

Water Table and Restrictive Layers

Washington State onsite septic codes state there must be a suitable amount of soil for treatment before you reach the depth of either the highest seasonal water table, or a restrictive layer that isn't porous enough for the wastewater to get through.

Let's take a look at each of these situations, starting with how to tell where the water table is. There are two ways to tell if you've reached the water table, or the depth of the groundwater, for your site.

1. In some cases it may be obvious, when you dig a test pit or a monitoring well and you can see water in the hole. Make sure the standing water isn't because of something temporary, like recent rainfall or irrigation, that hasn't had time to drain yet.
2. In other cases, there may be evidence of where water has been consistently present, even if it is not there at the time you are doing your analysis. When soil is saturated, meaning the spaces between the soil particles are almost completely filled with water for an extended time, natural processes of the bacteria in the soil will cause discolorations. These variations in color are called redoximorphic features, and are commonly referred to as mottling.

Mottled soil always has 3 distinct colors. The matrix color is the dominant color of the soil; you can think of this as the "normal" color that the soil would be without mottling. When soil particles are oxidized, meaning they are losing electrons as part of chemical reactions, the color becomes brighter. Another process is called reduction, which refers to reducing the amount of oxidation; in other words, the soil is gaining electrons. When reduction happens, there will be a loss of color, and the soil will look less bright. If you look at a Munsell color page, the oxidation color will appear higher in chroma, and the reduction color will be lower in chroma.

When you find mottling, you should document it in your soil log. Be sure to include the Munsell color code of all 3 of these colors. There are exceptions, but generally, mottling has all 3, a matrix color, oxidation color, and reduction color.

When you find significant amounts of mottling in a layer of soil, you have found the water table. This soil cannot be used for treatment. In addition to a water table, if you reach a depth with a restrictive layer, then the soil is no longer suitable for treatment. A restrictive layer is a layer that is too hard for water, roots or air to get into. This could be a solid layer of rock, like bedrock, or it could be a hard pan, which is a layer that has been so compacted that it is about as hard as solid rock. Additionally, any soil you determined to be type 7 is also not usable for treatment.

Transcription from WA DOH WWMSOSS Performing Soil Evaluations for On-Site Septic System Designs. https://youtu.be/zpH2FCh4jpw?si=U44Z3r2pEBp_yzXl