

**PROTECTING
YOUR
GROUNDWATER
THROUGH
FARMSTEAD
ASSESSMENT**

AE-1074

Assessing the Condition of Your Water Well and Its Location

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The condition of your well is an important factor to consider when looking at the potential for groundwater contamination. Specifically, you should be concerned about well depth, well construction and activities around the well.

Planning for New Wells

When planning a new well, take some time to assess future farmstead activities. Locate your new well so that it will not be in jeopardy of ever being contaminated. Locate your well on high ground, so that if a spill occurs, contaminated water will flow away from the well. Make the well accessible for repairs, cleaning, testing and inspection. Hire a competent, licensed well driller to dig your new well. The licensing process for well drillers ensures that wells will be constructed according to the most recent codes that protect your health.

Water Testing

Water testing is the *only* sure way to know what substances are present in your drinking water. Some contaminants may be purely aesthetic and not harmful to your health, while some contaminants such as bacteria and nitrates can be quite serious, or even fatal. A list of certified laboratories that perform water testing in North Dakota is listed in Appendix I of this circular.

This circular contains a brief discussion of each question on the Farmstead Assessment checklist, and a section discussing what you can do and who to call if you answered "Yes" to any of the questions.



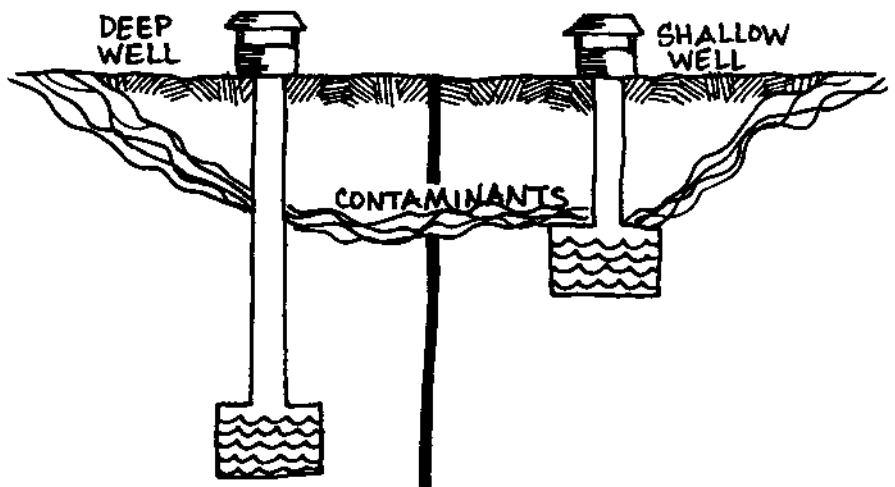
NDSU EXTENSION SERVICE

North Dakota State University, Fargo, ND 58105

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1 Is your well shallow (less than 50 feet deep)?

The depth of your well is an important factor to consider when looking at the potential for groundwater contamination. Contaminants which infiltrate from the surface are more likely to reach a shallow well than a deep well. Also, wells screened in the lower part of an aquifer have less potential for contamination than those screened in the upper part of an aquifer. For deep or shallow wells, they should be screened to draw water from the deeper part of the aquifer where less contamination is likely to occur.

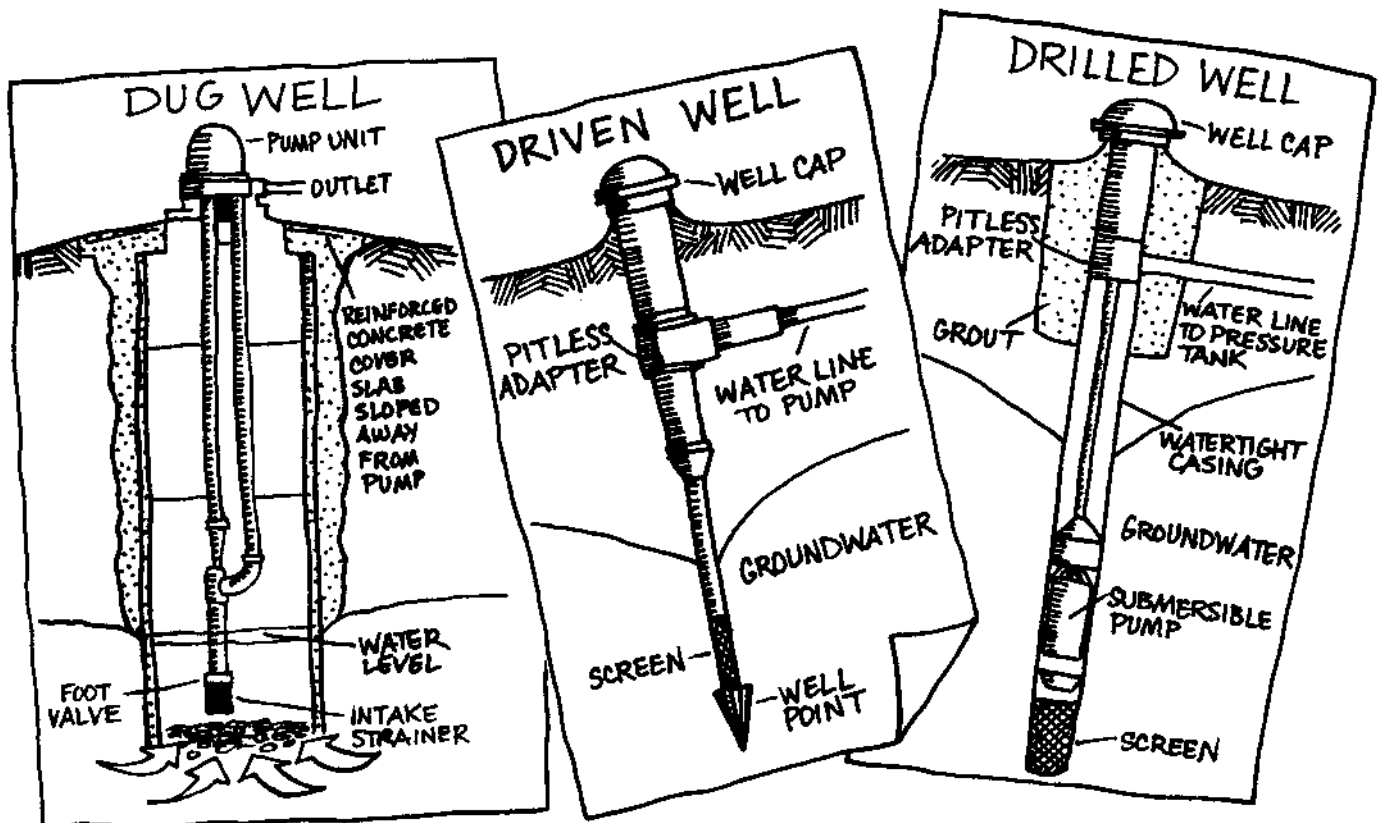


2 Do you have a driven or dug well?

Different types of wells include dug, driven, and drilled. A dug well is a large-diameter hole more than 2 feet in diameter often constructed by hand. Of the different types of wells, dug wells have the greatest risk of being contaminated because they are usually shallow and often poorly protected from surface water.

Driven wells are usually 2 inches or less in diameter, less than 50 feet deep, and typically installed only in areas of relatively loose materials such as sand. Because driven wells are usually shallow and not grouted between the casing and earth, their risk of being contaminated is also higher than other types of wells.

Drilled wells are usually the least susceptible to contamination and usually the safest. Drilled wells are deeper than most wells and have grout surrounding the casing to prevent contamination.



3 Was your well constructed more than 50 years ago?

The age of your well is a factor to consider when assessing the potential for groundwater contamination. The older your well, the more likely it is improperly located, downhill from possible pollution sources. Older wells are generally shallow and likely to have structural problems such as collapsed casing or casing with holes.



4 Is there a depression around the casing of your well?

Direction of surface flow can affect the risk of your drinking water supply being contaminated. Possible pollution sources on your farmstead should be situated downslope from your well. If contaminants do get into the surface water flow, they will flow away from the well.

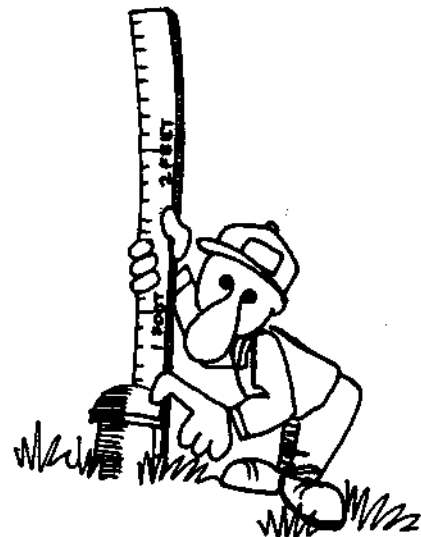
If a depression exists around your well casing, it provides a sink for surface water to accumulate in. Contaminants in the accumulated surface water can either leak down along the well casing or penetrate through cracks in the well casing.

The top of the well casing cannot, by law, terminate in the basement of any building or in a pit, room, or other space which is below ground level.

Minimum distances of specific possible contamination sources from your well include:

- A: At least 50 feet from privy pits, cesspools, septic tanks, absorption fields, barnyards, feedlots, high water marks of lakes, streams, sloughs, and ponds.
- B: At least 30 feet from sewerlines.
- C: At least 10 feet from basements or pits.
- D: At least 20 feet from overhead powerlines.

Greater distances are always preferable and often necessary, depending on soil conditions.

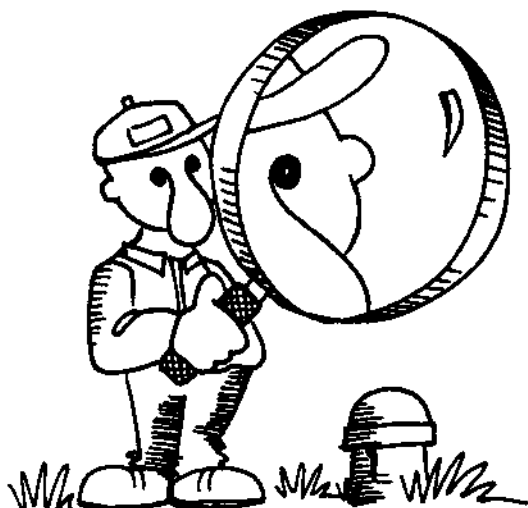


5 Does the casing of your well extend less than 12 inches above the ground level?

In looking at potential groundwater contamination, you need to consider casing height. Currently, in North Dakota, the well casing or cap (if the well has one) is required to project not less than 12 inches above final ground elevation. In addition, in areas subject to flooding, the top of the casing, cap, or well cover shall be at least 2 feet above the highest known flood elevation and be surrounded with earth fill (Section 33-18-01-06 of the North Dakota Century Code). The purpose of these standards is to ensure that surface water cannot run into the well through the top. If your well does not meet these standards, the risk of your drinking water being contaminated is higher.

6 Is your wellhead located in a pit?

Wellheads located in well pits are more easily flooded during periods of excessive surface water or when the groundwater level rises above normal levels. Flooding of well pits increases the likelihood of well contamination by surface water and accompanying contaminants. Wellheads ending in pits should be modified to extend the top of the well at least 12" above ground level and the pit should be properly filled.



Can you see any cracks or holes in the casing of your well?

Condition of the well casing and cap need to be assessed when looking at the potential for groundwater contamination. Wells are commonly cased with steel, plastic, or concrete to prevent the collapse of the borehole. The space between the casing and the sides of the borehole is filled with grout, usually cement, concrete, or bentonite, depending on the geologic materials encountered. Both the casing and the grout prevent pollutants from seeping down into the well.

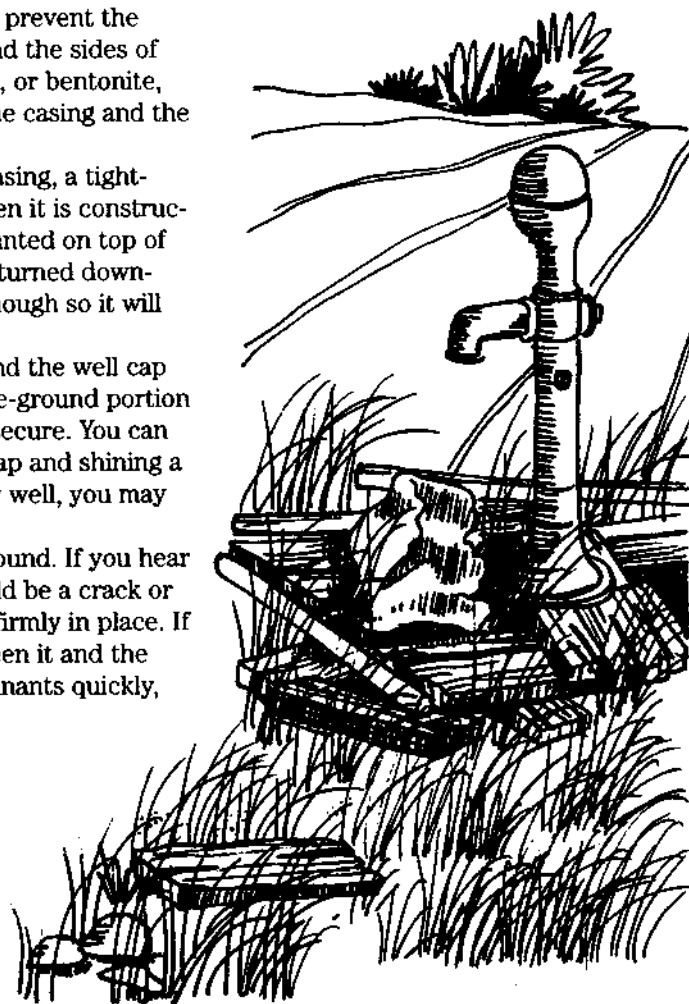
To prevent contaminants from flowing into the well casing, a tight-fitting, vermin-proof cap must be installed on the well when it is constructed. Not all wells are capped; some wells have pumps mounted on top of the casing. The cap should have a screened vent which is turned downward so air can enter the well. The vent should be high enough so it will not allow surface water to enter the well.

It is possible for the well casing to corrode or crack and the well cap to become damaged. You should visually inspect the above-ground portion of your well for holes or cracks and make sure the cap is secure. You can also check the inside of the casing by removing the well cap and shining a light around the inside of the casing. If you have a shallow well, you may also

be able to assess the condition of the well casing underground. If you hear water running when the pump is not operating, there could be a crack or hole in the well casing. Also, make sure the casing is still firmly in place. If you can move the casing, a channel probably exists between it and the surrounding materials. That channel can conduct contaminants quickly, below the surface and possibly directly to the aquifer.

! Are there abandoned wells on your farmstead that have not been properly plugged?

Besides being a safety hazard, abandoned wells are a direct pathway for contaminants to enter the groundwater. The NDSU Extensive Service in cooperation with several other agencies has developed guidelines for the plugging of abandoned wells in North Dakota. If you decide to plug an abandoned well on your farm, the guidelines should be followed as closely as possible.



ASSESSING THE CONDITION OF YOUR WELL

If you answered

"Yes" to the

following questions

If you answered "Yes" to the following questions	What you should do	Who to call	Other references
Questions 1,2,3,7.	Have your water tested annually for the most common contaminants, nitrate and bacteria, to see if a problem actually exists.	Water testing can be obtained through the North Dakota State Department of Health, (701) 221-5262 (microbiology), and (701) 221-6142 (chemistry).	Please refer to Appendix I for other certified labs available for water testing.
Question 4.	Relocate sources of contaminants downslope from well. Fill in depression and mound. Test water annually.	State Department of Health – Water Quality Division about contaminant distances from wells. (701) 221-5210.	North Dakota State Department of Health. "Water Well Construction and Water Well Pump Installation," Article 33-18.
Question 5.	Measure well casing to make sure it is at least 12 inches above the ground surface.	Local certified well driller for well modifications. State Department of Health for construction codes and inspections. (701)-221-5210.	"Water Well Construction and Water Well Pump Installation," North Dakota State Department of Health, Article 33-18.
Question 6.	Extend the top of the well to at least 12" above the ground surface. Fill in the well pit.	Local certified well driller for well modifications.	"Water Well Construction and Water Well Pump Installation," North Dakota State Department of Health, Article 33-18.
Question 8.	Assess number of abandoned wells located on your farmstead.	County SCS for technical assistance. County Extension for information. County SCD or Water Board for possible cost-share.	NDSU publication – AE-996; Plugging Abandoned Wells.

APPENDIX I

List of certified laboratories that perform water testing:
All of these laboratories are certified by the State of North Dakota. Please contact the laboratory to determine if they will accept your sample.

North Dakota State Department
of Health and Consolidated
Laboratories
1205 Avenue A West
Bismarck, ND 58501
Telephone: 701-221-5262
or 701-328-6140

Minnesota Valley Testing Lab
1411 South 12th Street
Bismarck, ND 58501
Telephone: 701-258-9720
or 1-800-279-6885

Diagnostic Laboratory
Vet Science Department
North Dakota State Univ.
Van Es Hall
Fargo, ND 58105
Telephone: 701-231-7527

Southwest Dist. Health Unit
2869 3rd Avenue West
Dickinson, ND 58691
Telephone: 701-227-0171

First District Health Unit
801 11th Ave. SW
Minot, ND 58701
Telephone: 701-852-1376

Fargo Cass Public Health Center
401 Third Ave. North
Fargo, ND 58105
Telephone: 701-241-1360

Astro-Chem Service and Lab
4102 Second Avenue West
Williston, ND 58801
Telephone: 701-572-7355



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