

HOW TO DISINFECT YOUR WELL



Whitman County Environmental Health
Public Service Building
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INSTRUCTIONS FOR CHLORINATING WELLS

The Whitman County Department of Public Health recommends chlorination to remove or control bacterial contamination in wells. This simple, but effective, method of well chlorination can be successful if followed properly.

Please read all instructions carefully before starting!

1. Most wells will have a sanitary seal in place. These seals are protective caps placed over the opening of the well to keep contamination out, and are essential to assure safe drinking water. The diagrams on the following pages show some of the most common seal types. All wells should have this sanitary seal. If your well doesn't have a seal, you should have one installed. Plumbing supply firms can provide additional information on products and may be able to assist in the installation of the seals.
2. In order to chlorinate your well, you must first gain access to the inside of the well casing (The large pipe going into the ground). This can be done by either removing the sanitary seal (see Type 1 Seals *Figures #1 & 2* and Type 2 Seals *Figure #3*) or by removing only the access plug on the seal (see Type 3 Seals *Figure #6*). CAUTION: Type 1 & 3 seals can support heavy pumps and pipes and are very difficult to remove safely.
3. The exact amount of chlorine (**standard household bleach**) needed depends on the depth of the standing water in the well casing. Many times it is not possible to measure this depth. A simpler (and usually just as effective) approach is to use the amount of chlorine shown in the table below:

<u>Total Well Depth</u>	<u>Amount of Chlorine Bleach</u>
Less than 40 feet	½ gallon
40 feet – 150 feet	1 gallon
150 feet or more	1 ½ - 2 gallons

4. One of the best methods for pouring chlorine into the well is to pre-mix the bleach with enough water to make five gallons; (you can use a five (5) gallon or larger bucket). Pour the solution down the inside of the casing. **DO NOT** pour the chlorine (bleach) by itself. The extra volume of the solution will help with washing down the plumbing and mixing the chlorine with the well water. With sanitary seal Type #2, use a circular motion as you pour. With seal Type #1 and #3, a funnel will be necessary because of the small opening in the seal.
5. Place a hose into the open well casing (Type #2) or plumbing fittings (if available) connect a hose to the access hole (Type #1 or #3). Turn the hose tap all the way open. This insures mixing of the chlorine throughout water column in the well. Let the water run between 3-4 hours, then shut it off.
6. Remove the hose from the well and refill the bucket with ½ cup of bleach (see step #4). Use this water to rinse the sanitary seal (Type #1 and 2) or the access plug (Type #3). Securely replace the seal or plug. You can pour the remaining solution left in the bucket onto the ground. CAUTION: Avoid plants and trees, the chlorine may be harmful to them.

7. Starting at any cold-water tap, run the water until you smell chlorine – then shut it off. Go to all cold water taps inside AND outside the house (remember to include the toilet and washing machine) and repeat this procedure. This will allow the chlorinated water to circulate in the plumbing and pipe system of the home.
8. Once chlorine is smelled in all taps, turn off the taps and let the chlorinated water set in the system over night. This will allow time for the chlorine to do its work.
9. The following day, connect a hose to an outside tap and turn the water on full flow. This will allow you to clean the remaining chlorine out of the system. The water will typically run for quite awhile, so be sure the water will not build up and cause damage. **AVOID LAWNS, PLANTS, AND THE SEPTIC TANK AND DRAINFIELD AREA.** When you can no longer smell chlorine, turn the water off.
10. Turn on all the other remaining cold water taps (full flow) and let them run until you can no longer smell chlorine – then turn them off.
11. Chlorine sometimes will loosen scale (rust) inside the pipes. The scale will collect on screens at sink faucets and the laundry washing machine. Be sure to check the screens and remove the scale.

That's all there is to it. To check on the success or failure of chlorination, a bacteriological analysis of the water must be made. A sample should be collected 10 days after chlorinating the well. Occasionally problem wells will need to be chlorinated more than just once.

SEE PAGE #7 FOR ADDITIONAL COMMENTS ABOUT DRIVEN WELLS.

Whitman County Public Health recommends testing the water once every three (3) months for the first year. By testing every 3rd month, any seasonal contamination t the well can be detected. After the first year, one test per year is typically all that is required.

If the well requires re-sampling to test for chemical contamination, or is being reviewed for a bank loan and requires additional testing, please contact the Whitman County Environmental Health Department for additional information and requirements.

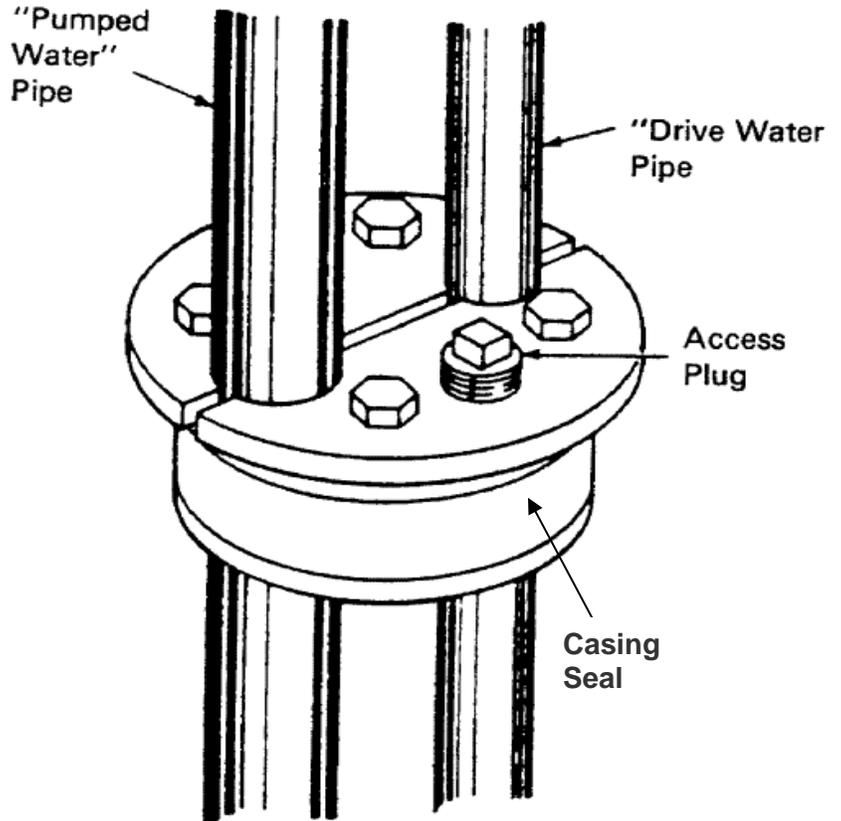


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Type 1 Seals

Figure 1: Well Seal for Jet Pump

A circular expandable neoprene gasket, compressed between two (2) steel plates. There are 3 tapped openings in the well seal: two on the mid-line for the "pumped water" pipe, the "drive water" pipe and a third between and below for an access plug. The well seal has 4 cap screws located above and below the two pipes.



*The Manual of Individual Water Supply Systems, Environmental Protection Agency (EPA)
Publication number EPA-430-9-73-003*

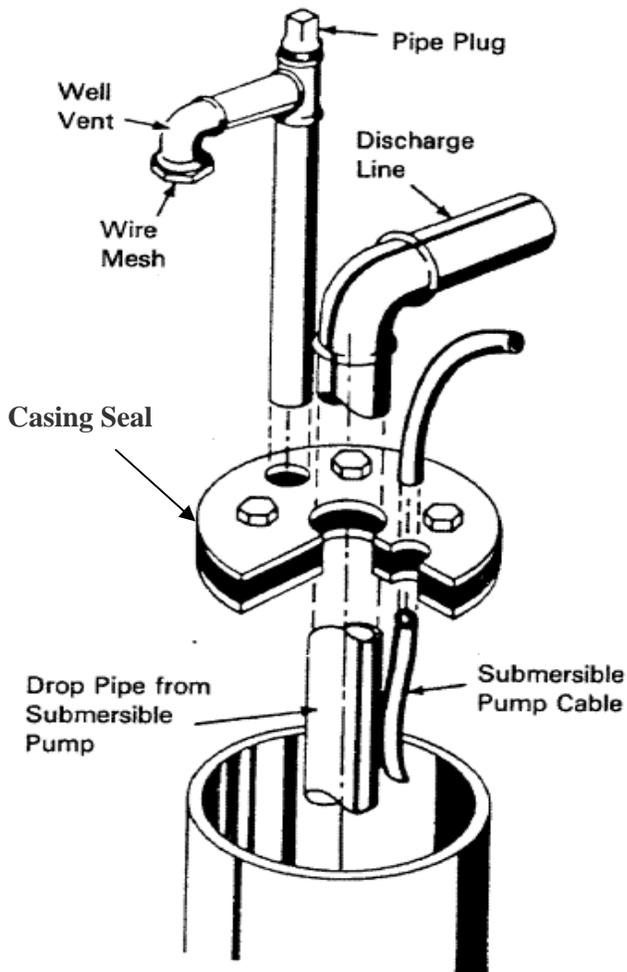
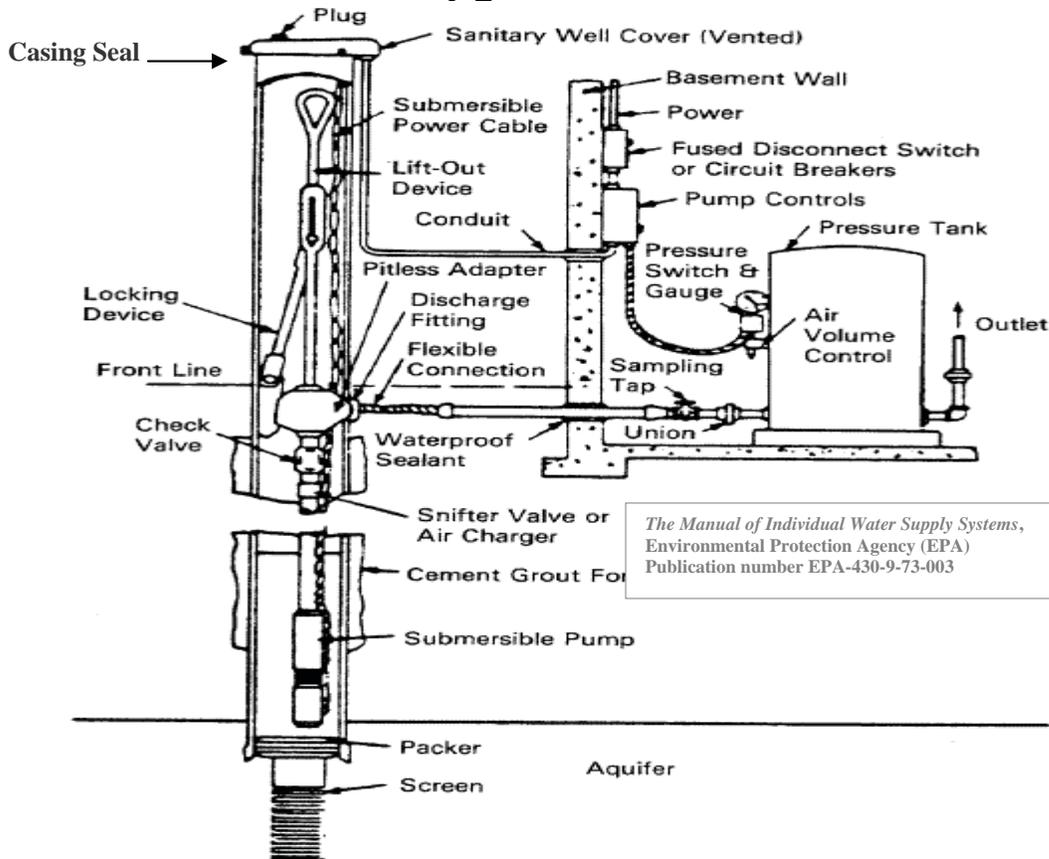


Figure 2: Well Seal for Submersible Pump

A circular expandable neoprene gasket, compressed between two (2) steel plates. There are 3 tapped openings in the well seal: the largest in the center of the seal is the discharge line that is connected to the drop pipe from the submersible pump. On one side of the discharge line there is a self-draining well vent that has been capped with a pipe plug and has as its opening an overlapping and downward flange. The opening is covered with wire mesh. On the other side of the discharge line is a smaller opening for the submersible pump cable.

*The Manual of Individual Water Supply Systems, Environmental Protection Agency (EPA)
Publication number EPA-430-9-73-003*

Type 2 Seals



*The Manual of Individual Water Supply Systems,
Environmental Protection Agency (EPA)
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Figure 3: Pit-less Adapter with Submersible Pump

On the left of the image is the well casing capped with a vented sanitary well cover (Several variations of this construction are used). The well cover has a plug in the top. The submersible power cable runs from the well cover to the submersible pump below the water line. At the top of the well is the handle for the lift out device, a long pole attached to the pit-less adapter. The locking device, a wedge between the pit less adapter and the left wall of the well casing, is also attached to the lift-out device by a hinged pole. The pit less adapter is located in the well casing below the frost line. It is fitted to a discharge fitting in the right wall of the well casing.

The drop pipe below the pit less adapter has a check valve. Below the check valve is a snifter valve or air charger. The well casing is surrounded by a cement grout formation seal from just below the pit less adapter to the level of the submersible pump. The submersible pump is below the water level in the well casing. The well casing extends just into the aquifer. The end of the well casing is closed with a packer. A screen extends further down from the packer into the aquifer.

A flexible connection goes from the discharge fitting on the pit less adapter toward the basement on the right side of the figure. The flexible connection joins a pipe that goes straight across through the basement wall to enter the bottom of a pressure tank. The opening in the basement wall the pipe goes through is sealed with waterproof sealant. Inside the basement before the pipe enters the pressure tank is a sampling tap. Between the sampling tap and the pressure tank is the union.

The submersible power cable comes up through the sanitary well cover, goes through an underground conduit and through the basement wall to the pump controls on the basement wall. A power cable comes down the basement wall to the pump controls through a fused disconnect switch or circuit breakers. A cable leads from the pump controls to a pressure switch and gauge and an air volume control on the pressure tank. A pipe leading from the bottom right side of the pressure tank bends upwards and is labeled outlet.

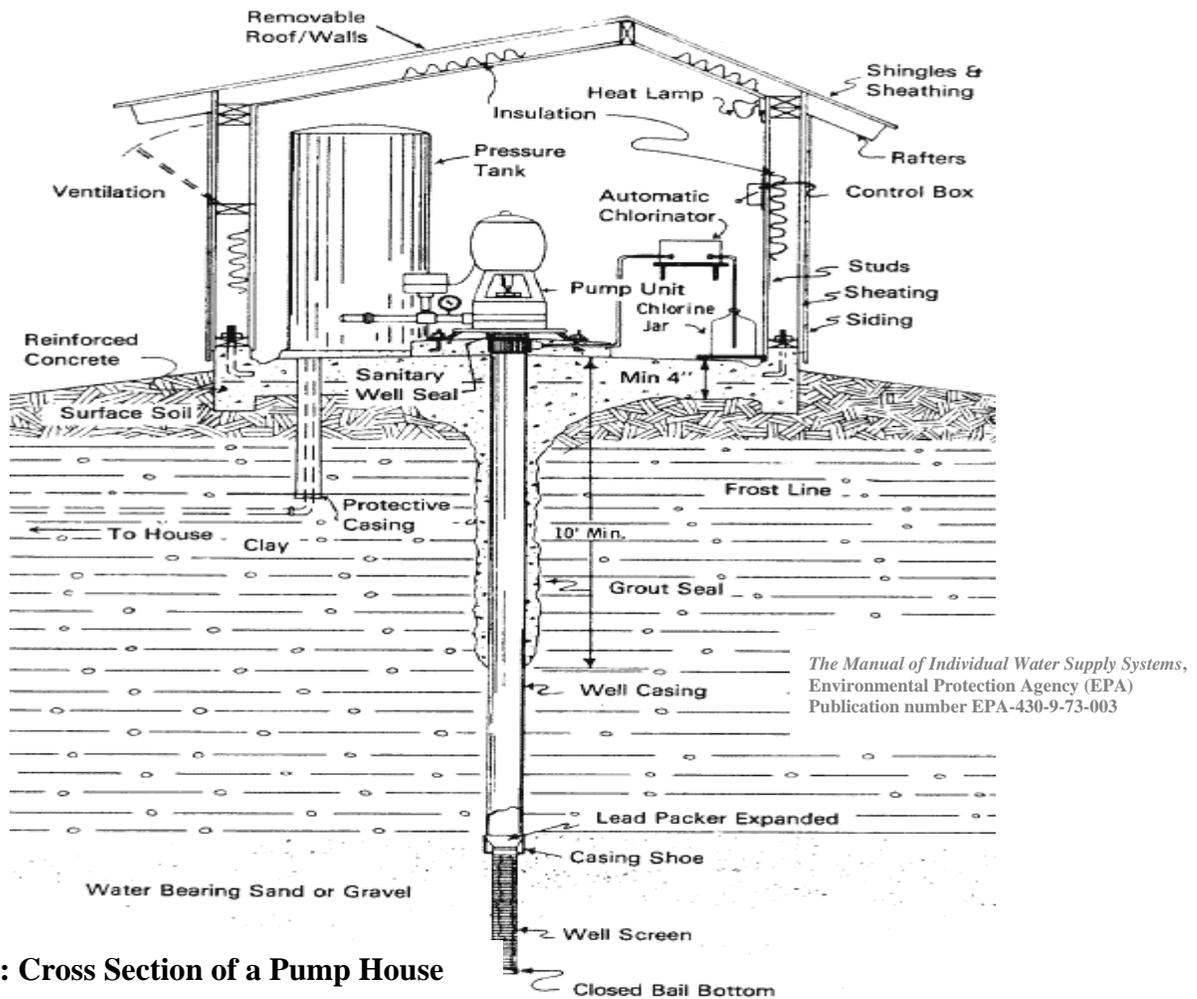


Figure 4: Cross Section of a Pump House

Cross section of a pump house, the well inside it and surrounding ground layers. The pump house sits above ground level with the ground sloping away from it in all directions. The floor of the pump house is reinforced concrete 4 inches thick minimum and slopes away from the pump unit in the center to gutters along the walls.

The roof and walls of the pump house are removable. The area in the walls between the studs and the sheathing and siding is filled with insulation. The area in the roof between the rafters and the shingles and sheathing is filled with insulation. The left hand wall of the pump house has an opening for ventilation.

In the top right hand corner of the pump house there is a heat lamp. Below the heat lamp on the right wall of the pump house is a control box. If needed, there is a chlorine jar. A tube leads up from the chlorine jar to an automatic chlorinator on a shelf. A tube leads from the automatic chlorinator to the well casing below the sanitary well seal. The well casing comes up through the middle of the pump house. It is capped by a sanitary well seal and a pump unit is above it. A pipe extends to the left from the pump unit to a pressure tank. There is a gauge on this pipe. A pipe extends downward from the pressure tank through the floor of the pump house. It is covered with a protective casing until it extends past the frost line. At this point the pipe bends and goes to the left 'to house'.

The well extends downward from the middle of the pump house. The well casing is surrounded by a grout seal from the surface to a depth of 10 feet minimum. The depth of the grout seal is shown as extending through the surface soil layer and into the clay layer past the frost line. At the interface between the clay layer and the water bearing sand or gravel layer, the well casing ends in a casing shoe. Inside the well casing there is a lead packer expanded. Extending down into the water bearing sand or gravel layer is a well screen ending in a closed bail bottom.

PROCEDURE FOR CHLORINATION OF A DRIVEN WELL

Superchlorination Process

If your well casing is less than three (3) inches in diameter, than you probably have a driven well. Driven wells are almost always shallow. These wells are very easily contaminated by dirty surface water or septic tanks and drainfield. To check on the continued safety of driven well water, Whitman County Environmental Health recommends the water be tested approximately once every three (3) months.

Driven wells are not easily chlorinated. It may be necessary to repeat this procedure.

1. To chlorinate a driven well you must gain access to the inside of the well casing. To do this, disconnect the direct connection so that the well casing is open.
2. Using a gallon of “regular” household bleach (such as Clorox® or Purex®), pour all but one (1) cup down the casing be sure that you are washing down the inside of the casing. Use the cup of bleach to wash off the connections before replacing.
3. Wash the direct connection with bleach and rejoin it.
4. Let the mixture set for at least one hour. This will give the chlorine time to work in the well casing.
5. Continue with the steps #7-#11 on Page 3 to finish the disinfecting process.

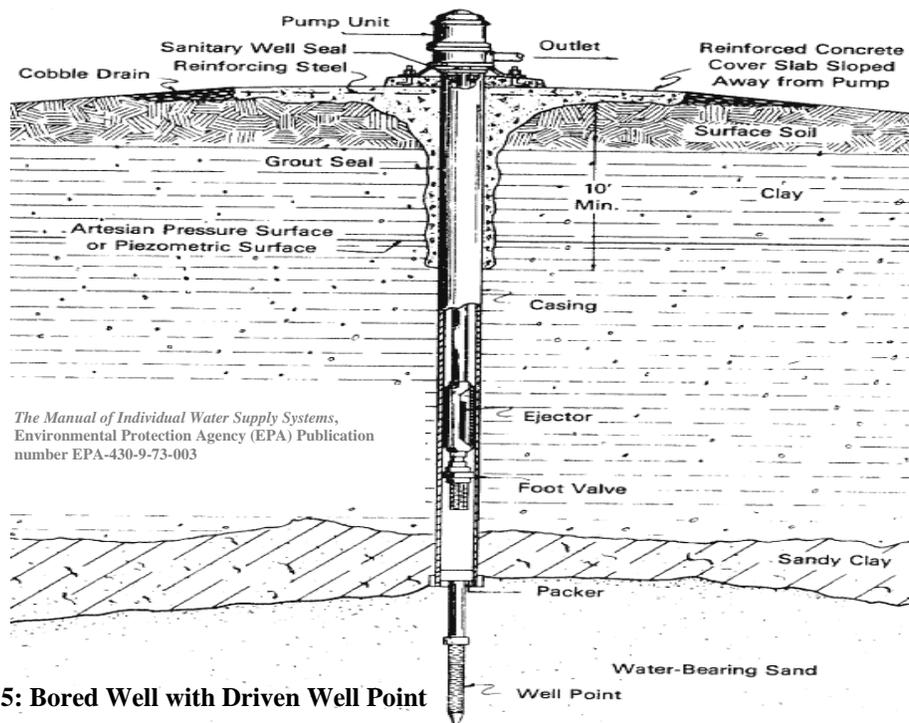
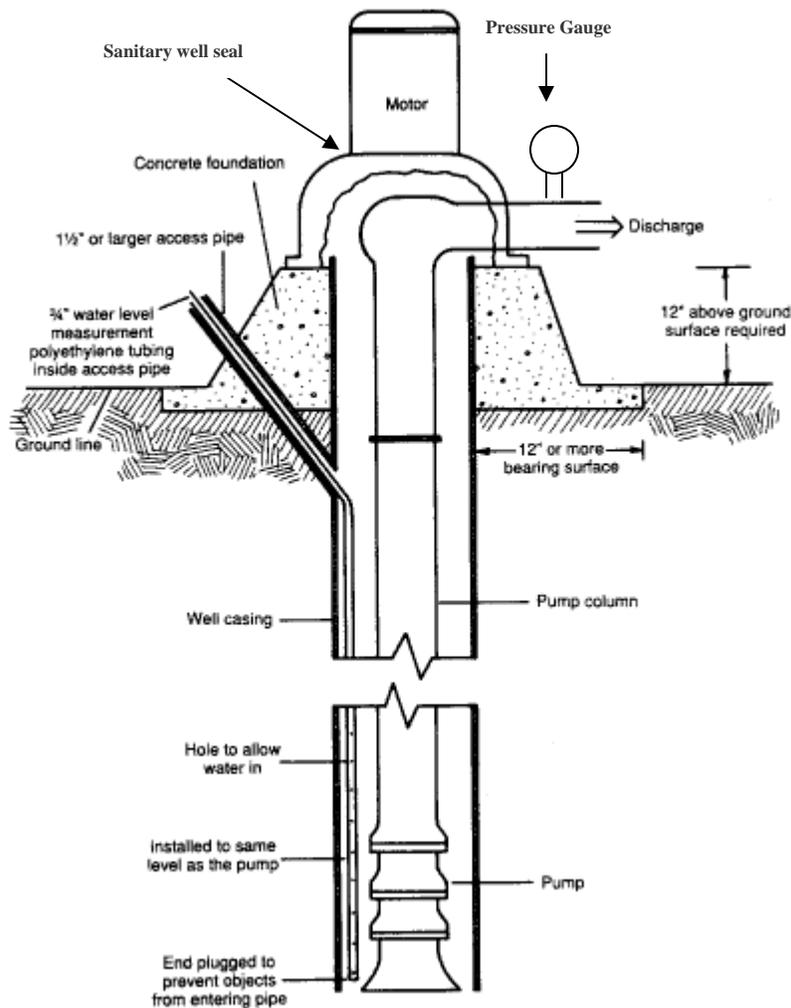


Figure 5: Bored Well with Driven Well Point

Cross section of a bored well with driven well point and surrounding ground layers. Above ground, on top of the well casing, is a pump unit with an outlet pipe going to the right. Between the pump unit and the well casing is a sanitary well seal. On the ground surrounding the well is a reinforced concrete cover slab sloped away from the pump to a cobbled drain area. Underneath the concrete cover slab is a layer of reinforcing steel. The well casing is surrounded by a grout seal from the reinforcing steel to a depth of 10 feet minimum. The depth of the grout seal is shown as extending through the surface soil layer and into the clay layer past the artesian pressure surface or piezometric surface. An ejector and foot valve are shown as inside the well casing below the level of the artesian pressure surface or piezometric surface and above the sandy clay layer. Inside the well casing a packer is shown at the interface between the sandy clay layer and the layer of water-bearing sand. The well casing ends at this interface. A well point extends beyond the well casing into the water-bearing sand layer.

Type 3 Seals

Figure 6: Well with Access Pipe



North Dakota State University Extension Service
1993 Irrigation Water Pumps. Publication AE1057.

This type of well is typically seen in high flow or high volume water systems. Large water systems, such as municipalities or cities, that require large outputs of water will typically use this type of well configuration. It is also common to see this arrangement in larger irrigation or sprinkler/watering systems. It is uncommon to see this type of well on a private residence.

The access pipe that is found on these types of water wells can be used to allow the well owner or water system operator to measure the water level. Groundwater levels can be accurately measured to one one-hundredth of a foot (0.01 ft) using a survey-grade groundwater level meter. CAUTION: A groundwater meter may become lodged in the pump or plumbing of the well if inserted improperly, if you are unfamiliar with this process Whitman County Environmental Health recommends contacting a professional water system and/or a water well specialist.