



# THE SPIGOT

from the NORTH DAKOTA RURAL WATER SYSTEMS ASSOCIATION

# Drain Tiling Safely Around Buried Utilities

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Artificial drainage of soils has been an important aspect of agriculture in some parts of the country for nearly a century. The rate of installation increased markedly in the 1990s due to many factors. Some of these include the ability to evaluate return on investment because of the advent of combine yield monitors, the overall economic environment in agriculture, and a significant decrease in the cost of installation due to changes in installation processes and machinery. This last factor has led to a trend toward farmers installing their own drainage systems. Previously, this was largely the domain of professional contractors.

While many public utilities run parallel to roadways or within road rights-of-way, there are some exceptions that cut through areas of a field, the most common of which are pipelines. The installation of artificial drainage tile in these situations may present a challenge. Most professional contractors have lots of experience dealing with this issue, while farmer installers may not have encountered this in the past.

Farmers that do their own installation should strongly consider having a professional contractor design and install the drainage system if there is a utility present in the farmed area.

Drainage installation presents a unique challenge in this regard, as drainage systems are not simply designed and installed on site (like a fence or a road culvert). In the case of drainage, the entire system is designed and planned before ever going out to the field. This means simply calling 811 before you dig is not enough. Information regarding buried utilities needs to be gathered during the planning or design state as well as the installation phase.

All planned drainage systems must be checked for the presence of utilities by seeking information from your state's One Call Center by requesting a "Design" or "Engineering" ticket if your state allows. In this instance, it is important you talk to a professional drain tile rep to discuss your plans, rather than simply

requesting to have the site marked, because the time lag between design and installation is frequently weeks to months. Rather, you need to find out whether there are pipelines or other utilities in the field you plan to tile.

In instances where there are utilities present, your state One Call Center will connect you with the buried utility owner, and they will share important information about the location and depth of the pipeline or underground utility.

The science of drainage design starts with the amount of water the system is designed to remove in a 24-hour period. The design then takes soil properties into consideration. The hydraulic conductivity of the soils determines the appropriate space between the lateral, the long runs of drain tile that constitute the majority of the drainage in a field. Engineering calculations determine the amount of water that will be conveyed through the tile and the size of the drain tile needed. Planned tile lines are drawn to scale on a map (most computer aided now) and take the contour of the land into consideration, and therefore, the natural flow pattern of water through the field. The potential outlet locations for the system are always considered as primary design criteria.



*A drain tile being installed into an agricultural field.*



The number of times drain tiles cross buried utilities should be minimized. When a buried utility bisects a field, the simplest solution is to design separate systems on each side. This, obviously, requires separate outlets for each side. Consider working with neighboring landowners to achieve this. It is entirely possible it will be less costly and less inconvenient to pay for an outlet through someone else's property than to cross a pipeline. In cases where there is only a single outlet for a field and the utility must be crossed, you will want to design collector lines that run parallel to the utility and have these empty into a single main or submain that crosses the utility. There are private consultants who specialize in drainage system design that can be employed should the necessary design prove to be complicated.

After you have your design worked out, it is necessary to reconnect with the utility owner to review the design and verify the utility depth. It is essential a drainage system maintain grade to function. There are some instances where a buried utility may be closer to the surface than expected. If there is a conflict

between the desired depth of the drain tiles to be installed and the buried utility, it will be necessary to redesign the system to take this into consideration. This is best done during the planning and design phase.

When the time nears for installation, at least two to three business days before the work is to commence, be sure to call 811 again to have all utilities marked on site. In some cases, you cannot dig within 50 feet of a buried pipeline without a qualified pipeline company representative present to ensure the safety of excavators, the community, and the pipeline. When this is required, the utility owner will send a person to be with you to direct activities around the buried utility. They will tell you when you need to stop digging mechanically. Usually the utility owner will allow mechanical digging to be within a few feet of the buried utility, provided it has been located precisely and exposed. If you need to get closer than that, you will need to dig by hand to ensure the excavation does not damage the utility. Remember to practice trench safety. When a person is working in a trench over four feet in depth, it should either be benched to widen the top of the trench and therefore sloping back the walls, or you must use wall reinforcement. Check OSHA or local regulations to be sure.

The presence of a pipeline or utility does present a challenge to drainage system installation, but by using proper planning and design, the amount of extra time and difficulty can be minimized. For more information, or to identify local resources of assistance, contact your state's One Call Center or the closest Extension office of your state's land grant university.

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