

**Meeting Summary**  
**Upper Neuse River Basin Association**  
**Site Evaluation Tool Task Force**  
**January 22, 2004**

**Attendees**

Chris Dreps, UNRBA  
Terry Stephens, Homebuilders Association  
Perry Sugg, Orange County  
Betsy Pearce, Town of Cary  
Bill Hunt, NCSU,  
Rich Gannon, NCDWQ  
Mike Coughlin, Wake County  
John Cox, Durham  
Scott Job, Tetra Tech  
Kimberly Brewer, Tetra Tech

**DWQ and Tetra Tech Update on BMP Removal Efficiency Guidance**

Rich Gannon of NCDWQ led off the meeting with an update on work by DWQ staff (Bradley Bennett and Rich Gannon) and NCSU staff (Bill Hunt) in providing guidance on BMP removal efficiencies to be used in DWQ's Neuse and Tar Pamlico stormwater programs. Rich shared a draft memorandum from Bradley that outlines proposed revisions for BMP removal efficiencies for TN and TP for bioretention cells, grass swales, and 50' restored riparian buffers with level spreaders. Associated design requirements and key assumptions were also noted in the draft memo. Rich said that DWQ had worked with Bill in developing the assumptions, and the staff feels comfortable with the proposed revisions. He said that the draft memo is now being reviewed internally, and therefore is subject to some revision or "tweaking". The elements most subject to review are design specifications for bioretention, new assumptions for the vegetative filter strip with level spreader, and administration of the buffer credit. Regarding the latter, Rich said that he had checked with various DWQ staff on the local government representatives' perceptions that the NSW required buffer does not receive credit—only the buffer area which goes beyond the required minimum 50 ft width. Rich said that this is not DWQ's interpretation of the NSW rules; therefore, DWQ staff is drafting a memo to clarify policy for implementation of the rule. The draft proposal would allow a 30% credit for nitrogen reduction for developments where a buffer is restored (for the buffer of minimum width). However, if the developer is just preserving an existing buffer (of the required minimum width), there would be no credit. Rich said that before the policy can be adopted, DWQ needs to develop a good way to administer this approach.

Kimberly said that DWQ's interpretation of the buffer rule was similar to how the existing SET treats buffers (i.e., credit is given to the minimum 50-ft, buffer. The model could be programmed to distinguish between existing buffer and restored buffer in terms of nitrogen removal credit.)

Betsy asked why TSS was left out of the table of removal efficiencies. Rich said that DWQ had discussed TSS assumptions and that development of new or revised TSS removal efficiency assumptions would require a longer term process than this current update of the TP and TN assumptions.

Kimberly asked why guidance had not been updated for dry detention (e.g., putting a level spreader adjacent to the pond to achieve water quality and volume control benefits). Rich and Bill said they had concluded that if designed this way, dry detention would essentially become a wetland but not a functional detention device. If the site needs a wetland, build a wetland; if it needs detention only, built a dry pond. Bill said his analysis indicates that unmaintained dry ponds (which become pseudo-wetlands) actually can be worse mosquito risks than wetlands. For dry detention to have nutrient removal, Bill said the detention basin would need to be mowed regularly and the clippings removed from the area.

Bill Hunt and all members of the group expressed appreciation for DWQ's willingness to update the assumptions. Bill said he believes that the revised assumptions better reflect science and what we now know about BMP pollutant removal efficiency. Rich said it had been the intent of DWQ to periodically review the stormwater program's assumptions, and that this provided a good opportunity to do that. He said that Bill's assistance had been invaluable in updating the assumptions.

Bill next provided an update on his proposed approach to estimating hydrology and pollutant removal credits for cisterns. He recommended treating residential cisterns (draining pitched roofs) differently than commercial/nonresidential cisterns (draining flat roofs).

For residential cisterns (ie, 60-gallon rain barrels), Bill said that you can capture ¼" to ½" of rainfall. However, you need to empty the barrel before the next storm—or provide property management that empties/drains the cistern in a timely way. If you assume that 50% of the property owners will manage cisterns well, you can capture 4/10". On average, across all residential cistern owners, you would be able to reduce hydrology by 20% and achieve a 20% reduction in nitrogen.

For commercial/nonresidential cisterns, Bill said that property owners would likely install equipment for timing the irrigation of the site and emptying the cisterns on a regular basis. He believes that you might capture 80% of the 1<sup>st</sup> inch of rainfall. Because you could assume less nitrogen runoff from lawns/landscaped areas, he said there could be a net loss of nitrogen. He pointed out that nutrients from collected rainwater used for irrigation would act as a fertilizer and could reduce the need for residential fertilizer application.

Scott said that the loading calculations in the SET are based on event mean concentration and the source of nitrogen. Since rooftops collect nitrogen only from rainfall/air deposition, the amount deposited is less than on lawns and roads. Therefore, we will be removing 20% of a much smaller number. This needs to be considered when thinking about where to install/invest in the BMPs.

Bill next reviewed proposed assumptions for greenroofs. He said that green roofs generally have a 4" media on a flat surface. Since the media is not tight and absorbs water readily, it can hold ½" to 8/10" of rainfall, which leaves quickly through evaporation. Over the first year or year and a half, the greenroof will likely be a net exporter of nitrogen, due to the high nitrogen content in the media needed to establish the plants. Bill is starting to see a decline in the amount of nitrogen exported after this initial period. He is now testing a media that has lower nutrient content, but does not have results yet. He recommended not assigning a nitrogen removal efficiency to green

roofs at this time. Bill noted that the other ½ inch leaves over a period of 4 to 5 hours, which helps reduce peak flow. The most important aspect of green roofs for water quality considerations is that they create a huge reduction in the peak flow leaving the roof, even for larger storm events.

Scott updated the group on the water quality swale. He said that this BMP is called a “dry swale” in the MD manual. He referred to the relevant pages from the MD manual and the schematic diagrams, which were handed out to the meeting attendees. John Cox said that the schematic shows the forebay as “optional”, but in this area he thinks we would need to require the forebay at end of the swale to avoid clogging the device. Scott said that he is still working on the most reasonable assumptions for removal efficiencies for the water quality swale.

Rich stressed that the NC and/or MD stormwater manual must be referenced. Bill said that the NC manual is being updated currently. Until completed, local governments must use the existing manuals.

### **Guidance on the SET Hydrology Function**

Kimberly reviewed how the current Mecklenburg County SET tracks hydrology—both the calculations that are performed by the model and those that are user inputs calculated outside the model. The SET calculates pre- and post-development stormwater runoff for the 1-year and 2-year 24-hour storm events using the Curve Number method. The user enters the extended detention storage volume held by the BMPs for comparison. The SET does no calculations or tracking of peak flows.

Perry asked whether a planner or an engineer calculated the user inputs on the BMP storage for the 2-yr. storm event and runoff volume control. And what type of staff would need to do that type of calculation for the model generally. Kimberly said a storm water engineer.

The group then discussed whether they would like to use the Upper Neuse SET for regulatory purposes or educational purposes—this would influence the level of rigor needed.

The main points of agreement from the group were

- The tool needs to be designed for the short term (next few years), knowing that soon it will need to be revised to enhance features, add/revise requirements, etc.
- Ideally, the local governments would like to be able to choose from a menu of volumes or targets to track, including
  - The current SET stormwater tracking volumes (pre and post development total annual volume; 2 year, 24 hour storm event; 1 year, 24 hour storm event—without stormwater BMPs)
  - ½” stormwater runoff
  - 1” stormwater runoff
  - Peak discharge for the 1, 2, and 10 year, 24 hr. storm events.

Kimberly noted that Tetra Tech had developed a site evaluation tool module for Prince George’s County, MD which requires more user input in terms of BMP design details, and which generates a range of information about pre- and post- development hydrology given different BMP designs (such as hydrographs for different storm events). She said

that Tetra Tech would explore how much of that tool could be “merged” with the Upper Neuse SET –in the short or long term—to meet the needs of the group.

Bill said that capturing and treating the 1<sup>st</sup> inch of runoff from the site (Phase II final rule), likely attenuates the 2, 5, and 10 year peaks. This should be true up to 85% imperviousness (with B soils). If you have C & D soils, he said you might have to control more.

Chris noted that the Phase II rule is triggered only for imperviousness greater than 24%. However, the Upper Neuse Plan calls for extended detention for developments with imperviousness greater than 10%.

Most of the group said that it sees the SET as an educational/screening tool. However, Betsy said it would be nice to have such information in plan review (i.e., more of a formal regulatory review).

Scott and Kimberly said that based on the discussion, they would develop a memorandum with options for dealing with hydrology in the SET -- short and long term-- and with a recommendation for the group to consider.

### **Next Steps**

- Tetra Tech will continue working with the group on BMP removal efficiency assumptions.
- In the next two weeks, Tetra Tech will develop a Technical Memorandum on the SET Hydrology Function and forward it to the group.
- In the next week Tetra Tech will begin to evaluate the assumptions used in the Upper Neuse Watershed model (used to develop the loading targets), particularly the event mean concentration assumptions, to determine how the SET assumptions need to be revised for consistency.

Chris said the next Task Force meeting would likely be in late February or early March, and that he will be scheduling the meeting soon.