

Wellhead Protection

Mississippi depends on groundwater for its water resources. The state has more than 104,000 wells—84,000–85,650 are private home wells, 2,600–3,000 are community water systems, and 15,750–17,000 are irrigation/aquaculture wells.

Because of the importance of groundwater to Mississippi, protecting the underground water supplies, or aquifers, is essential. Wellhead protection, or well protection, is also important to all well owners in the state.

Proper construction of wells is only one aspect of groundwater protection that must be monitored. The Mississippi Department of Environmental Quality (MDEQ) and the Mississippi State Department of Health (MSDH) regulate construction of many types of wells in the state. MDEQ regulates irrigation wells, while MSDH regulates public water supply wells, which supply drinking water. Additional standards may apply for other types of wells, including municipal supply wells.

The following general regulations and guidelines govern well construction in Mississippi. For more complete information, contact the appropriate regulatory agency listed at the end of this publication.

Regulations/Guidelines

1. **End the well casing above the 100-year flood level.** If flood levels around the well routinely exceed a reasonable height for an extended casing, the well must be protected against floodwaters entering the casing.
2. **Protect all wells from contaminants.** The casing must be covered with a pump house, a lock, and an overlapping cover to prevent contaminants from entering the well.
3. **Fill the space between the drilled hole and the casing pipe with a nonpermeable material called grout (refer to number 8 below).** All wells located within 100 feet of a potential pollution source (for example, sewers, septic tanks, landfills, waste piles, and other pollution sources) must be grouted. The grout must be from a depth of at least 50 feet below the land surface, except as specified in number 7 below. For private wells, the MSDH requires only 10 feet of cement grout below the land surface.
4. **Any wells located within one-quarter mile (horizontally) of a known existing area of a contaminated aquifer must be grouted from the top of the filter pack or sealed to the surface (except as specified in number 7 below).**
5. **Wells serving public water supply systems must be grouted from the top of the filter pack or sealed to the ground surface.**
6. **Monitoring wells must be grouted from the top of the filter pack or sealed to the surface unless alternate construction is mandated by the applicable regulatory program.** Other specifics of monitoring well construction must follow the

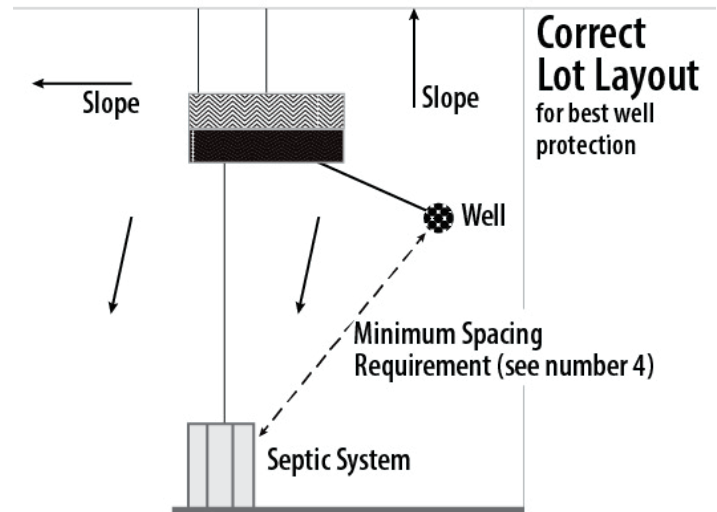


Figure 1. Optimal well location to minimize potential contamination.

MSDH also requires a 4-inch slab to be poured, starting at the edge of the casing pipe and extending 2 feet to the edge of the slab. The grout and the slab must be a continuous pour of concrete without any joints to prevent leaking.

In addition, a 50-foot spacing is required between the well and a septic tank, aerobic treatment plant, sewage-holding tank, animal-holding pen with concrete floor, or non-potable well (i.e. not for drinking).

There is also a 100-foot spacing requirement between the well and a subsurface injection field, the edge of surface discharge effluent, pesticide or fertilizer storage, and manure storage.

requirements of the applicable regulatory program or accepted professional practices.

7. **Introduce grout in one continuous operation from the top of the filter pack or seal to the surface for continuous lengths not separated by multiple screens.** A staged grouting operation may be used for deep wells, provided the completed grout is continuous from the top of the filter pack or sealed to the surface.
8. **Grout on all holes should be composed of neat cement, cement grout, cement-bentonite mixture (5–8 percent bentonite), or bentonite.** Other ratios of cement to bentonite may be used for specific applications; all or most of the upper 25 feet of the well must be grouted with one of the previously listed grouts. Use pure bentonite grout as a surface seal only when the annular space is grouted to a depth of at least 25 feet. Bentonite pellets may be added under free-fall conditions for depths not exceeding 25 feet. Granulated or pelleted bentonite may be placed to greater depths if introduced through a tremie pipe. Free-fall addition of other types of grout from the surface is prohibited.
9. **Chlorinate all drilling and development water used in the construction.** If the water is obtained from a local public water supply distribution system, it need not have additional chlorine added, except what is necessary to properly disinfect the well, supply lines, and storage tank.
10. **Use metal casing in all wells (regardless of size) drilled through or into aquifers containing chloride concentrations of more than 250 milligrams per liter and/or total dissolved solids (TDS) concentrations in excess of 1,000 milligrams per liter.** In addition, all such wells must be completed using only the casing method of grouting (Halliburton Method) to thoroughly grout the open space from the bottom of the casing to ground surface. These requirements may be waived if the water from such wells is used for domestic, municipal, or water association supply. It must also be demonstrated that construction or use of these wells will not harm freshwater aquifers.

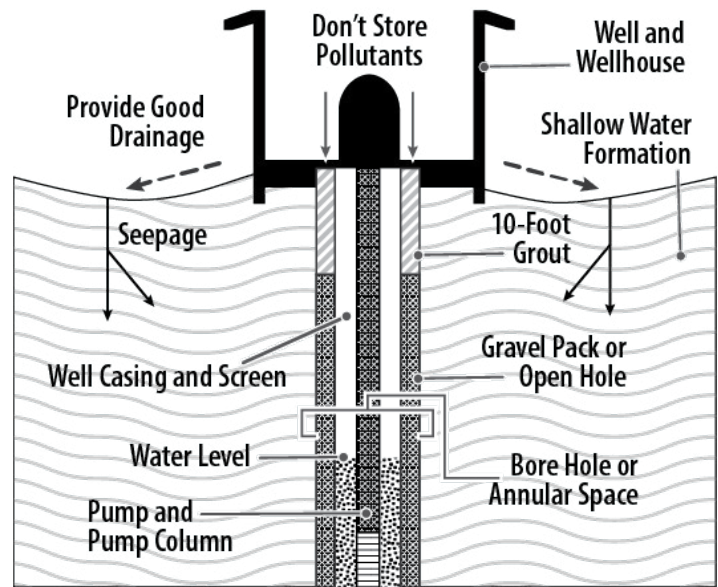


Figure 2. Well construction and components.

contact the [Natural Resources Conservation Service](#) or [Farm Service Agency](#) office in your county.

1. **Grout should consist of neat cement, cement grout, cement-bentonite mixture (5–8 percent bentonite), or bentonite.** Bentonite pellets may be added under free-fall conditions for depths not exceeding 25 feet if pellets are tamped into place. Granulated or pelleted bentonite may be placed to greater depths if introduced through a tremie pipe. Free-fall addition of other types of grout from the surface is prohibited.
2. **Remove obstructions from the well casing.**
3. **Pull or ream the casing.** If the casing cannot be removed, pierce holes in it, unless the annular space was grouted during construction. Grout is forced into the annular space under pressure during the sealing operation. In farming areas, cut off the casing at least 3 feet below the land surface and fill the excavation with compacted soil after plugging.
4. **Seal abandoned wells or holes from the bottom of the hole to the ground surface.** Use grout as described in number 1 of this section.

Plugging Abandoned Wells

The procedures for plugging or sealing an abandoned well may vary depending on your location in the state. The following are general requirements for plugging an abandoned well in Mississippi. To find out if you qualify for financial assistance to plug an abandoned well,

Proper Well Location/Maintenance

Selecting a good site for a well is also important. Choose well-drained areas where the water runs away from the well site and not toward it. Make sure the site is a safe distance from septic tank fields, livestock and livestock confinements, chemical storage, or any other potentially hazardous area on the same property (or adjacent property).

Proper Well Location

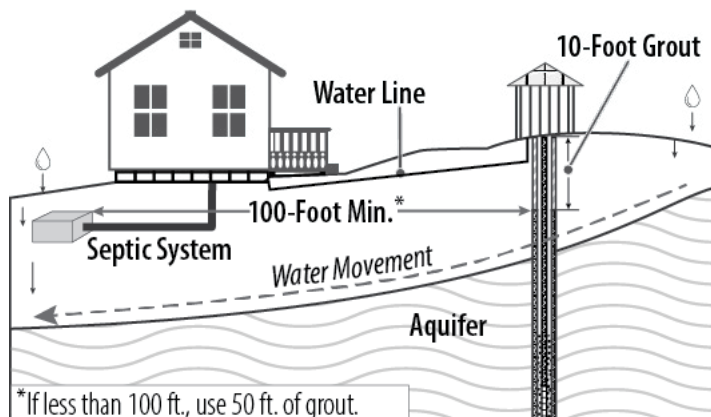


Figure 3. Well placement with minimum setback distances and groundwater flow.

Keep the well house maintained and free of any chemicals, paints, fuels, or other potentially hazardous materials that could accidentally leak on the ground at the well location.

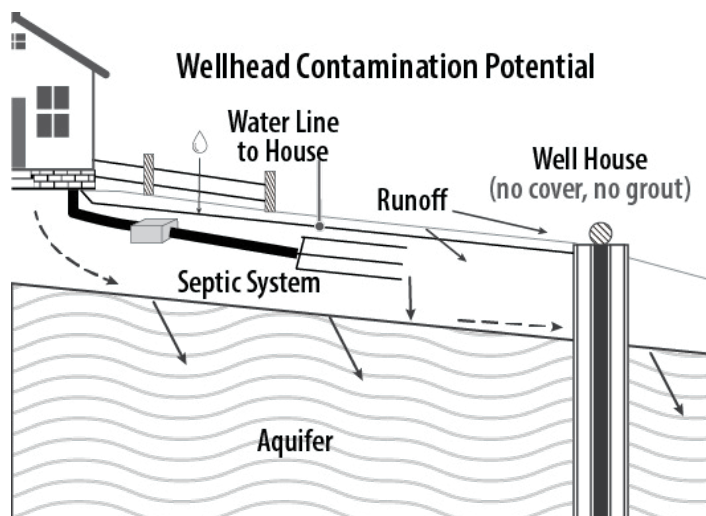
Use an anti-siphon or back-flow prevention device to prevent contamination when using a water supply or well for chemical mixing and application. Use a check valve or vacuum breaker valve when a well is used to fill chemical tanks or bottles. Do not leave the hose or fill device in the container. The hose should be at the top of the container, so if the water supply shuts off for some reason, the hose will not back-siphon into the water supply system.

Chemical-filling practices should take place at the point of use (not the filling location) so the chemicals being handled are not near the well site. This practice prevents accidental spills that could eventually leach into the well casing or gravel pack and enter the groundwater supply.

Using common sense is the best way to prevent a potentially dangerous situation at a well site. Swimming pools and lawn irrigation systems also may require back-flow prevention. Consult your local building codes for any requirements.

Groundwater contamination could be a life-threatening situation if not detected soon enough. Many chemicals at low levels don't have a distinct taste or smell, making them difficult to detect and extremely dangerous. These products include household chemicals and agricultural and industrial chemicals.

Wellhead Contamination Potential



Prevention is cheaper than the resulting contamination and cleanup.

Figure 4. Example of poor well placement and why there may be contamination.

In recent years, many shallow wells in Mississippi have been tested for pesticides. Only isolated cases of pesticide contamination have been reported, with most detections below the minimum reporting level.

The best way to keep water supplies as contaminant-free as possible is to construct the well properly and develop good maintenance and protection habits.

For more information on well regulations, contact a certified well driller in your area or one of the following agencies:

Your local office of the Mississippi State University Extension Service

www.extension.msstate.edu/county-offices

Mississippi Department of Environmental Quality Office of Land and Water Resources

P.O. Box 2309

Jackson, MS 39225

(601) 961-5575

www.mdeq.ms.gov/water

Mississippi State Department of Health

P.O. Box 1700

Jackson, MS 39215-1750

(601) 576-7400

(866) 458-4948

www.msdh.ms.gov

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