



As a follow-up to our December 7, 2017 webinar, Vegetated Swale and Site Evaluation for Storm Water Infiltration for Use in Construction, please see answers to the following participant questions below.

The complete webinar can be viewed at <http://wislandwatermedia.org/webinars/>

Question: Can Jan talk about the need for groundwater mounding calculations?

Answer: Groundwater mounding is addressed in the Considerations section, number 8, of the Site Evaluation technical standard (1002) on page 11. That section is included here:

“(8) Consider conducting a groundwater mounding analysis to verify that the highest anticipated groundwater level does not approach the native soil interface. The infiltration rate into saturated soil in this case may be at or near zero. This standard requires that limiting layers within 5 feet below the native soil interface of an infiltration device be considered in the design infiltration rate. It is also possible for a limiting layer more than 5 feet below the native soil interface to affect an infiltration device where lateral movement is limited. Increased mounding height, and therefore the potential for increased infiltration device drawdown time, are more likely to occur under the following conditions: shallow depth to groundwater or limiting layer, increased infiltration device size, decreased device length/width ratio, the presence of low-hydraulic conductivity material, thin aquifer thickness, and shallow water table gradient. It is also appropriate to conduct a mounding analysis in locations where mounding may impact basements or adjacent property. Refer to http://dnr.wi.gov/topic/stormwater/standards/gw_mounding.html for mounding calculation guidance.”

The team did not find evidence that groundwater mounding was leading to device failure; failure was most commonly due to improperly evaluated soil infiltration rates. The new Required Qualifications should ensure that visual cues, such as redoxomorphic features, are better evaluated. The team included a statement in the criteria that groundwater mounding analysis may be required in certain situations. Additional mounding recommendations were moved to the Considerations, as noted above. The team included the reference to a groundwater mounding calculation guidance webpage to further assist users.

Question: **What was wrong with using soil borings? Performing test pits is not feasible for certain types of projects, such as pervious streets with loose sands, a test pit would be unnecessarily large and disturb conditions.**

Answer: The Site Evaluation technical standard (1002) includes notes below Table 1 (outline of test pit requirements). Those notes indicate that trench safety requirements are to be adhered to. Notes also indicate that borings can be used if a backhoe is not able to excavate to 5 feet below the native soil interface.

The team's research and experience shows that when devices fail, it is most often because the site's conditions were not appropriately evaluated. Boring samples may be broken and information may be omitted or inconsistent. The most accurate soil information is obtained via pit evaluation. The team proposed that pits be required on all projects with few exceptions. In response to Broad Review input, the following accommodations were made:

- Data from soil borings and monitoring well logs may be used to supplement data from pits for design.
- Data from borings beyond the extent/depth of the backhoe (15 feet) are allowed.
- The number of test pits for Bioretention Systems and Infiltration Basins was reduced.
- If initial site borings show consistent/uniform soils throughout the site, the professional meeting the Required Qualifications may use best judgement to conduct fewer test pits than Table 1 requires per square or linear foot, down to the minimum stated in Table 1, Column 3 (e.g., "...a minimum of # test pits"), as long as information from test pits aligns with soil borings.

Question: **Is there any way to quantify peak flow control in swales, other than by modeling them as skinny basins with some sort of outlet restriction?**

Answer: In HydroCAD swales can be modeled as "reaches," but this does not account for losses due to infiltration. See the HydroCAD website (search for "Exfiltration") for discussion about this topic and options.

Question: **For a swale wider than 8 feet, what is considered an acceptable longitudinal divider?**

Answer: A vegetated earthen berm would be an acceptable longitudinal divider; however, the department may also consider other designs acceptable.

Question: **Does the dynamic infiltration rate just apply to grassed swales or all infiltration practices? There is standing water in infiltration basin/bioretention--not moving water.**

Answer: In our current technical standards, the dynamic infiltration rate (infiltration rate of flowing water) applies only to vegetated swale modeling.