



# A Consumer Guide For Well Construction





# Introduction

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If you are planning to have a water well constructed, there are some facts concerning the well construction permit, the well installation, and the pump selection that the Southwest Florida Water Management District (SWFWMD) (District) would like you to know. This booklet was created as part of the District's commitment to quality service and education. It will provide you with the kind of information listed below:

- **The Water Supply**

*Where does well water come from?*

- **Well Construction Permits**

*When do you need a well construction permit?*

- **Water Well Contractor**

*Selecting a qualified water well contractor.*

- **Types of Well Construction**

*How are wells constructed?*

- **Locating Your Well**

*Appropriate set-back distance from sanitary hazards.*

- **After Construction**

*Well water chlorination and testing.*

- **Pump Selection**

*Types of pumps.*

- **Water Level Declines**

*Recommendations to prevent pump damage from occurring.*

It is our hope that the information in this pamphlet will help you make informed decisions on water well construction. If you have any questions, call the Southwest Florida Water Management District's Well Construction Permitting Section at (352) 796-7211. We'll be glad to answer your questions.



# The Water Supply

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In most of the District's sixteen-county area, ground water is a good source of sanitary drinking water. However, certain areas of the District are more prone to contamination than others because these areas lack the necessary overlying sands and clays which can provide natural filtration before the water enters or recharges the primary ground water supply, known as the Floridan Aquifer System. Many chemicals and toxic substances have been developed, used, and discarded in the past without thinking about how they might affect our water resources. Some experts used to think that the negative effects of many chemical wastes would be reduced through dilution or by percolation through the soils. Today we know that numerous man-made compounds are contaminating groundwater supplies. Some of these chemicals can increase your risk of cancer.

To help establish awareness for you as a consumer, the Department of Environmental Protection (formerly the Florida Department of Environmental Regulation) has provided the District with maps delineating known areas of contamination. These areas require special well construction design and installation. Through proper design, contamination can be avoided and any further spread of contamination kept to a minimum. To assure that our groundwater system continues to provide the water we need, the District and the state have developed well construction related rules. These rules also establish the licensing criteria for water well contractors and a mechanism of enforcement activities to ensure compliance. Rules, coupled with proper enforcement, will help prevent future contamination from occurring. A publication of applicable rules is available from the SWFWMD upon request.



# Well Construction Permits

Currently, a well construction permit is required for *any well* constructed/drilled within the boundaries of the SWFWMD, including shallow irrigation and domestic wells that are two inches or less in diameter. A nominal fee is required to process the well permit application. If you are considering having a well constructed in Manatee County, a permit application must be obtained from the Environmental Action Commission. In Sarasota County, the Environmental Engineering Section within the Health Department will issue the permit. Excluding these two counties, the well permit application will be obtained from SWFWMD by you or your well contractor.

The permit form should be completed by you, as the property owner, and the water well contractor whom you have selected to drill the well. When filling out the permit, please be sure to clearly print or type your name and mailing address. The well location and the mailing address are not always the same, but the permit application allows for both addresses. This information is very important to the District. As a requirement, once the permit is obtained and the well completed, the water well contractor is responsible for filing a well completion log. You can request a copy of this completion form from the contractor or the SWFWMD. To prevent possible contamination of our water supply, the well casing must always have a tamper-resistant cap or cover installed to avoid objects or fluids from being thrown or dumped down the well.

If the well attempt fails, leaving a hole in the ground, or if an existing well is no longer being used, the property owner must have the well/hole abandoned to prevent possible contamination of our water supply. Proper abandonment techniques require the experience of a water well contractor to fill the well/hole from bottom to top with an approved sealant material such as neat cement or bentonite grout. A well abandonment also requires

the water well contractor to obtain an abandonment permit from the District. This permit must be obtained prior to the abandonment of the well. There is no charge for an abandonment permit. A District representative will be on site to witness proper well abandonment.



## Water Well Contractor \_\_\_\_\_

All wells must be constructed by a licensed water well contractor. The *only* exception to this law is for a water well two (2) inches or less in diameter constructed by an individual for his/her own private use on his/her owned or leased property as specified in Section 373.326(2), Florida Statutes. This type of well installation requires the owner to obtain a permit from the District prior to construction. Upon completion of the well, a completion report must be filed with the District.

All contractors are licensed by the water management districts. You can determine if someone has a current state license by calling (352) 796-7211. Certain cities and counties also require occupational licenses and permits. Check with your city or county occupational license office for this information.

The state and counties do not guarantee the performance of well contractors/drillers. Selecting a well contractor is the customer's responsibility. You can get the names of local well contractors/drillers from the yellow pages or from neighbors who have had wells drilled. There are many things to consider when selecting a good water well contractor. Ask about their experience, reputation, routine repair and emergency repair policies. Ask for referrals and talk with some of their previous customers. Ask if the drilling contractor is a member of the National Ground Water Association or the Florida Water Well Association and if he/she has any certification from the associations. Another important consideration is whether a

guarantee is offered. The following story is an example of what you could encounter:

One water well contractor guaranteed a customer good water in an area where sand was a problem. Another water well contractor would not guarantee good water to the same customer in this area. The well contractor who made the guarantee stated he would drill as many holes as necessary until he located good water, but *failed* to state there would be a charge for each attempt. Both well contractors approached the identical problem differently. Ask questions and be informed when selecting a well contractor.

The contractor should be able to tell you all of the following before you sign anything:

- The method of construction.
- Expected depth and diameter.
- Anticipated yield.
- Method of disinfection.
- Pump size.
- Local water treatment requirements.
- The estimated cost.

The prospective contractor should itemize the drilling cost estimates and provide information on the type and extent of Workers' Compensation and associated insurance they carry. Workers' Compensation information for an individual and the company performing the work can be obtained by contacting the Florida Division of Workers' Compensation, Employment Assistance Office at 1-800-342-1741. When you have reached the point of selecting a contractor, ask if the contractor guaranties the quality of the water in the well. *Most contractors do not.* In certain areas of the District the water quality may be very mineralized and a water treatment system may be necessary. Ask the contractor or a neighbor about the quality of the water in their well and any information they can supply you with relative to the casing depth, total depth, and the contractor they used.

This can give you some idea on the depth you may need to install your own well, and the quality of water you may expect. The District can also supply you with an estimate on the approximate depth for a well in your area before you have it constructed. This information will help you plan a budget for your particular need.

Another item to consider when selecting a contractor is their history of compliance with District rules and their record of complaints. The District is responsible for maintaining Contractor and Violation files. Complaints against the water well contractor are kept in the Violation file. These files are available to the public. Once negotiations are completed and all questions are satisfactorily answered, a written contract should be drawn up. A written agreement helps avoid misunderstanding and provides legal protection for both the contractor and the customer. If you have done adequate research about the well contractor/driller, the contract will be only a formality.



## Types of Well Construction

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There are four types of drilling methods used within the SWFWMD to construct water wells. Each method is effective and has certain advantages and disadvantages. Well construction usually consists of four or five steps: drilling; installing the casing; placing a well screen if required; grouting to provide sanitary protection; and developing the well.

### *Cable Tool Method*

Cable tool machines, also called “Spudder” rigs, are operated by repeatedly lifting and dropping a heavy string of drilling tools and a chisel-shaped bit into the borehole. The drill bit breaks or crushes consolidated rock into small fragments. The reciprocating action of the tools mixes the crushed or loosened particles with water to form a slurry or sludge at the bottom of the borehole. When slurry accumulation reduces the impact of the



tools, it is removed at intervals from the borehole by a dump bailer. Currently, during the installation of cable tool wells, a bentonite grout is required to be used to help seal any artificial void created during drilling. The casing must be seated into rock, which reduces the possibility of the well pumping sand or surface water migrating down into the well.

### *Rotary Method*

With the rotary method, the borehole is drilled by rotating a bit, and cuttings are removed by continuous circulation of a drilling fluid as the bit penetrates the formation. The drilling fluid is pumped down through the drill pipe and out through the ports or jets in the bit. The fluid then flows upward in the annular space between the hole and drill pipe, carrying the cuttings to the surface. The well casing is placed into the borehole and grouted with cement from bottom to top between the casing and borehole to ensure a good seal. To insure that the ground water is protected from surface contamination and from poor-quality water mixing with good-quality water, Florida's well construction code requires the borehole of a rotary constructed well, which is less than four inches in diameter, to have a minimum of one inch of grout around the casing. Wells four inches or greater require two inches of grout around the casing. The space created between the casing and the borehole must be sealed with cement or a bentonite slurry pumped under pressure. This procedure ensures a seal around the casing and provides corrosion protection to the pipe.

### *Combination Method*

This method combines the rotary drilling method with the driving capabilities of the cable tool method for installing the well casing and borehole. By using this method, the well casing is driven into consolidated rock instead of installed in an open borehole. This eliminates the requirement for the casing to be fully grouted.



### *Sandpoint Method*

This method is employed by “do-it-yourselfers” or irrigation contractors. Sandpoint wells are generally shallow and produce water only for lawn irrigation. This is suitable in sandy areas that absorb water. They are constructed by attaching a well point to a series of pipes and driving or jetting the combination directly into the ground. The well point (called a sandpoint) is a predetermined length of slotted well screen with a fabricated point on the end of the screen. Water is oftentimes pumped down and out through the well screen while working the point downward into the water-bearing sands.



## Locating Your Well

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A well should be located on the highest ground possible so that surface water will drain away from the well. Wells should be located in an area that will not pose a threat of contamination to the water resource, and will provide protection for the health, safety and welfare of the user. Domestic wells must be located a minimum of seventy five (75) feet away from your septic tank system and a recommended twenty five (25) feet from a termite treated building slab. Public supply wells must be located a minimum of 100 feet away from any septic tank if they serve facilities which generate less than two thousand (2000) gallons per day (gpd) of effluent, and a minimum of two hundred (200) feet away from any septic tank for public supply wells which generate more than 2000 gpd effluent flow. The well casing is required to be at least one foot above land surface for domestic wells and all others, except public supply wells which are required to be a minimum of eighteen (18) inches above land surface. In general, shallow wells that utilize the water table or sand aquifer are the most susceptible to contamination. Deeper wells are, in general, less prone to contamination. However, the overlying subsurface material will be a major factor in this determination.



## After Construction

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Before the pump is installed, make sure your well is properly chlorinated. The drilling contractor should do this to assure your water supply is sanitary. This is accomplished by pouring a measured amount of household bleach (Clorox) or dry chlorine (HTH) tablets or powder directly into the well. The chlorine should be allowed to dissipate for a specified amount of time before drinking or collecting a sample for analysis. The amount of chlorine added will depend on the casing size and well depth.

Even with disinfectants, the water quality in the well may not be aesthetically pleasing to your taste. After the well has been chlorinated, be sure the water is tested by a private lab or your local health department and cleared for human consumption before using it. A variety of different treatment technologies can also be added to treat the water before you drink it. Most drilling contractors can also supply this technology or recommend a company to remedy your specific water quality situations.



## Pump Selection

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The type of pump selected is usually dictated by the size of the well and the depth to water on a seasonal basis. The most common types of well pumps are centrifugal, shallow well jet, deep well jet, and submersible. Turbine pumps are usually restricted to six-inch or larger diameter wells.

*Centrifugal and shallow well jet pumps* differ only in the fact that a jet is built into the jet pump, which helps build high pressure up to sixty pounds per square inch (60 psi). These pumps range from a one-half (1/2) horse power (hp) to one and

one-half (1 1/2) hp, depending on the application. Both of these types of pumps are located at land surface. The normal limit of either type pump is twenty-five (25) feet of suction lift.

*A deep well jet pump* is also located at land surface. It can be equipped with multiple impellers and the jet can be set lower to accommodate deeper water levels. A deep well jet pump can normally lift water two hundred (200) feet.

*A submersible pump* is a pump in which both the pump and motor are submerged inside the well. Consequently, they are not visible from the surface. A submersible pump is usually installed in wells with a minimum diameter of four inches. However, three-inch submersibles are available. Submersible pumps are installed on a drop pipe and are submerged deep enough into the water to allow for season variations in the water level. Once the well is complete, the next decision is how deep to set the pump and drop pipe.



## Water Level Declines ---

A crucial factor to keep in mind is that water levels may vary more than forty (40) feet between wet and dry years, as well as seasonally when water demand peaks. If you are in a high demand area, the water in the well could drop below the intake of your pump. To protect your investment, a low pressure cut-off switch is recommended to prevent permanent damage to the pump. Within the SWFWMD, May is usually the month in which water levels drop to their lowest level and September is usually the month when water is at the highest level due to the preceding summer rainfall. Another factor to consider is neighboring water users. Many agricultural operations use ground water as a means of frost and freeze protection during the winter months of the year. This demand may cause a temporary lowering of the water level. For example, some areas of Plant City, Dover, and other parts of Hillsborough County have experienced as much as a

forty-foot lowering of water levels during this season. Ask your installer about this switch and other ideas to prevent permanent damage to your pump.

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## Definitions

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- 1. *Abandoned well*** A well the use of which has been permanently discontinued. Any well shall be deemed abandoned that is in such a state of disrepair that continued use for the purpose of obtaining ground water, or disposing of water or liquid wastes, or for observation is impracticable.
- 2. *Annulus* or *annular space*** Any artificially created void existing between a well casing or liner pipe and a borehole wall, or between two casings or between tubing and the casing for liner pipe.
- 3. *Aquifer*** A geologic formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield useful quantities of ground water to wells and springs.
- 4. *Casing diameter* or *diameter of casing*** The largest nominal permanent water-bearing casing. For the purposes of Chapter 40D-3, the diameter of the casing at the upper terminus will be presumed to be the diameter for the entire length, unless the well owner or contractor can demonstrate that the well has a smaller diameter permanent water-bearing casing below the upper terminus.
- 5. *Construction of water wells*** All parts and acts necessary to obtain ground water by wells, including the location and excavation of the well, but excluding the installation of pumps and pumping equipment.

- 6. Contractor** Any person licensed by the Department, or a water management district, in accordance with Chapter 62-531, and engaged in the business of construction, repair, or abandonment of wells.
- 7. District** The Southwest Florida Water Management District.
- 8. Driller** A licensed contractor, or a person working for a licensed contractor who actually constructs the well.
- 9. Incomplete well** Any attempted well that the construction of which has been discontinued and is unsuitable for any permitted use.
- 10. Neat cement grout or grout** A mixture of water and Portland cement (American Concrete Institute Types I, II or III), or any other approved types of cement, or Bentonite for applications specified in Rule 40D-3.517, and acceptable amounts of additives approved by the District for use in cement grouts.
- 11. Packer** A device made from material other than lead placed within the well casing that seals the joint between two pieces of casing, between the casing and screen, between one formation or water bearing strata and another, or between the formation and the casing.
- 12. Potable water** Water suitable for human consumption and approvable by the county health unit (Florida Department of Health and Rehabilitative Services).
- 13. Public water supply well** A well constructed for the purpose of supplying water to a public water system, as permitted under Chapters 62-550, 62-555, 62-560, 62-524 and 10D-4.
- 14. Public water system** A community or on-community system for the provision to the public of piped water for human consumption, provided that such system has at least 15 service connections or regularly serves at least 25 individuals daily at least 60 days out of the year, as set forth in Chapters 62-550, 62-555, and 62-560 and 62-524.

**15. *Water well or well*** Any excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed when the intended use of such excavation is for the location, acquisition, development, monitoring or artificial recharge of ground water. This term does not include any well for the purpose of obtaining or prospecting for oil, natural gas, minerals, or products of mining or quarrying, for inserting media to dispose of oil brines or to repressure oil-bearing or natural gas-bearing formation, for storing petroleum, natural gas, or other products, or for temporary dewatering of subsurface formations for construction, mining or quarrying purposes.

**16. *Well completion*** Termination of all construction, repair, modification or abandonment activities.

**17. *Well completion report*** The well completion form as described in Rule 40D-3.411(1)(a) supplied by or approved by the District.

**18. *Well seal*** An arrangement or device approved by the District that prevents contaminants from entering the well at the upper terminus.



## For More Information \_\_\_\_\_

### Publications:

The following publications may be helpful to well owners. Write to the listed organization to get information on prices and availability.

*Manual of Individual and Non-Public Water Supply Systems.*  
May 1991. EPA-570/9-91-004. U.S. Environmental Protection Agency, Office of Water (WH-550), Washington, DC 20460

*When You Need A Water Well.*  
National Ground Water Association, Worthington, OH 43085

*The Water You Drink.*  
1984. Watertest Corporation, New London, NH 03257

*Private Water Systems Handbook.*  
1979. Midwest Plan Service, Iowa State University, Ames, IA 50011

*Florida's Ground Water Resource.*  
1989. Florida Department of Environmental Regulation, Tallahassee, FL 32301

*State of the Environment: Florida Ground Water.*  
1989. Florida Department of Environmental Regulation, Tallahassee, FL 32301

### Government Agencies:

Your county health department can provide help on problems concerning wells, water testing, water treatment methods, quality of well water, and septic systems. Your county environmental services department can give you information on safe disposal of hazardous wastes.



Florida Cooperative Extension agents in your area may be helpful in providing information on local groundwater conditions. They can also provide copies of the following and other publications on water prepared by the University of Florida's Institute of Food and Agricultural Sciences (IFAS).

*Home Water Quality and Safety.* 1986. Circular 703.

*Water Resource Management in Florida.* 1985. Bulletin 206.

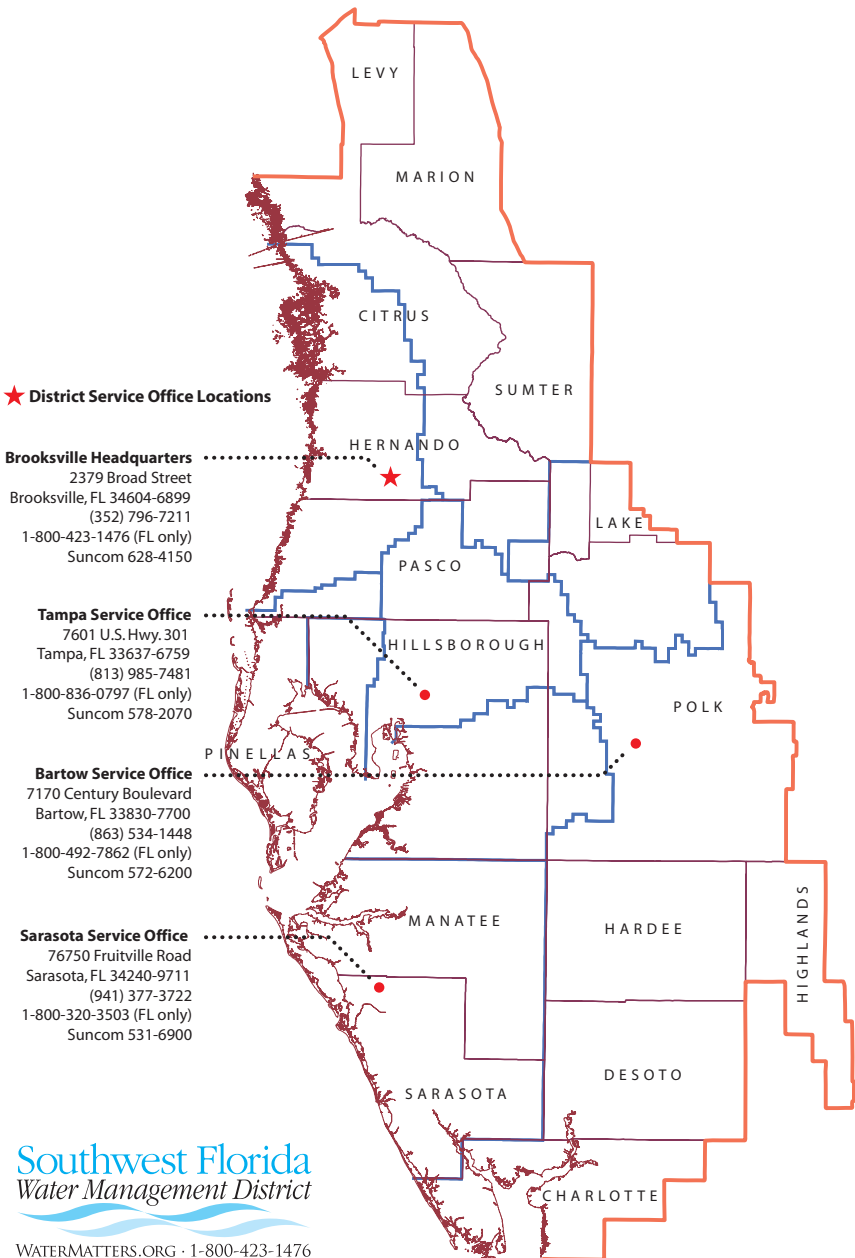
*Florida's Water Resources.* Bulletin FRE 40.

The Agricultural Source and Water Well Management Section of the Florida Department of Environmental Protection and the U.S. Environmental Protection Agency's Drinking Water Office can provide you with information on drinking water and contaminant limits. These agencies can be contacted by writing or calling:

Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400  
[www.dep.state.fl.us](http://www.dep.state.fl.us)

U.S. Environmental Protection Agency  
Region IV Office  
Atlanta Federal Center  
61 Forsyth Street, SW  
Atlanta, GA 30303-3104  
[www.epa.gov](http://www.epa.gov)

The U. S. Environmental Protection Agency also has a "Safe Drinking Water Hotline".



**★ District Service Office Locations**

**Brooksville Headquarters**  
 2379 Broad Street  
 Brooksville, FL 34604-6899  
 (352) 796-7211  
 1-800-423-1476 (FL only)  
 Suncom 628-4150

**Tampa Service Office**  
 7601 U.S. Hwy. 301  
 Tampa, FL 33637-6759  
 (813) 985-7481  
 1-800-836-0797 (FL only)  
 Suncom 578-2070

**Bartow Service Office**  
 7170 Century Boulevard  
 Bartow, FL 33830-7700  
 (863) 534-1448  
 1-800-492-7862 (FL only)  
 Suncom 572-6200

**Sarasota Service Office**  
 76750 Fruitville Road  
 Sarasota, FL 34240-9711  
 (941) 377-3722  
 1-800-320-3503 (FL only)  
 Suncom 531-6900

**Southwest Florida  
 Water Management District**

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This information will be made available in accessible formats upon request.  
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 1-800-423-1476 (FL only), ext. 4757; TDD only at 1-800-231-6103 (FL only).



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