Proposal for Pollutant Removal Efficiencies for Detention Facility Self-Converted Wetlands

This proposal is for consideration of creation of a subclass of an existing BMP type. Specifically, a subclass of dry detention facilities that have the pond bottom partially converted to wetlands.

Background: Dry detention facilities were an early type of stormwater management designed to control quantity and not water quality. These designs could be either underground structures, such as, pipe storage or storage vaults; or above ground structures with embankments and vegetated bottoms. Both types of structures were designed with release structures that controlled the flow from the structure based on storm sizing criteria, with typical design for a 2-year, a 10-year, and a 100-year storm. Storms smaller than 2-years were passed through the structure, while storms larger than 2-years were retained with the release rate controlled to match a 2-year storm event for storms between 2 and 10 years, etc. Over time some of the above ground vegetated facilities developed wetlands within the pond footprint. These types of facilities have not been constructed in Maryland since the 1980s and are generally >30 years in age.

Local jurisdictions have looked to these facilities as having potential for conversion to types of facilities that provide water quality treatment. However, many of these facilities were found to already have wetlands to varying degrees in the bottom of the facility. This raised the question, are these facilities already providing some degree of water quality and the local jurisdiction would not gain appreciably in water quality improvement by converting the facility,

In order to address this question Baltimore County in conjunction with the consulting firm KCI and partial funding from the Chesapeake Bay Trust conducted a study on pollutant removal efficiency of "self-converted dry detention ponds". The recommendations below are based on the results of the study.

Recommendation: The current pollutant removal efficiency for dry detention ponds are laid out in two expert panel reports; *Recommendations of the Expert Panel to Define Removal Rates for New State Stormwater Performance Standards*, and *Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects*. In both documents, dry detention facilities are addressed in appendices, as an historic practice that is no longer meets the current criteria for stormwater management performance for either new projects or retrofits. As such, neither expert panel report specifically addresses the pollutant removal efficiency of dry detention ponds, but relies on earlier assessments (Baldwin, et al 2003, Simpson and Weammert 2009) for the current Chesapeake Bay Program approved rates of 5% for nitrogen, 10% for phosphorus, and 10% for sediment.

This recommendation does not result in a modification of the pollutant removal rates or methodologies of either of the above referenced expert panels, but creates a subclass of dry detention ponds with new removal efficiencies based on empirical data. Dry detention ponds are not proprietary practices, but were a standard engineering practice 30-40 years ago. These facilities are already in the BMP tracking system and do not represent a discovered historic BMP.

The self-converted facilities represent a real change over time as wetlands develop within the facility. This is an on-going process in the present day, however, many of these facilities are being converted to water quality treatment systems through conversion of various sorts. This leaves the self-converted facilities that are providing water quality unaccounted for in terms of pollutant load reduction.

Study Results: The study results are summarized in Table 1. The details of the study can be found in the *Pollutant Removal Efficiency of Self-converted Dry Detention Ponds* (KCI Technologies 2015).

Table 1: Self-Converted Pond Study Results

BMP Type	Reduction Efficiency		
	TN	TP	TSS
Dry Detention Pond	5%	10%	10%
Dry Extended Detention	20%	20%	60%
Wet Ponds/Wetlands	20%	45%	60%
Study Results			
Dry Detention Ponds – Control (Avg.)	18.5%	28.8%	53.2%
Self-Converted Ponds (Avg,)	23.3%	47.9%	60.0%

It is not the recommendation of this memo to change the pollutant removal efficiency of the standard dry detention pond. This may be taken up in a future reassessment of BMP efficiencies, where consideration should be given to separating above ground vegetated facilities from underground facilities of this type.

Based on the study results it is the recommendation of this memo that Self-Converted Dry Detention Ponds be assigned the reduction efficiency of Wet Ponds/Wetlands.

In order to qualify for the new pond type designation the following criteria must be met:

Pond Characteristics

- The wetlands within the facility must be delineated using the 3 parameter USACE methods (wetland vegetation, soils and hydrology).
- Herbaceous or woody vegetation should be predominate, covering >50% of the pond bottom.
- The wetland area must cover >10% of the facility bottom. (This is a conservative parameter as the study did not indicate a relationship between percent wetland cover and removal efficiency).
- Facility must have diffuse flow or a meandering flow path without a concrete pilot channel or a riprap/gabion channel.
- No woody vegetation on the embankment or within 25 feet of a pond structure.
- Wetland condition should not be a result of a structural failure.

Qualifying Data

- Need to provide photo-documentation of the site conditions.
- Need to provide delineation data meeting qualifying criteria
- Must have an original as-built and passed triennial inspections

Inspection and Verification

- Visual verification and photo documentation of wetland conditions as part of the triennial inspection.
- Credit duration would be the same as for other SWM facilities, with a re-delineation of wetlands for extending the credit duration.
- All other reporting requirements for new, redevelopment, or retrofit facilities would apply.