Michael F. Easley, Governor

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director
Division of Water Quality

September 8, 2004

MEMORANDUM

TO: Local Programs, Neuse and Tar-Pamlico Stormwater Rules

FROM: Bradley Bennett, Supervisor, Stormwater Unit
Rich Gannon, Planner, Nonpoint Source Unit

SUBJECT: Updates to Stormwater BMP Efficiencies

With your involvement, DWQ has produced model local stormwater programs under the Neuse and Tar-Pamlico stormwater rules, 15A NCAC 2B .0235 and .0258 respectively. In the Neuse model, we established nitrogen removal efficiencies for a number of stormwater BMPs. Subsequently in the Tar-Pamlico model, we modified those efficiencies based on current research, and added phosphorus removal efficiencies.

It is our intent to provide you refinements to the menu of BMPs and their efficiencies periodically as the state of technical knowledge advances in this area. We would like to minimize disruptions to your programs, yet make the latest technological advances and understanding available to you. With this memorandum, we take the important step of reconciling the Neuse and Tar-Pamlico nitrogen efficiencies into a single value for each of the currently credited practices. We also add a practice (dry detention) and update the phosphorus reduction efficiency values for the Tar-Pamlico Basin.

The following table identifies the efficiencies currently in place in each basin and the efficiencies that will apply from this point forward (the table is not meant to imply a phosphorus requirement in the Neuse Basin). An existing value in **bold** typeface signals that the new value will differ. Design standards for these practices remain those provided in the most recent version of *Stormwater Best Management Practices*, NC DENR, Division of Water Quality, Water Quality Section. The manual can be found at http://h2o.enr.state.nc.us/su/Manuals_Factsheets.htm#StormwaterManuals. Please also consult the footnotes to the table below, which are found on page 2 of this memorandum.

Tar-Pamlico local programs will use these efficiencies now as they begin implementation in September 2004. Neuse local programs should begin requiring the use of these efficiencies on all projects received from this point forward, allowing a brief but reasonable time period to inform the development community.

Table. Existing and New Nutrient Removal Efficiencies for BMPs Used under Neuse and Tar-Pamlico Stormwater Rules

Practice	**Existing Tar Efficiencies**		**Existing Neuse Efficiencies**		**New Neuse/Tar Efficiencies[a]**	
	TN	**TP**	**TN**	**TP**	**TN**	**TP**
Wet Pond	25	40	25		25	40
Stormwater Wetland	40	35	40		40	35
Sand Filter	35	45	35		35	45
Bioretention	**40**	**35**	**25**		35[b]	45[c]
Grass Swale	20	20	**30**		20	20
Vegetated Filter Strip w/Level Spreader[d]	**30**	**30**	20		20	35
50' Restored Riparian Buffer w/Level Spreader[e]			30		30	30
Dry Detention					10[f]	10[f]

Footnotes to Table, Existing and New Nutrient Removal Efficiencies for BMPs Used under Neuse and Tar-Pamlico Stormwater Rules:

a: Neuse stormwater programs are not required to meet a phosphorus export target.

b: An additional design requirement beyond the specifications given in *Stormwater Best Management Practices*, NC DENR, Division of Water Quality, Water Quality Section, April 1999, to achieve the nutrient efficiency listed here is the use of fill soils with an infiltration rate of between one and three inches per hour, *and* the use of mulch on the surface.

c: An additional design requirement beyond the specifications given in *Stormwater Best Management Practices*, NC DENR, Division of Water Quality, Water Quality Section, April 1999, to achieve the nutrient efficiency listed here is the testing of soils to meet a phosphorus index value of less than 50. Visit http://www.agr.state.nc.us/agronomi/sthome.htm for soil testing information.

d: The NC BMP Manual establishes vegetated filter strips as a managed riparian practice, located adjacent to streams or other waterbodies. Since Neuse and Tar-Pamlico buffer rules require 50-foot buffers adjacent to surface waters in new developments, vegetated filter strips under Neuse and Tar-Pamlico stormwater rules would be located adjacent to and landward of these protected buffers. Nitrogen and phosphorus removal efficiencies are assigned based on that assumption.

e: As established in an August 28, 2001 memorandum from DWQ Stormwater Unit to Neuse local governments, existing riparian buffers are **not** eligible for nutrient credit, while restored riparian buffers meeting buffer rule specifications *and* with level spreaders **may** receive credit. Use of and credit for a restored riparian buffer would depend on a degraded prior land use condition and would require site-specific approval by DWQ staff.

f: Dry detention is considered primarily an adjunct practice that can provide volume attenuation to help meet site attenuation requirements. The practice could be employed for this purpose preceding a grassed swale or bioretention area, or preceding a level spreader above a vegetated filter strip or riparian buffer. Available data indicate that it can provide only limited nutrient removal, as reflected in the efficiencies listed. Additional research data may result in adjustment of these values in the future.