

# WELL OWNER'S MANUAL



**A Water Systems Council Publication**

# Well Owner's Manual

## Table of Contents

Your Water Well System	3
Well Records	4
Where Your Water Comes From	7
Wells	9
Sample Well Diagram	11
Well Maintenance	13
Selecting a Well Contractor	16
Protecting Your Wellhead	19
Well Water Testing	21
Understanding Your Results	25
Checklist For Well Owners	29
The <a href="#">wellcare®</a> Hotline	30
Well Owners Network	31

**WELL WATER – NATURALLY BETTER®**

# Your Water Well System

## Important Records

If you are among the millions of Americans who rely on a private water well system for your household water supply, you can rest assured that your properly constructed well and pump system will provide you with many years of service.

This is a good place to keep the basic information you need to protect your investment and keep your well operating at its best. There is also a place to keep a log of water testing results and maintenance performed. These records are a helpful reference for the professional you hire to do inspection or repair work to your well, when that is necessary.

Finally, these records offer important information about your well for anyone who may purchase your property in the future.

## Your Well Permit and Well Completion Report

In most states before a well is drilled, the well contractor or property owner is required to get a well permit. This permit includes information on the location and design of your well. Often, this permit is issued by the health department.

When your well is completed, your well contractor is usually required to file a well completion report with the agency responsible for wells in your state. The well completion report contains more important details on your well's location, size and depth, as well as on materials used in construction and water quality. Keep copies of your well permit and well completion report with this manual for future reference.

If you don't have your well permit or well completion report, contact the well contractor who installed your well or your county or state health department. They may be able to locate these records.

# wellcare® Well Records

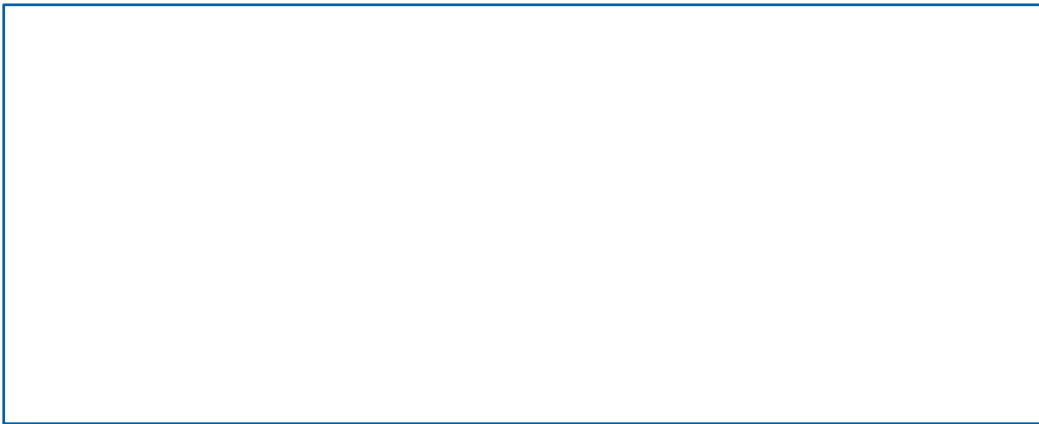
## Basic Information

Your Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Well Contractor \_\_\_\_\_  
Contractor Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Contractor Phone \_\_\_\_\_  
Well Permit Number: \_\_\_\_\_ Construction Date \_\_\_\_\_

## Initial Water Testing Results

Bacteria \_\_\_\_\_  
Minerals \_\_\_\_\_  
Other (Name) \_\_\_\_\_  
Other (Name) \_\_\_\_\_  
System Disinfected After Construction \_\_\_ Yes \_\_\_ No  
Disinfectant Used/Amount \_\_\_\_\_

## Well Location



Use this box to represent your property. Sketch in the location of your house, your well, and any other structures on your property. Include distances to your septic system and your neighbors' septic system, if you know where they are. Also include any garages, kennels, barns and barnyards, abandoned wells, and fuel storage tanks. Show which way the land slopes and how water drains on your property. Consult this drawing when you are planning any construction or landscaping or when interpreting the results of any water tests.

# wellcare<sup>®</sup> Well Records

## Well Data

Depth (ft.)	Diameter (in.)	Estimated Flow (gal. per min.)

Hole Size	Casing Size/Type	Screen Size/Type	Gravel Pack (ft./size)	Grout (ft./type)

## Pump Information

Manufacturer	Model No./Series	Motor Brand/HP/Voltage	Pump Depth (ft.)

Riser Pipe (in.)	PSI Rating	Pump Wire Size/Type	Pitless Adapter Model/Size	Flow Sleeve Size

## Tank Information

Manufacturer	Model No.	Precharge Pressure (psi)	Drawdown (gal.)	Pressure Switch Cut-on (psi)	Pressure Switch Cut-off (psi)

## Additional Components Information

# wellcare® Well Records

## Water Test Results Summary

Date	Lab	Reason for Sampling	Bacteria	Nitrate	Other Tests

## Well & Plumbing Maintenance Record

Date	Work Performed	Company	Cost

*(File any receipts and warranties)*

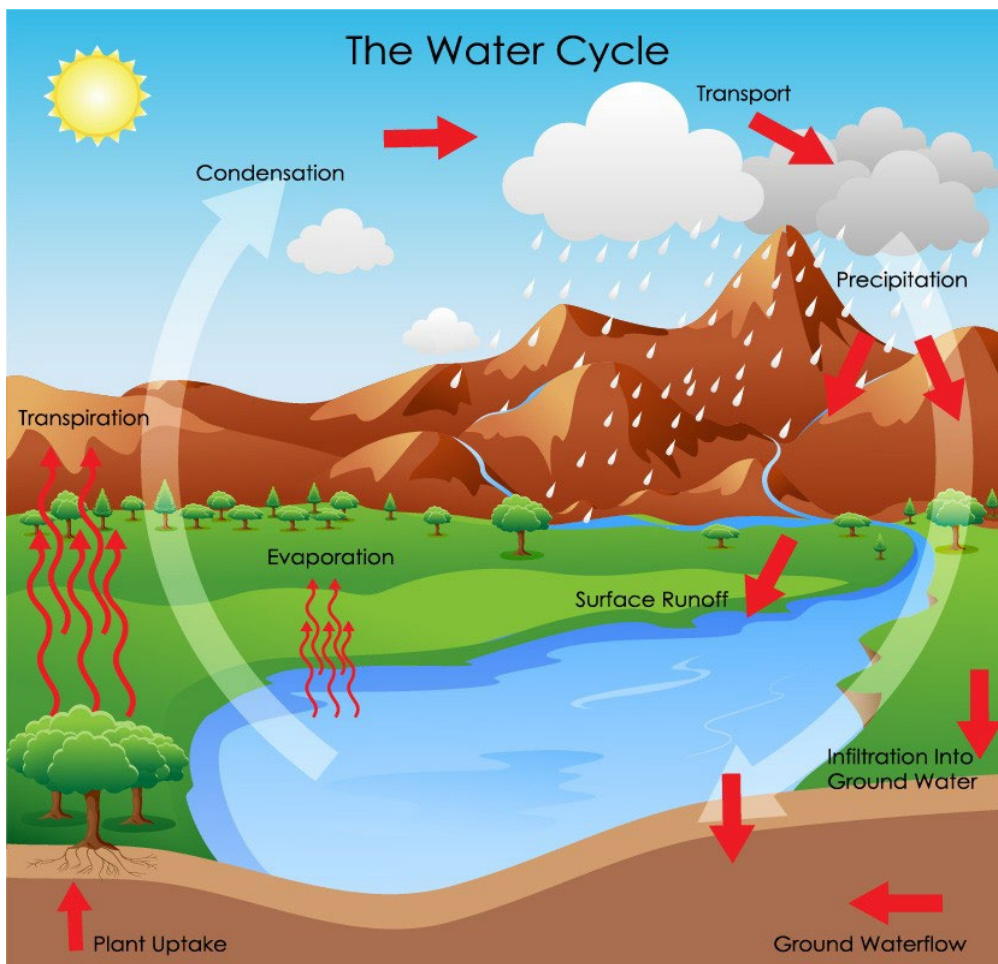
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# Where Your Water Comes From

## What is Groundwater?

Groundwater, which accounts for 30 percent of the world's fresh water, occurs below the ground where it is filtered naturally as it passes through layers of the earth. Groundwater is stored in aquifers - layers of soil, sand, and rocks - but can come to the surface naturally through a spring or brought to the surface through a well.

Water on the earth is constantly moving. The water cycle, pictured below, describes the continuous movement of water on, above and below the earth's surface. Water can change states (liquid, vapor, ice) at various stages of the water cycle.



*When water falls as rain, hail or snow, some of it collects as surface water. The rest seeps into the earth to become groundwater. Groundwater flows slowly underground and emerges again as surface water. Evaporation of surface water takes place and the cycle begins again.*

## **Steps You Should Take to Protect Your Groundwater and Well Water**

- ✓ Maintain your well.
- ✓ Keep household chemicals and paint away from your well and dispose of them properly. Take used motor oil to a recycling center.
- ✓ Limit your use of pesticides and fertilizers.
- ✓ Install a well cap and keep it clear of leaves, mulch, dirt, snow, or other materials.
- ✓ Be careful when you mow around your well so you don't damage the well casing.
- ✓ And remember...even though your well can meet all the water needs of a modern household, it is important to conserve water to protect the nation's groundwater resources.

## **For More Information on Groundwater**

Your licensed well contractor, health department, cooperative extension service, and state environmental or natural resources agency can provide you with more information about groundwater in your area. For help locating these agencies, contact the [wellcare®](https://www.wellcare.org) Hotline at 888-395-1033 or visit our website at [wellcarehotline.org](https://www.wellcarehotline.org).



# wellcare® information for you about Wells

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Modern wells allow access to groundwater, supplying water to an estimated 23 million households nationwide (according to the U.S. EPA). When installed and maintained properly, wells can provide safe, affordable water for many years.

## Three Basic Types of Wells

Bored or “shallow” wells are usually bored into an unconfined water source, generally found at depths of about 100 feet or less.

Consolidated or “rock” wells are drilling into a formation consisting entirely of a natural rock formation that contains no soil and does not collapse. Their average depth is about 250 feet.

Unconsolidated or “sand” wells are drilled into a formation consisting of soil, sand, gravel or clay material that collapses upon itself.

## Well Construction

All private well construction is based on establishing the right location for the well, sizing the system correctly and choosing the proper construction techniques. Only a licensed well contractor should install a well. They know the hydrology in your area and all the local codes and regulations for wells. They also have the modern equipment and expertise needed to make sure that your well is properly constructed to meet the water needs of your family.

Your well is located on your property according to certain regulations required by the state, county or other locality. These regulations are designed to protect the integrity of your water supply. In addition, the well contractor uses his experience and expertise to select a location for your well on your property that is suited to your lot size, the location of existing structures and utilities, and the most likely location for a good supply of water.

Accurate sizing is critical to the construction and performance of your well system. Your system is designed to suit the needs of your household. Factors considered when sizing your system include number of bathrooms/fixtures, occupants, and anticipated water use.

Proper well construction is the key to operating and maintaining your well. The initial cost of a properly constructed well may be somewhat higher. However, in the long run, a properly constructed well results in improved efficiency, less maintenance, and longer well life.

### Your Well

Your well is constructed of quality materials designed to prolong its life and performance. The following is a list of the most important materials used in the construction of your well:

**Casing** is used to maintain an open access in the earth while not allowing any entrance or leakage into the well from the surrounding formations. The most popular materials used for casing are black steel, galvanized steel, PVC pipe or concrete pipe.

**Grout** is a sealant that is used to fill in the spaces around the outside of the well. It protects the well against the intrusion of contaminants. A grout mixture can be made of neat cement, bentonite or concrete, each used separately.

**Screen** is used when wells are drilled in unconsolidated materials to help keep sand and gravel out while allowing groundwater to enter. Available in many materials, with the most popular being stainless steel and PVC.

**Gravel Pack** is placed around the outside of the screen to prevent sand from entering the well or clogging the screen and to stabilize the well assembly.

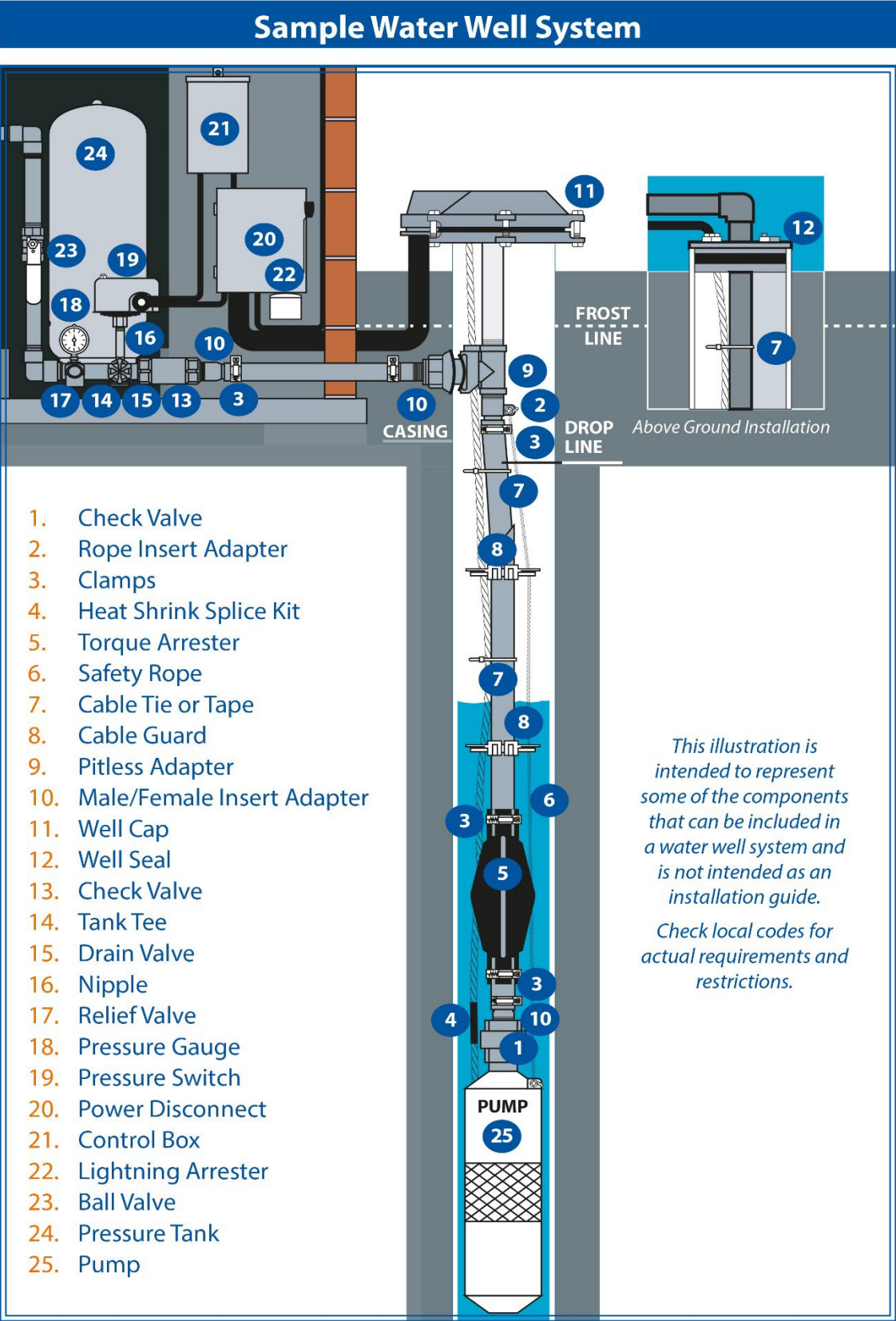
The modern drilling process makes use of sophisticated technology. Two drilling methods are commonly used for private wells:

**Air rotary drilling:** A drill rig or truck outfitted with a large drill is driven onto the well site. The drill is lowered to the ground and turned on. As the drill spins, a hammer at its end smashes rock and soil creating the well shaft. The hammer is powered by air that is shot through the drill at very high speed.

At the same time, water is pumped around the drill to make the drilling easier. As the drill moves down, the same air that moves the hammer clears out the broken rock, dirt and excess water. When the drill hits a solid rock formation, a casing is placed in the well shaft to keep unwanted materials from entering the opening. Drilling then continues into the rock until water is found. The space between the casing and the ground is then filled with grout and the well is cleaned and capped.

**Mud rotary drilling:** Mud rotary drilling is used to drill where the soil is loose and sandy. It is similar to rotary drilling except that as the drill bit spins, a fluid (drilling mud) shoots down through the middle of the drill, then flows out at very high speeds at the sides and the tip of the drill. Without this fluid moving up and around the drill, the walls of the hole would cave in, and the well could not be made.

The fluid and sand that come out of the hole are pumped to a pit. The fluid in the pit is pumped out and used again, while the extra sand stays put. After the drill hits an area of sand that is filled with water, the casing and screen are put in to keep sediment from getting in the well. When drilling is finished, the driller grouts and cleans the well, then seals it with a sanitary cap.



## Well Pumps and Tanks

Your private water system has two important components in addition to the well itself – a pump and a tank.

**Pumps:** There are many types and sizes of pumps for water systems. Some are only designed to remove water from a source. Others not only remove the water, but also force it through the rest of the water system. Some pumps are for special jobs such as boosting pressure or supplying a special outlet. Selecting the appropriate pump size and type is critical to good well performance.

**Tanks:** Tanks provide storage for your water system. The two most common tanks for residential wells are diaphragm or bladder tanks and plain steel tanks. If your water supply provides plenty of water for your needs and you have selected the proper pump, it is easy to select the right size and type of tank. The amount of stored water in the tank is equal to the pump discharge in gallons per minute.

**Additional storage:** Some well owners may consider additional water storage tanks. Additional water storage is useful when there are power outages and other emergencies. Storage capacity of one day's water supply is sufficient. Be sure to have the installer provide manual access to this additional water tank.

## For More Information on Your Well

Contact the well contractor who installed your well or a licensed well contractor in your area. Many states maintain lists of licensed or registered well contractors.

If you need help locating this list or finding a licensed well contractor in your area, contact the [wellcare®](https://www.wellcare.org) Hotline at 888-395-1033 or use our interactive map on our website at [wellcarehotline.org/well-water-testing-contractors](https://www.wellcarehotline.org/well-water-testing-contractors).

## wellcare® information for you about

# Well Maintenance

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The safety and purity of your drinking water and the efficient operation of your private well system depends on a well-organized maintenance plan. Protect your investment through regular inspection and testing, and repair or treatment when necessary.

### Create a Well Maintenance Log

Gather a comprehensive history on your well and water quality. If you don't already have a well log (also known as a water well record, well completion, or drilling report), ask your well contractor or state environmental agency for a copy. Most states require well contractors to file a well log when a new well is drilled, and many states have searchable databases to retrieve this information electronically. Local health departments may also keep a copy of these records.

The well log should include a reference number for the well, date the well was drilled, the well owner at the time of construction, location of the well, and various construction details such as drilling method used, depth of the well, depth and type of casing (lining of your well/visible pipe aboveground), and depth and size of the pump. Some well logs may also have results of the first water test when the well was drilled. This information will provide the basis on which to schedule regular maintenance such as water testing and inspections.

### Set a Well Maintenance Schedule

Plan maintenance of the wellhead, well system, water quality, water treatment devices, and septic system using our recommendations below.

### Well Inspection

- ✓ Inspect your wellhead several times a year. Check the well covering, casing, and well cap to make sure all are in good condition, leaving no cracks or other entry points for potential pollutants.
- ✓ Have the well system, including the pump, storage tank, pipes and valves, and water flow inspected every 5 years by a licensed well contractor.
- ✓ If you have no inspection record and cannot determine the age of the well, have it inspected immediately by a licensed well contractor.
- ✓ When your well reaches the end of its serviceable life, contact your licensed well contractor to install a new system and properly close the old well.

### Water Testing

- ✓ Test drinking water immediately if you have no recent test results or any record of previous tests.
- ✓ At a minimum, your water should be tested every year for bacteria, anything of local concern, or any contaminants that you are monitoring from previous test results.
- ✓ Test if you notice any change in the taste, color or odor of your water.
- ✓ Test more than once a year in special situations: someone in the household is pregnant or nursing; there are unexplained illnesses in the family; your neighbors find a dangerous contaminant in their water; or there is a spill of chemicals or fuels into or near your well.
- ✓ Test after any flooding on or near the well system.
- ✓ Test after disinfecting your well to make sure the process was effective. Note that this treatment process is not recommended as regular maintenance. Please see our information sheet on [Disinfecting Your Well](#) for additional information.

Contact your state or local health department for a list of state-certified laboratories in your area or use our interactive map on our website at [wellcarehotline.org/well-water-testing-contractors](http://wellcarehotline.org/well-water-testing-contractors).

### Water Treatment System

- ✓ Test drinking water before installing any water treatment device.
- ✓ Test water every year to make sure the device is working properly.
- ✓ Follow the inspection and maintenance schedule provided by your water treatment device manufacturer or water treatment professional.

If your test results indicate treatment may be necessary, contact a certified water treatment professional in your area for guidance. To search for a certified water treatment professional in your area, use Water Quality Association's website at [wqa.org/find-certified-professionals](http://wqa.org/find-certified-professionals).

## Septic System

A poorly maintained wastewater treatment system poses a serious threat to the quality of your drinking water and can require expensive repairs. The cost of pumping a septic tank is far less than the expense of replacing a drainfield clogged by solids. We recommend the following preventive measures:

- ✓ Inspect the septic tank each year for capacity and leaks.
- ✓ Pump out the tank as needed, usually every three to five years, based on the number of people in the household and the size of the tank.
- ✓ Repair the tank or drainfield system as needed to prevent leaks of bacteria and nutrients into groundwater.

*Contact your septic service professional for additional recommendations and service. To local septic service professionals in your area, try these websites: NOWRA ([nowra.org/septic-locator](http://nowra.org/septic-locator)) and NAWT ([nawt.org/search.html](http://nawt.org/search.html)).*

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# Selecting a Well Contractor

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## Hiring a Water Well Professional

Selecting the right well contractor is somewhat like searching for a doctor or dentist. All are directly involved in your health. A licensed well contractor is your best assurance of a good, clean supply of drinking water. Take the time to find the right person or company for the job.

## Well Professionals

To find a licensed well contractor or drilling company in your area, ask your neighbors for a referral, contact your state drillers or groundwater association, local health department, or the [wellcare® Hotline](#) at 888-395-1033 or visit our website at [wellcarehotline.org](#). Once you have identified a few prospective companies, ask a lot of questions.

### ✓ Professional Qualifications

Your well contractor should be certified, licensed, or registered with your state health or environmental agency. Specific requirements vary from state to state. Ask for proof of proper credentials and well association memberships.

### ✓ References

Ask for two to three references from former customers. Find out how long the company has worked in your area, how many wells they have drilled and how satisfied their customers are.

### ✓ Contracts

A professional well contractor uses a written contract. The contract should include details of the job and warranties or guarantees, if any.

### ✓ Insurance and Bonding

A drilling company and its personnel should be insured. Some states require bonding, some do not. Find out what the law requires.

### ✓ Local Geology

An experienced well contractor knows about the geology of the area in which he or she drills and can clearly explain it to you. You should also do some research on groundwater levels. Check the U.S. Geological Survey's website at [water.usgs.gov](#) and contact your local office for more information.

### ✓ State and Local Laws

A knowledgeable well contractor is familiar with local and state regulations that govern well drilling. You should also acquaint yourself with these regulations by contacting your local and state oversight agencies or visit our website to search our State Well Codes at [watersystemscouncil.org/state-well-codes](#).

### ✓ Maintenance and Repair

Timely maintenance and repair services are important to well owners. A company that offers these services can make life easier for you and ensure the proper function of your well system.



## **Responsibilities**

Before signing a contract, discuss who is responsible for various aspects of the well construction or repair work.

**Permits, Site Visits, Fees, etc.** - The homeowner typically secures permits required by the local government or health agency. A well contractor can tell you what agencies to contact and approximate fees. The well contractor coordinates site visits by inspectors and construction activities.

**Well Location** - In most states, strict regulations govern location of the well. The well contractor should know the regulations and will tell you if health officials or other regulators must be present during the well location process.

**Well Capacity** - The well contractor can estimate the water requirements for your household. Help your well contractor by discussing things like the number of bathrooms, the number of people in the household, and anticipated water use.

**Water Quantity/Quality** - The quality and quantity of water from your well depends on the geology and hydrology of the area. Well water comes from underground aquifers, which exist throughout the ground at different depths. These "storage spaces" contain different amounts of water. A well contractor cannot tell you exactly how deep they will have to go to get water. An estimate can be based on other wells drilled in your area.

In addition, a well contractor cannot predict the exact quality of the water that will be tapped. What a well contractor can do is make reasonable judgments about water quality based on previous experience. However, some states or localities may have regulations on minimum quantity and or quality of water on newly drilled wells. Check with your state or local environmental agency for these regulations.

**Well Records** - Your well contractor should make a construction record (sometimes known as a well record, well log, or well completion report). Ask for a copy. If the law requires an inspection, keep that report as well. You should also save repair bills and information on equipment purchases. Well records are very useful for maintenance purposes. Some states require the well contractor to submit records to regulatory agencies. Ask the well contractor what your state requires.

**Troubleshooting** - Discuss with the well contractor what will be done if water is not reached at the estimated depth. Also ask what options are available if the water needs some form of treatment.

### Potential Cost

Finally, discuss the cost of well construction, maintenance, and repair. There are several factors that will influence the final cost, including:

✓ **Depth of Well**

The depth of a well is a determining factor in figuring the basic cost of drilling and the cost of pipe because most drillers charge by the foot. A well contractor will base estimates on what experience shows is an average depth for your area. If the water first tapped is adequate for your family, then drilling can stop. If not, then drilling may have to go deeper.

✓ **Materials and Equipment**

Some of the components of a well include casing, pipes, a pump, a tank, and grout to seal the well. Talk to the well contractor to determine additional equipment you will need and try to choose quality products to improve the efficiency and longevity of the well.

✓ **State Regulations**

Most states require specific construction practices designed to protect health and groundwater. Some states prohibit use of certain construction materials. Ask the well contractor how state construction requirements may affect cost.

✓ **Labor**

Labor is usually figured into the charge-per-foot for drilling a well. There may be labor costs for installing the pump and tank or for performing repairs on an existing well. Experience teaches a well contractor to anticipate problems that may occur. However, nature is full of surprises. Some of which even the most experienced contractor cannot anticipate.

✓ **Cost Effectiveness**

Over the long term, the cost of water from your well will be pennies per day. Even factoring in construction and routine maintenance, a private well is still cost effective when compared to other systems.

If you need further assistance with selecting a well contractor, contact your state health department or environmental agency, the local extension service, your state water well or groundwater association or the wellcare® Hotline at 888-395-1033.

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# Protecting Your Wellhead

The most visible portion of your drinking water system is the wellhead, the structure built over your well to protect its various parts. By protecting your wellhead, you will help ensure the quality of your drinking water supply.

## Maintaining Your Wellhead

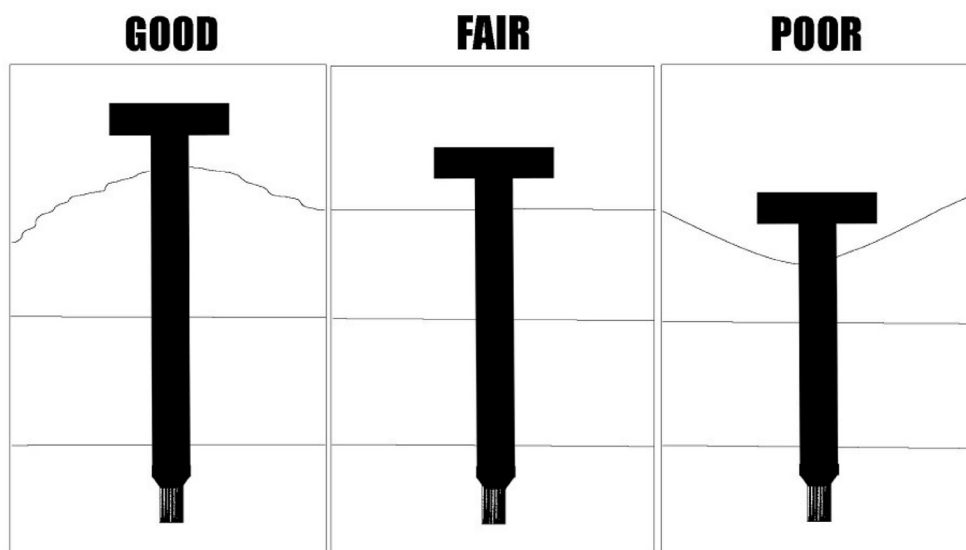
The wellhead protects the well casing, which is the lining of the well, and the well cap, which provides a tight-fitting seal at the top of the well. The wellhead is your first line of defense to prevent pollutants from penetrating your drinking water system. Inspect your wellhead regularly to make sure these elements are in good condition.

To keep your well safe, hire a licensed well contractor to perform any new well construction or modification, or to close an old well.

Take care when working or mowing around your well. It is easy to damage the wellhead with heavy equipment, which will jeopardize the sanitary protection of your well, permitting contaminants to enter the water supply. Don't pile snow, leaves or other materials around the well, where they can carry pollutants into the system. Consider adding a fiberglass marker to help with locating the well during fall and winter months.

When landscaping around your well or siting a new well, make sure the top of the well sits at least one foot above the ground. Slope the ground down and away from your well for proper drainage.

## Well Location & Surface Drainage



**Good:** The well is high in the landscape so surface water drains away from the wellhead; little chance for contamination.

**Fair:** The well is on level ground; moderate chance for contamination by surface runoff.

**Poor:** The well is poorly located on the landscape; surface water runoff may move toward the well with a high chance for contamination.

### **Ensure Clean Drinking Water**

Some common household activities can actually threaten the quality of your drinking water. Even small spills of pesticides, fertilizers, or fuels near your well can seep into the ground and contaminate the water.

Avoid mixing or using pesticides, fertilizers, herbicides, degreasers, fuels or other pollutants within 100 feet of your well. When siphoning water for these tasks, be careful to avoid back-flow back into the well system.

Conduct a quick visual check for activities that might threaten to enter your drinking water system at or near the wellhead which may include the following: septic tanks, lateral fields, cesspools, pit privy; chemical storage areas, machinery maintenance areas, waste piles, lagoons, sewers; underground storage tanks for chemicals, fertilizers, or petroleum products, above-ground tanks for chemicals, fertilizers or petroleum products; animal pens or feedlots and manure storage areas.

If your existing well is located near these activities, you may need to test your water quality more often than once a year. Try to move the risky activities away from your well. Check that your well is located on your property according to standards set by the state, county or locality. These regulations are designed to protect the integrity of your water supply.

You should also inspect and pump septic systems on your property as often as recommended by your local health department or septic service, usually at three to five year intervals. Failing septic systems can leach contaminants into the water supply.

### **For More Information on Protecting Your Wellhead**

Contact the well contractor who installed your well or find a well contractor in your area by searching online. Many states maintain lists of licensed or registered well contractors or have state water well associations, state well driller associations, or state groundwater associations that maintain a list of contractor members.

Contact your local or state health department or environmental agency, your state water well or groundwater association or the [wellcare®](https://www.wellcare.com) Hotline at 888-395-1033 to find out where you can obtain a list of well contractors.

## wellcare® information for you about

# Well Water Testing

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Testing your well water is important to ensuring your water quality is safe for you and your family. Private well owners are solely responsible for the quality of their drinking water, so it is up to you to decide when and how to test your water. The information below provides guidance on well water testing.

### Recommended Testing

At a minimum, your water should be tested every year for bacteria, anything of local concern, or any contaminants that you are monitoring from previous test results.

The table on the following page describes some conditions that may prompt you to test for select contaminants. For example, if your well is in an area of intensive agricultural use, test for nitrates and pesticides commonly used in that region. If household tests of radon in the air are high, test for radon in the water. If you have problems with taste, odor, staining, or color of your water, then test levels of iron, manganese, sulfate, and tannin.

Testing more than once a year may be warranted in special situations:

- ✓ Someone in your household is pregnant or nursing.
- ✓ There are unexplained illnesses in the family.
- ✓ Your neighbors find a dangerous contaminant in their water.
- ✓ You note a change in water taste, odor, color, or clarity.
- ✓ There is a spill of chemicals or fuels into or near your well.

If you have a situation that is mentioned above, follow comprehensive testing recommendations below or call the [wellcare® Hotline at 888-395-1033](tel:888-395-1033) for assistance on what to test for.

### Comprehensive Testing

If you have a situation that is mentioned above, follow comprehensive testing recommendations on the following page or call the [wellcare® Hotline at 888-395-1033](tel:888-395-1033) for assistance on what to test for.

### Tests for Specific Conditions

Conditions of Surroundings	Recommended Tests
Cloudy, frothy or colored water	Coliform bacteria, chloride, hardness, iron, pH, sodium, tannins, turbidity
Coal or mining operations	Boron, metals, pH, Total Dissolved Solids (TDS)
Corrosion of pipes, blue-green colored water or stains, metallic taste	Alkalinity, chloride, copper, hardness, iron, lead, manganese, pH, sodium, sulfate, zinc
Dump, landfill, factory or dry-cleaning operation nearby	Metals, pH, PFAS, salts, Volatile Organic Compounds (VOCs)
Gas drilling (fracking) operations nearby	Barium, chloride, methane, sodium, strontium
Gasoline or fuel odor	Gas or oil indicators or VOCs
Gastrointestinal illness	Total coliform, E. coli, fecal coliform, cryptosporidium, giardia, legionella
Household plumbing and/or well casing is metal	Alkalinity, chloride, copper, hardness, iron, lead, manganese, pH, sodium, sulfate, zinc
Intensive agriculture	Arsenic, coliform bacteria, nitrate, pesticides
Radon present in indoor air or region	Gross alpha and beta or radium plus radon, uranium
Rapid wear of water appliances including treatment devices	Chloride, hardness, iron, manganese, pH, sodium
Salty taste, heavily salted roadway nearby	Boron, chloride, sodium, total dissolved solids (TDS)
Scaly residue, soaps won't lather	Chloride, hardness, sodium
Slimy residue, jelly-like substance	Chloride, iron bacteria, pseudomonas, pH, silica, sodium
Stained laundry, plumbing, water appliances	Iron, manganese, sulfate, tannins
Unpleasant taste or smell	Coliform bacteria, iron, manganese, sulfate, tannins
Water softener to treat hardness (before purchase)	Chloride, hardness, iron, manganese, pH, sodium, sulfate, turbidity

It is important to note that these are only some tests that may be recommended. Contact the [wellcare®](#) Hotline for further assistance at 888-395-1033.

## Water Samples

You will need to collect water samples for the laboratory you choose to test your water. The laboratory usually provides specific sampling instructions and clean bottles in which to collect the water sample. Do not rinse lab containers or fill them to overflowing. Check to see if the sample must be refrigerated or treated with special chemicals.

You may need to take a sample from the tap with the first flush of water in the morning or after the tap has been allowed to run for a period of time. If you suspect a problem somewhere in your home plumbing, you may need to take samples from several points, such as before and after water enters the hot water tank or at the inlet and outlet of a treatment device.

Again, carefully follow the instructions provided by the laboratory. We have provided an example at right for taking samples. Sampling is the most important part of testing. A carelessly collected sample can give you inaccurate results.

## Finding a Testing Lab

We have provided water testing resources for each U.S. state and Canadian province to assist well owners in those areas obtain lists of certified water testing laboratories. These lists can be found by using our [interactive map on our website](#) or calling the wellcare® Hotline at 888-395-1033.

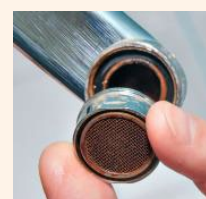
Check with individual laboratories to get prices. Ask how soon you should expect results and about the information that will be provided with your test results.

## To Collect Most Water Samples

*Always follow laboratory directions carefully to ensure the accuracy of the test.*

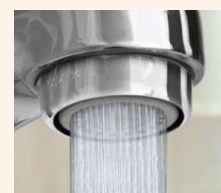
**Step 1:** Identify the collection point (for example, the kitchen sink).

**Step 2:** Remove the washer and aeration device from the faucet. This is usually required depending on the type of water test(s) you are having performed.



**Step 3:** Disinfect the faucet with either isopropyl alcohol or bleach and let it stand for 4-5 minutes. Some states or counties require that you use a flame to superheat the metal to disinfect it.

**Step 4:** Turn the water on and allow it to run until there is a noticeable change in temperature or until you've ensured the well pump has come on and started to fill the tank (about 5 minutes).



**Step 5:** Reduce the flow of water and fill your container according to the laboratory's instructions being careful not to touch the inside of the bottle or cap.



**Step 6:** Close the sample container and transport or mail it as instructed by the laboratory.

### **Understanding Your Results**

Laboratories may provide your results in a variety of forms sometimes called an Analysis Report, Certificate of Analysis, Client Sample Results, Report of Analysis, or Sample Results. It may be a computer printout that is mailed or faxed to you or provided electronically through email. On the report, you may see general information about the laboratory that performs the testing, the specific tests you requested, the results, unit used to measure the contaminant, symbols, and abbreviations.

The important question is whether the contaminant found poses a threat to your health at the level it was found. Many contaminants do not pose a threat to health, but can cause the water to change color, cause staining, have an odor or an unpleasant taste. Continue reading this manual to understand your well water test results or contact the [wellcare® Hotline at 888-395-1033](tel:888-395-1033) or [info@wellcarehotline.org](mailto:info@wellcarehotline.org) for help with interpreting your results.



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# Understanding Your Results

Regular water testing is essential to keep your drinking water clean and your well operating at peak performance. But many well owners are stumped when they receive their test results from the laboratory. The often confusing measurements, limits, and standards make it tough to determine if your water is safe or if it needs some type of treatment.

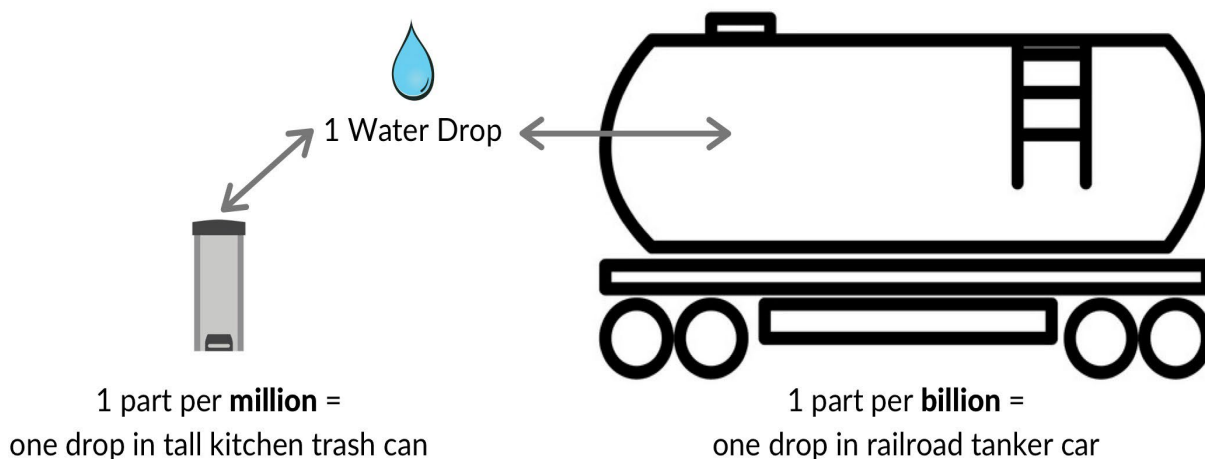
## Figuring Out the Measurements

Most substances in water are measured as a concentration: a specific mass of a specific chemical within a specific unit or volume of water. The confusing part is that different terms can be used to reflect the exact same measurement.

- part per million/ppm = milligram per liter of water = mg/L
- part per billion/ppb = microgram per liter of water = ug/L

What do these terms really mean? Basically, they refer to very small amounts of a substance within about a quart of water. (A liter amounts to 1.05 quarts.)

For example:



These are very diluted concentrations. For example, the recommendation for sodium in drinking water is no more than 20 parts per million. By comparison, the salt content of seawater is 32,000 parts per million.

## Figuring Out the Standards

The U.S. Environmental Protection Agency (EPA) regulates public water supplies but not private wells. Well owners can use EPA's standards to judge their drinking water quality. Sometimes state standards are stricter than the EPAs, so check with your local or state health department for specific substances of concern.

Maximum Containment Levels (MCLs) are the highest level of a contaminant that the EPA allows in drinking water. MCLs are legally enforceable for public water supplies. When they turn up in the water, a utility must treat and remove or reduce the contaminant below the maximum level to protect public health.

EPA also sets standards for a second group of contaminants. These limits serve as guidelines for good water quality but are not required by law. These National Secondary Drinking Water Regulations (NSDWRs), known as the secondary standards, regulate contaminants that may cause cosmetic effects, such as skin or tooth discoloration, or aesthetic effects, such as taste, odor or color, in drinking water. These contaminants are not considered threats to public health.

Finally, EPA studies another group of contaminants for possible regulation in the future. The Drinking Water Contaminant Candidate List (CCL) is published every five years. These standards are under discussion but are not yet an official EPA recommendation or regulation.

Here's the confusing part. On most government charts, the standard for a given substance will be written in parts per million. But the great majority of limits actually relate to much smaller amounts, in parts per billion. If your laboratory chooses one over the other, you may not be able to figure out if your water needs treatment or not.

For example, arsenic is a naturally occurring mineral found in soil and bedrock. We know arsenic as a popular poison in murder mysteries. But the substance can also work its way into groundwater through erosion and build to dangerous levels in some wells. On most charts, the MCL for arsenic is written .010 mg/L. What they really mean is 10 parts per billion.

## Translating Your Test Results

The chart below is a road map to your test results. It lists each contaminant, how it is regulated or not, and the maximum levels in all the measurements you are likely to see. Cross reference your test results with the chart to determine your water quality.

Contaminant	MCL	Secondary	Candidate	PPM or mg/L	PPB or ug/L
Arsenic	X			0.01	10
Atrazine	X			0.003	3
Bacteria	X			Zero	Zero
Barium	X			2	2000
Benzene	X			0.005	5
Cadmium	X			0.005	5
Chromium	X			0.1	100
Chlorine	X			4	4000
Copper	X			1.3	1300
<i>Cryptosporidium</i>	X			Zero	Zero
Fluoride	X			4	4000
<i>Giardia lamblia</i>	X			Zero	Zero
Iron		X		0.3	300
Lead	X			0.015	15
Manganese		X		0.05	50
Mercury	X			0.002	2
MTBE <sup>1</sup>			X	0.020	20
Nitrate <sup>2</sup>	X			10	10000
Nitrite	X			1	1000
Sodium			X	20	20000
Sulfate		X		250	250000
TCE	X			0.005	5
THMs	X			0.08	80
Toluene	X			1	1000
Total Dissolved Solids		X		500	500000
Uranium	X			0.03	30

<sup>1</sup>EPA has not set a national standard for MTBE, check with your local or state environmental agency for guidance.

<sup>2</sup>Although your testing laboratory may report nitrate as N, it can also be reported as nitrate NO<sub>3</sub>. If your result is reported as nitrate NO<sub>3</sub>, you should refer to the maximum level of 45 ppm, which is equivalent to 10 ppm nitrate as N. Some states may set limits for nitrate and nitrite even lower than those set by the EPA. Check with your local or state environmental agency for maximum levels used in your state.

### Next Steps

Laboratories have detection limits, or levels below which contaminants cannot be reliably detected. That does not necessarily mean that the contaminant is not present. There could be so little present that it cannot be reliably detected with the laboratory equipment or testing procedures being used.

The important question is whether the contaminant poses a health threat at that particular concentration. Compare your water test results to the federal standards in the table to assess the potential for health problems. If in doubt, contact your local or state health department or environmental agency, the local extension service, your well contractor, or the [wellcare®](#) Hotline at 888-395-1033.

After you get your first test results, you would be wise to follow up with a second test taken at a different time before you decide on any water treatment. This is because there is a certain margin of error in water testing and contamination problems may vary. Use bottled water until the second results are in.

**There is a major exception to this rule.** Any positive test for bacteria, such as fecal coliforms and E. coli, or microorganisms, such as cryptosporidium or Giardia lamblia, demands immediate disinfection of your well and water supply. These organisms can make you very sick. Contact your local health department, well contractor, or the [wellcare®](#) Hotline at 888-395-1033 for help.

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# **Checklist for Well Owners**

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Properly constructed private water supply systems require little routine maintenance. These simple steps will help protect your system and investment:

- ✓ Always use a licensed or certified water well contractor and pump installer when a well is constructed, a pump is installed, or the system is serviced.
- ✓ Perform an annual water test for a minimum of bacteria. Check with your local health department for other tests of local concern.
- ✓ Test your water any time there is a change in taste, odor or appearance, or someone is ill or pregnant.
- ✓ Keep hazardous chemicals, such as paint, fertilizer, pesticides and motor oil, far away from your well.
- ✓ Periodically check your wellhead for damage to the casing or well cap.
- ✓ Confirm your well is properly separated from buildings, waste systems, or chemical storage facilities.
- ✓ Allow only grass to grow around your well. Other plants can have longer roots that can damage your well casing.
- ✓ Take care in working or mowing around your well. Damage to your casing can jeopardize the sanitary protection of your well. Don't pile snow, leaves or other materials around your well. Consider adding a fiberglass marker to help with locating the well during the fall and winter months.
- ✓ Always keep good well records, including using the maintenance and water testing logs in this manual.

**wellcare® information for you about**  
**The wellcare® Hotline**

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If you have a question about wells or need help, contact the **wellcare® Hotline** Monday-Friday at **888-395-1033**, or visit **wellcarehotline.org** at any time for information on:

- ✓ Wells - Private residential wells including small shared well systems
- ✓ Avoiding seasonal water problems
- ✓ Learning well care basics
- ✓ Help locating a licensed water well contractor
- ✓ Identifying possible contaminants
- ✓ Understanding well mechanics
- ✓ Water conservation
- ✓ Water well care and maintenance
- ✓ Well components
- ✓ Well construction codes and other regulations related to wells or water well systems
- ✓ Well water quality
- ✓ Well water testing

**wellcare® information for you about**  
**Well Owners Network**

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The **wellcare®** Well Owners Network provides consumers served by private water wells nationwide with education and information regarding the proper construction, regular well water testing, and maintenance of water wells and septic systems to ensure safe drinking water.

A few benefits when you sign up:

- ✓ It's free!
- ✓ Unlimited access to the **wellcare®** Hotline.
- ✓ Quarterly e-newsletter with tips and tools to maintain your water well and protect your well water.
- ✓ Opportunity for discounts on water test kits.
- ✓ Your information is kept private. WSC does not sell our mailing lists.
- ✓ Unsubscribe at any time.

Signing up for the **wellcare®** Well Owners Network is easy and FREE! Join today at [wellcarehotline.org/well-owners-network](http://wellcarehotline.org/well-owners-network).



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