

Devo Seereeram

From: Devo Seereeram [devo@devoeng.com]
Sent: Friday, June 23, 2006 7:13 AM
To: 'Everett Frye'
Cc: 'robert@devoeng.com'; 'robin@devoeng.com'; 'vijay@devoeng.com'
Subject: RE: PONDS Bottom of Aquifer Parameter

Everett:

The procedures for selecting the base of the aquifer for modeling purposes are not always very straight forward and require judgment and experience in many cases. I will outline below some guidelines for your use:

GENERAL

- As a first step, you can download the pdf version of SJRWMD Technical Publication SJ93-SP10 from the district publications web site as I refer to some equations in that manual.

DRY BOTTOM PONDS

- For dry bottom retention systems, the base of the aquifer is usually selected as the top of the first, laterally continuous hydraulically restrictive layer encountered below the pond bottom.
- For storm water pond design in Florida, hydraulically restrictive can be interpreted as a saturated hydraulic conductivity (aka soil permeability) less than say 0.3 to 0.5 ft/day. For typical range of permeabilities of Florida sands, refer to Figure 84 of page 167 of SJ93-SP10. As you will see from this figure, the soil permeability lower than 0.5 ft/day is in the low flat line range for sands with high fines content and this range is considered "hydraulically restrictive" for our purposes. As an aside, note that in other fields of engineering, such as dam design or landfill liner design, these permeabilities are considered "high".
- In cases where the soils above the hydraulically restrictive layer are stratified, use the weighted horizontal hydraulic conductivity as explained in equation in second paragraph of page 166 of SJ93-SP10.
- For dry bottom systems in leaky aquifers (fissured clays) such as in Marion and Sumter County, the base of the aquifer is set 1 to 2 ft below the water table (which is usually in the limestone aquifer). You will not see this in the Jacksonville area. Pond recovery in these settings are controlled by vertical infiltration only which is on the order of 1 to 5 ft/day.
- If you read the second paragraph on page 162 of SJ93-SP10, it is recommended that the thickness of the aquifer used in the analysis not exceed the width of the pond.
- There are some cases where a shallow confining layer of hardpan or clay lens can be removed below the pond and the base of the secondary layer is used for the base of

the aquifer. We usually see this on the east coast (Brevard/Indian River) where hardpan is removed to access the sand/shell layer directly below it.

WET BOTTOM PONDS

- For wet bottom ponds in the low permeability soils, we set the base of the aquifer at the pond bottom to 5 ft below the pond bottom. If the ponds are dug into a thick deposit of free draining sand (not very typical), then the base of the aquifer should be set deeper, near the top of the first “hydraulically restrictive” layer.
- In cases where the soils above the hydraulically restrictive layer are stratified, use the weighted horizontal hydraulic conductivity as explained in equation in second paragraph of page 166 of SJ93-SP10.
- Same concept applies for borrow pits.

Let me know if any part of this explanation needs amplification and hope it is of help.

Devo

P.S. Bob – can you clean this up and make this into a tech memo for posting to the devoeng web site. Ahmed will post for you when done. Feel free to add to this.

From: Everett Frye [mailto:efrye@sjrwmd.com]
Sent: Thursday, June 22, 2006 10:48 AM
To: devo@devoeng.com
Subject: PONDS Bottom of Aquifer Parameter

Hi Devo. I work for the SJRWMD in Jacksonville.

I have a technical question regarding the referenced subject. What is the best way to obtain some technical direction on how to establish the bottom of aquifer parameter based on site boring and permeability testing?

In short, we are struggling with how to apply the bottom of aquifer parameter based on field boring logs and perm. testing, and consultants are all over the map up here on how they apply it.

Any guidance you can provide would be greatly appreciated. Or can you direct me to someone in your organization that could field the question?

Thanks Devo.

Everett M. Frye, P.E.
SJRWMD
7775 Baymeadows Way, Suite 102
Jacksonville FL 32256
(904)-448-7913