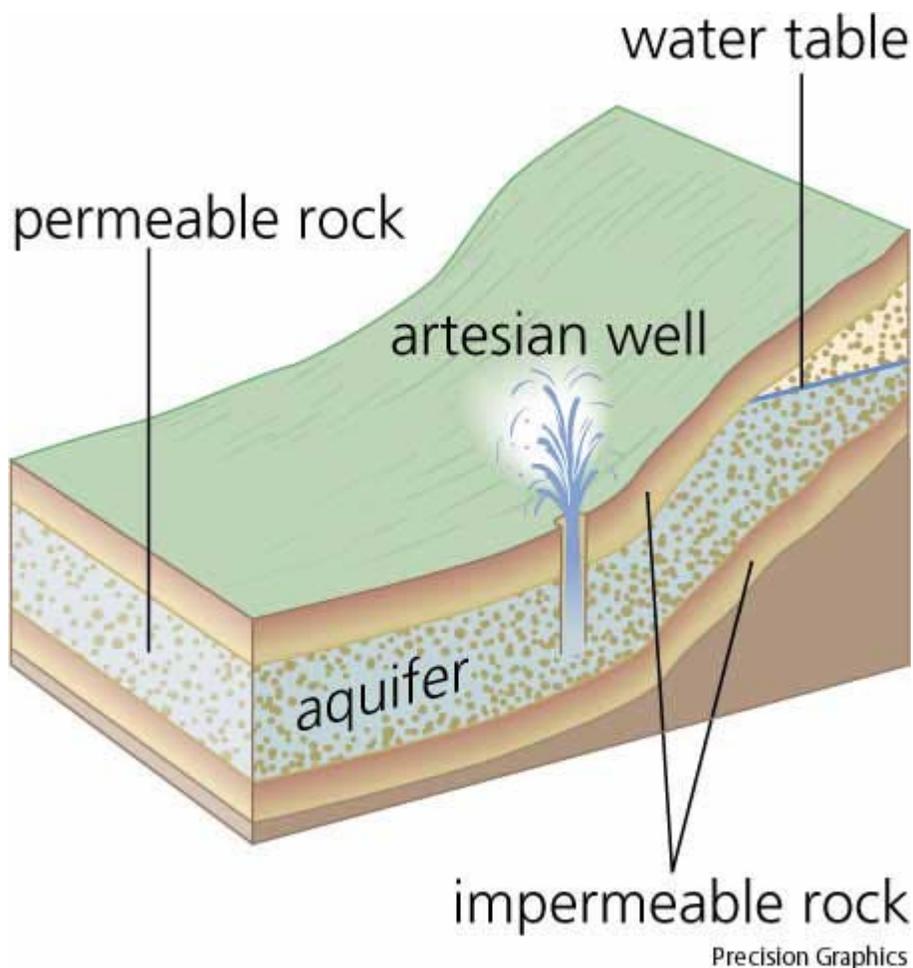


Diagram: example of a flowing artesian well

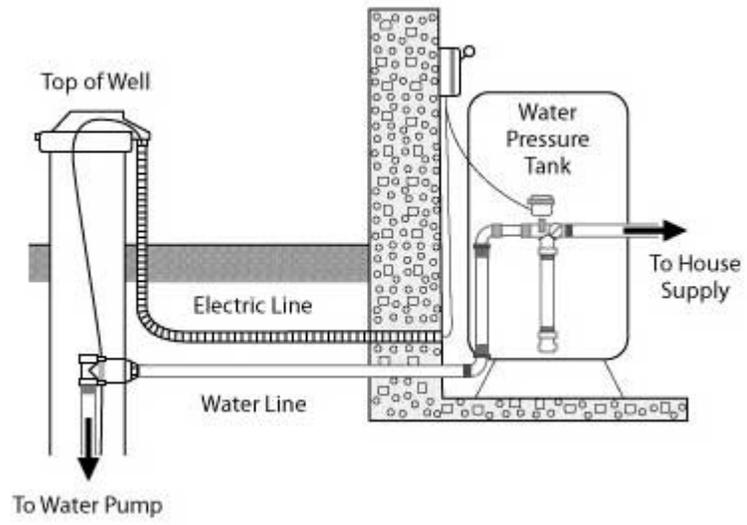


Diagram: How well water is brought into your home.