



# BASIC UNDERSTANDING DRAINAGE AROUND YOUR HOME

## Have a Drainage Problem?

Is your basement wet? Does your yard flood or pond periodically? Do trees, shrubs, and plants grow poorly?

Don't be surprised! About 20% of the land in the United States is affected by excess water. The good news is that there are signs for homeowners to look for, situations to avoid, and solutions that reduce drainage problems. Investigate the problem by first checking your downspouts. Downspout water should be directed away from your house. Second, grade the ground adjacent to the foundation walls so that they direct water away from the house.

If these solutions are in place, but you still have a wet basement or a sump pump that never stops running, you may have a more complex problem. If controlling surface water doesn't help, the problem may be below the surface--a high water table, spring or seeps, or abandoned subsurface agricultural tile that is draining water from other areas and directing it to your foundation. This dilemma can be dealt with by redirecting the water to new subsurface drains.

## What Causes These Drainage Problems?

The soil we rely on as a foundation for our homes and property is a complex natural system. Then left alone, the deep and rich prairie soils of Illinois can effectively handle normal and excessive amounts of water. But when the natural soil structure is disturbed and a high percentage of the soil surface that once absorbed water is covered with impervious surfaces and the surrounding landscape is severely altered, then the natural environment cannot cope on its own. In some newer subdivisions, all of the topsoil and part of the subsoil material is removed during construction. Only a thin layer of topsoil is returned to the site--just enough to support the shallow root system of your lawn.

These sites usually have severe problems with soil droughtiness and surface runoff. The topsoil is too thin to hold adequate amounts of water and the subsoil has been so densely compacted that it cannot allow excess water to infiltrate into it. By adding more topsoil, aerating, composting, using deeprooted, drought-resistant grasses and plants, you can overcome these common limitations and restore the health and functionality of soil resources on your property. Generally, wetness and water problems are caused by flooding, springs and seeps, seasonal high water tables, surface ponding, or slow soil permeability.

## Flooding...

If your home is in a floodplain of a nearby stream or creek, it is at risk for flooding if the stream overflows during heavy or prolonged rainfall or rapid snowmelt. Even if you've taken precautions to "flood-proof" your home, you can never totally eliminate the potential for flooding, but you can reduce flood damage.

Usually, community-wide measures are needed to reduce effects of flooding and provide some protection, but there are actions you can take to reduce problems. Making your home more resistant to flood damage may include measures that block openings such as windows and doors, regulate drain outlets, and waterproof walls. These measures can be expensive and require careful evaluation to prevent structural damage. If you plan to build a house outside a subdivision or near a perennial stream, be sure the site is not in the floodplain. Check with the local building department for floodplain maps and/or options for homeowners located in floodplains. Keep in mind that for many communities, floodplain maps may be outdated and may not adequately reflect actual conditions in the area. A building site *near* the floodplain boundary in a rapidly developing area 10 years ago, may be *in* the floodplain today.

## Seasonal High Water Table...

A water table can be defined as the upper surface of groundwater or the level below which the soil is saturated with water. This level may fluctuate by several feet throughout the year, depending on soil conditions, landscape, or weather. When selecting a new home site, consider the level of the seasonal high water table. In many areas of Illinois the seasonal high water table may be at or near the ground surface for long periods. Building in these areas should be avoided. If the water table is 6 feet deep or more, high water table problems will be minimal.

When building a new house in an area with a seasonal high water table that is less than 6 feet from the surface, a sump pump with a system of foundation drains should be used to lower the water table. Create a good outlet for discharge flow from the pump and consider where you direct this water--you don't want to create problems for a neighbor! If the home is already built, install gravel and drains around the base of outside walls. Lowering the water table under the basement floor should be done only after analysis by experts, since unequal settlement may crack the walls.

In lawn areas affected by a high water table, a small excavated pond, a wetland garden, or collection of water-loving plants may be a suitable remedy. Transform the nuisance wet area into an attractive landscaping feature. Provisions of the federal Clean Water Act or state and local laws may apply to persons who propose to alter any wetlands or to dredge, dig, or fill in floodplain areas. For clarification/information, contact the U.S. Army Corps of Engineers or IDNR's Office of Water Resources prior to any earthmoving activities.

#### **Surface Ponding...**

If a significant amount of surface water ponds on your lawn or driveway for long periods, install small diversions or swales to channel off the water. In developed residential areas, these practices are usually installed near property lines in back of or alongside houses. For low flows of surface water, redirect water to landscaped yard areas with thirsty trees and shrubs. Be sure not to direct water onto someone else's property! If only small amounts of surface ponding occurs for short periods, drains may not be needed. Consider solving the problem by planting the area with water-loving native grasses or trees.

Even in upland areas, a continually wet basement or flooding can occur if the house is built in the path of a natural drainage way, in a pothole, or if the site is lower than the surrounding area. A drainage way or low area may look fine in dry seasons but can carry runoff water in wet seasons. In developed areas where the landscape has been greatly modified, runoff has increased and natural drainage ways are often blocked or altered. If man-made drainage ways or storm sewers are not built to carry this additional seasonal water flow, nearby homes may flood or experience surface ponding. *Runoff from areas as small as 1 acre can cause flooding.* Measures to remedy this kind of hazard usually require the cooperation of several homeowners.

Grade the yard so that surface water drains away from the house. A minimum grade of 1 foot in 100 feet is generally adequate. When filling in low areas, use the most permeable soil available. Save the topsoil and spread it over the newly filled and graded areas to help establish vegetation. To reduce soil compaction, limit construction traffic or use track equipment whenever possible on the lawn. Installing roof gutters and downspouts to control roof water may prevent ponding in low yard areas. Downspouts can empty into outlet spreaders

that discharge water in a thin layer over a grassy area.

#### **Springs and Seeps...**

On many sites, natural springs and seeps occur due to existing geology and landscape characteristics. Water may flow seasonally, throughout the year, or may flow into or around homes constructed over or near a spring or seep. For protection, install subsurface drains at least 4 inches in diameter surrounded by 6-12 inches of gravel or sand. Place gravel along the outside of the base of the foundation wall. Be sure to install an adequate gravity or pump outlet for the tile. An interceptor drain can divert seep or spring water before it reaches the structure.

Springs and seeps also affect lawns and onsite septic fields. You can install subsurface drains to collect groundwater and divert it. For guidance with septic field problems, contact your local health department. Typically, subsurface drains are made of plastic but older drain tile may be made of clay, concrete, or metal. Be sure to check local building codes for approved materials and other drainage regulations.

#### **Slow Soil Permeability...**

If the soil has a dense layer, especially a layer of clay or a severely compacted layer, water flow through the soil may be restricted and may cause ponding. If this layer is near the surface, use a soil aerator or deep-rooted native grass to increase infiltration and reduce surface ponding. Most lawn grasses have short root systems that only venture down a few inches. These shallow root systems dry out quickly and must be watered often. Native grass species with much deeper root systems thrive in dry weather and offer avenues for excess water to infiltrate deep into the soil rather than into your basement!

Remember to loosen the soil in the hole around the root ball when planting trees or shrubs to increase permeability which allows greater air and water movement in the soil. For larger wet areas, install subsurface drains about 4 inches in diameter at a depth of 2 to 5 feet. Use sand and gravel to backfill the drain trench to within a foot of the ground surface. Use topsoil to fill the surface layer. Restrict foot traffic during wet periods because even on well-drained soils, this can compact the soil and reduce permeability.

Source:



Natural Resources Conservation Service