



Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

Erosion and Sediment Control Best Management Practices For Water Well Drilling And Aquifer Testing

This fact sheet describes Best Management Practices that should be used in developing and implementing erosion and sediment (E&S) control plans for water well drilling and aquifer testing sites. Because site conditions vary greatly, it is recommended that all well drilling contractors meet with county conservation district staff prior to beginning the work to discuss site constraints and to develop the most appropriate E&S plan. Consideration should be given to the terrain, vegetative cover, soil types, underlying geology and proximity to waterways and wetlands.

Erosion and Sediment Control Measures for Residential Wells and Other Low Capacity Wells

The installation of most residential wells typically involves the generation of **up to 25 gallons per minute (gpm)** including both the drilling operation and the pumping operation. The recommended E&S control measures to address the low flows leaving the well casing involve limited detention and then discharge from the well area overland through vegetated terrain.

Detention time should be provided to cause the well cuttings and solids to drop out of the flow. For wells being drilled at construction sites, this can be accomplished by excavating a shallow trench, 10 to 15 feet long, immediately downgrade of the well. The downstream edge of the trench should be level to allow water to spill out uniformly over the entire length of the trench. A semi-circle of silt fence or straw bales should be installed downgrade of the trench for further sediment removal. Refer to Tables 17 and 18 of the Erosion and Sediment Pollution Control Program Manual (E&S Manual) on the DEP website at www.dep.state.pa.us (directLINK "erosion control publications"), for straw bale and filter fence requirements.

From the trench, overland flow should be directed as sheet flow across a thickly vegetated area. This vegetated filter must conform to slope requirements discussed for vegetated filter strips on page 82 of the E&S Manual. As indicated, a minimum of 50 feet of vegetated terrain must be available between the trench and the nearest down slope water conveyance. If adequate vegetation is not available downgrade of the well site, or if the minimum distance to water conveyance is less than 50 feet, E&S measures for medium and high capacity wells described below should be employed. These more rigorous E&S measures for medium and high capacity wells should also be used for all residential or small sized wells drilled within 200 feet of special protection waterways.

For wells being installed in established, landscaped areas, minimal site disturbance is desirable. An alternative to the trench described above is to use a

device on the well casing to divert drillings to a tank truck or a container which can be hauled from the site for disposal.

Erosion and Sediment Control Measures for Medium and High Capacity Wells

More rigorous E&S measures are recommended for medium and high capacity wells with anticipated flows **exceeding 25 gpm**. Most larger private wells and public water supply wells will exceed these low flows.

The recommended E&S measures to address the medium to high flows leaving the well casing involve detention in an excavated sump and pumping the settled water through a filter bag.

Adequate detention time can be provided by directing well casing overflow to an excavated sump sized so that the volume of the sump in cubic feet is equal to the flow in gallons per minute. Settled water from the sump is pumped to an appropriately sized filter bag. According to manufacturer's recommendations, the filter bag should be placed on a stabilized area of dense vegetation as shown in Standard Construction Detail #26 (E&S Manual). If the vegetative cover is not available, the filter bag should be placed on a bed of gravel.

Erosion and Sediment Control Measures for Aquifer Testing

Flows exceeding 500 gpm are possible during aquifer testing of some water supply wells. The clarity of the test flows may vary from very muddy in a limestone aquifer where clay is present, to quite clear in a sandstone aquifer. Measures must be taken to prevent sediment pollution from aquifer tests with turbid water. Precautions are also needed to allow high flows of clear water to discharge from the site without causing accelerated erosion of the landscape.

Muddy water yielded by aquifer testing should be allowed to settle and then pumped through a filter bag as described above in E&S Control Measures for Medium and High Capacity Wells. Considering that these flows can be very high, the contractor must utilize large

enough filter bags or construct a manifold system using several smaller bags at one time. Care should also be taken to replace the bags promptly when full or when they fail due to a tear in the material.

In a situation where the actual well yields exceed anticipated flows by a considerable amount and the erosion and sediment control measures are inadequately sized, and waterways are threatened with sediment pollution, the operation must be shut down until more appropriate E&S controls are provided. It is recommended that the county conservation district or DEP Regional Office be contacted to assist in developing the appropriate E&S controls.

Clear water flows generated during well yield pumping should be discharged to a watercourse by way of a diversion channel or conduit. The project's E&S plan should provide details on proposed means of transporting the clear water. A typical cross section and design considerations for a clear water diversion channel are provided in Standard Worksheet #22 in the E&S Manual. The channel lining must be designed appropriately for the anticipated velocity. In a similar manner, if a conduit is proposed, supporting hydraulic design information should be provided.

Adequate protection against erosion should be placed at the downstream end of the clear water diversion channel or conduit. A General Permit No. 3 may be required for the protection and a General Permit No. 4 may be required for the outfall, depending on the drainage area of the receiving stream at the discharge point.

It is important to remember that when considering the most appropriate means of controlling erosion and sediment at well sites, recirculating the discharge water into the aquifer will invalidate the aquifer test. Therefore, care must be taken in designing and locating the E&S control measures so that the aquifer test does not induce artificial recharge from discharged well water.

Summary

The preceding E&S measures are considered acceptable Best Management Practices for well drilling sites. However, site constraints may require that other measures be taken to prevent erosion and sediment pollution. Alternatives to these measures can be developed and agreed upon by the well driller and the conservation district where appropriate.

For more information, call the county conservation district or the DEP regional office in your area or contact:

**Department of Environmental Protection
Bureau of Watershed Management
P.O. Box 8555
Harrisburg, PA 17105-8555
(717) 787-5259**

**Department of Environmental Protection
Bureau of Water Supply and Wastewater Management
P.O. Box 8467
Harrisburg, PA 17105-8467
(717) 783-3795**

Southeast Region
Suite 6010, Lee Park
555 North Lane
Conshohocken, PA 19428
Water Supply: 610-832-6059
Soils and Waterways: 610-832-6131

Counties: Bucks, Chester, Delaware, Montgomery and Philadelphia

Northwest Region
230 Chestnut St.
Meadville, PA 16335-3481
Water Supply: 814-332-6899
Soils and Waterways: 814-332-6942

Counties: Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango and Warren

Southwest Region
400 Waterfront Drive
Pittsburgh, PA 15222-4745
Water Supply: 412-442-4217
Soils and Waterways: 412-442-4028

Counties: Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington and Westmoreland

Northeast Region
2 Public Square
Wilkes-Barre, PA 18711-0790
Water Supply: 570-826-2511
Soils and Waterways: 570-826-2553

Counties: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne and Wyoming

Southcentral Region
909 Elmerton Ave.
Harrisburg, PA 17110
Water Supply: 717-705-4708
Soils and Waterways: 717-705-4707

Counties: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry and York

Northcentral Region
208 W. Third St., Suite 101
Suite 101
Williamsport, PA 17701
Water Supply: 570-327-3675
Soils and Waterways: 570-327-3670

Counties: Bradford, Cameron, Clearfield, Centre, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga and Union

This fact sheet and related environmental information are available electronically via Internet. For more information, visit us through PA PowerPort at <http://www.state.pa.us> or visit DEP directly at <http://www.dep.state.pa.us> (choose directLINK "Drinking Water Publications").



www.GreenWorks.tv - A web space dedicated to helping you learn how to protect and improve the environment. The site features the largest collection of environmental videos available on the Internet and is produced by the nonprofit Environmental Fund for Pennsylvania, with financial support from the Pennsylvania Department of Environmental Protection, 877-PA-GREEN.