

3.20 SUBSURFACE DRAINAGE

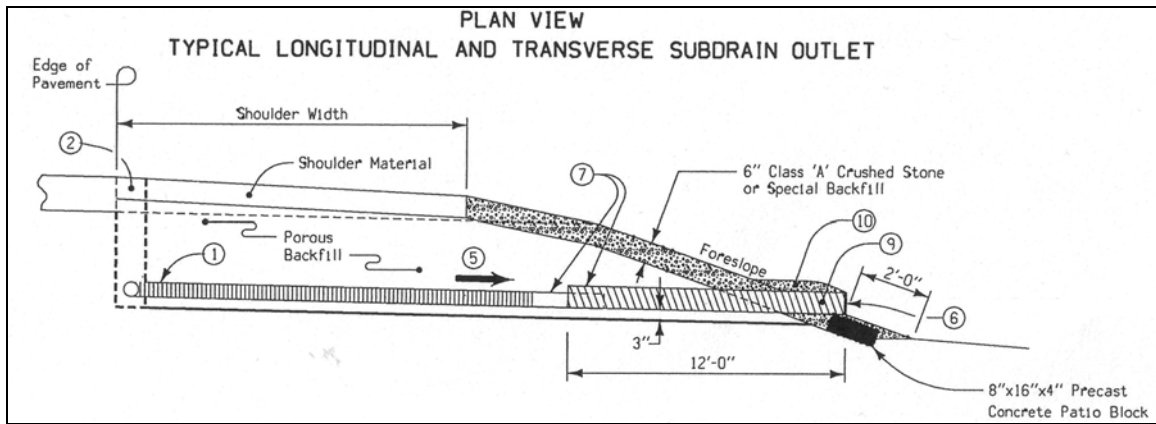


Figure 3.34. Subsurface drainage (Source: Iowa DOT)

Overview

Description: A perforated conduit, such as a pipe, tubing, or tiles, installed beneath the ground to intercept and convey ground water.

Problem identification: Soils may become excessively wet and subject to sloughing.

Design purpose: To remove excess water from the soil.

Associated practices: To remove excessive water that collects during the excavation phase of construction or to improve plant growth by lowering the water table.

Installation: The three types of subsurface drainage systems are sump pit drains, relief drains, and interceptor drains.

1. A sump pit drain consists of one or more pits to intercept ground water. The pit is dug so that the bottom is 12 in. lower than the depth that needs to be dewatered. A perforated vertical standpipe is placed in the center of the pit, which is backfilled with 2 in. rock or gravel. The water is pumped from the center of the pipe to a suitable discharge area.
2. Relief drains are used to lower the water table or to remove surface water. They are installed along a slope and drain in the direction of the slope. They can be installed in a gridiron pattern, a herringbone pattern, or a random pattern. Relief drains should be located through the center of the wet areas. This system is similar to agricultural systems. Gravity outlets must be provided for relief drains.
3. Interceptor drains remove water as it seeps down a slope to prevent the soil from becoming saturated and subject to slippage. Interceptor drains should be located on the uphill side of the wet areas. The drains should be installed across the slope and drain to the side of the slope. Gravity outlets must be provided for interceptor drains.

Maintenance/inspection: Inspect outlets monthly to ensure they are not plugged, and unplug if necessary. Repair any erosion that may be present.

Design life: Sump pit: For the life of the project construction.
 Relief drains: Permanent.
 Interceptor drains: Permanent.

Estimated Cost: Unit cost varies with drainage layout, depth of placement, material selection, installation method, and outlet control selection.

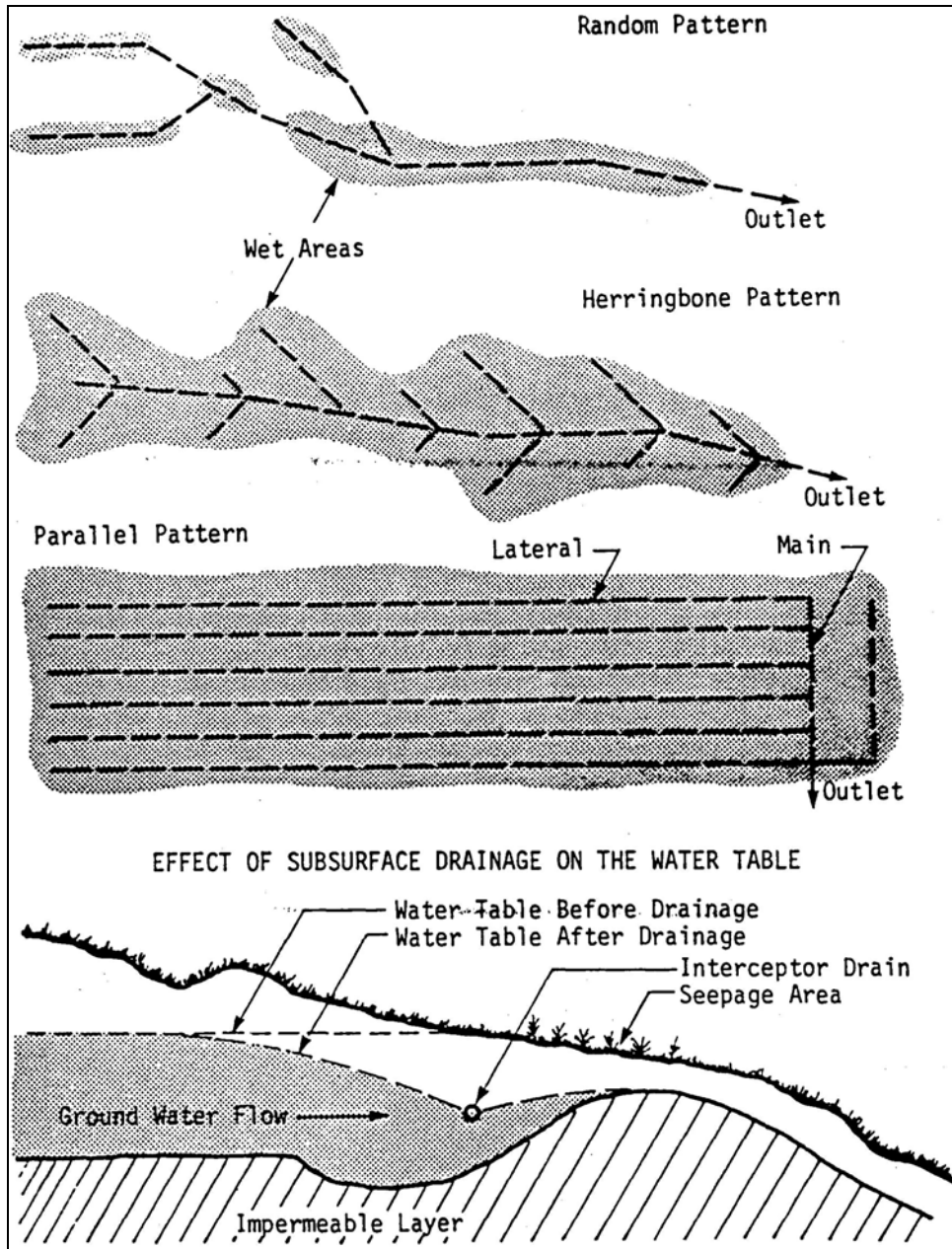


Figure 3.35. Subsurface drainage patterns (Source: Department of Civil, Construction, and Environmental Engineering, Iowa State University)