RESPONSIVENESS SUMMARY TO PUBLIC COMMENTS
ENHANCED PHOSPHOROUS REMOVAL STANDARDS
SUPPLEMENT TO THE NEW YORK STATE
STORMWATER MANAGEMENT DESIGN MANUAL
April 2008

Introduction

The New York State Department of Environmental Conservation announces the availability of the response to public comments on the second draft of the Enhanced Phosphorous Supplement Standards to the New York State Stormwater Management Design Manual. The draft of the Supplement was published for public comments in the Environmental Notice Bulletin on December 12, 2007. The document was made available at DEC's website and the comment period, ended on January 11, 2008.

All comments received were reviewed and evaluated as part of the development process. Incorporating several valuable comments resulted in adjustments and clarifications to the Supplement. All comments were carefully examined and taken into consideration. The editorial and formatting comments do not appear in the responsiveness summary. Some comments on clarifications are responded to in this summary and also addressed by modification to the Supplement if appropriate. All questions and comments on computations in the examples are addressed by clarification and elimination of the errors. There was also a series of comments that, although greatly appreciated and responded to in this summary, are not considered for modification to the Supplement at this time. Several of those comments will be considered in future updates to other chapters of the Design Manual. Several comments that share the same concerns are summarized and responded to by a generic statement.

RESPONSIVENESS SUMMARY

Comment: General Comment -NYSDEC should further investigate practices and materials that have been shown to reduce phosphorus from stormwater, such as scrap tire chips.

> Response: The study of additional stormwater management practices is beyond the scope of this chapter.

Comment: General -This chapter should include a list of additional resources from which practitioners can receive additional information about Better Site Design (BSD) or Low Impact Development (LID) principles / strategies.

Response: The draft chapter includes a list. The final chapter includes an expanded list with applicable available tools.

Comment: Some portions of this chapter are difficult to clearly understand. The average user (typically design engineers and landscape architects) want to know what requirements need to be adhered to and how to design a project to comply with the requirements. The scientific rational and backup information included in this chapter can make it difficult to pick out the What and How.

Response: The scientific information is provided to help the design engineer and planners understand the science behind the standards. This information is not intended to directly formulate instructions. Instruction for what and how is included in the sections 10.3 and 10.4. Additional clarification has been added to the final chapter to formulate more clear instructions.

Comment: The use of Better Site Design (BSD) techniques may provide enhanced phosphorous removal for conventional development (commercial, residential). BSD, however, is not easily implemented for linear transportation projects. For example, it may be easy to promote that a one acre residential lot saves a certain percentage of the existing woods and not clear cut the entire one acre lot. However, linear transportation projects must adhere to strict safety standards that may not allow for the implementation of many of the features of BSD. Consideration for linear transportation projects should be given in this chapter.

Response: Site specific designs related to linear projects apply to both standard practices and BSD techniques. The guidance document previously developed for transportation projects addresses many options for the design of stormwater treatment for linear projects. In finalizing this guidance document, DEC will highlight the BSD/LID opportunities identified in this guidance document.

Comment: While the inclusion of design examples in this chapter is a great opportunity to educate practitioners (especially when small projects fall under the SPDES General Permit) on how the hydrologic analyses should be done, and how the design criteria should be applied, these examples do not take advantage of this opportunity. The examples miss steps in the process or do not clearly explain where the results come from nor do they include enough plans or details to the analyses provided. Specific examples are included in these comments.

> Response: The examples in this chapter are developed based on the similar existing examples in chapter 8 of the Design Manual. Based on the public comments received previously, it was intended to avoid repeating information already provided in previous chapters. Specific cases that need further clarification, as pointed out in the public review process, will be used to improve the design examples in chapter 10.

Comment: Page 10-10 -In the fourth paragraph, it is stated that larger ponds (relative to runoff volumes) result in improved settleable solid removal. The encouragement of source controls in this chapter may lead to more, smaller practices being constructed to mitigate the adverse impacts of stormwater runoff. This seems to run counter to the philosophies presented in the beginning portion of this chapter.

> Response: Larger ponds are more sustainable and also provide better settling capacity. This is not in conflict with the principles of hydrologic source control, which results in infiltration and reduced runoff. As the goals mention the best means for preventing phosphorus impacts to receiving waters is to prevent runoff from occurring. Once runoff is generated, larger facilities function better than small for facilities for a given runoff volume. The point here is to select ponds as a treatment system where there is a considerable contributing drainage area.

Comment: Page 10-12, Figure 10.1 -This figure is difficult to read in black and white print. Suggest adding the values for the "lines" on the map from Putnam County south. There is not enough differentiation in the colors in black and white to know what the rainfall values are.

Response: The Northeast Regional Climate Center does not provide a more detailed map. DEC will use the data provided by the NECC to develop a GIS coverage for easier use of the Design Manual.

Comment: Page 10-13 -The third paragraph states: "These undisturbed areas can be removed from the contributing area used to determine the WQv." This seems to be inconsistent with Page 4 in Section 10.5 (the examples): “WQV = Estimated runoff volume.. .over the post-development watershed (including contributing on-site and off-site drainage from impervious and pervious areas. This apparent contradiction is resolved in the Draft Responsiveness Summary to public comments. According to this summary, the words "can be removed" mean that the practitioner should remove these areas from the contributing by redirecting the drainage from these areas. This important point is not made clear anywhere in this chapter, so it is suggested that the response in the Summary be summarized in this chapter.

Response: The language in Chapter 10 clearly defines that undisturbed areas can be removed from contributing areas. Additional language will be provided to define the qualifier how such deduction can be practiced.

Comment: Page 10-15 -The discussion of goals begins on this page. It is strongly recommended that this section clarify that the goals presented are the goals of the Phosphorus Removal and are intended to be met by the subsequent performance criteria provided later in the chapter, and are not intended to be performance criteria to be evaluated for every project.

Response: Section 10.1 clearly defines the intent of the chapter by the following statement: The goal of this chapter is to address design standards for “enhanced phosphorus removal” in phosphorus limited watersheds and projects. There is no requirement for individual project evaluation.

Comment: Page 10-16, First paragraph -In the second sentence it is stated: "Use of distributed controls and BSD approaches to meet source control goal is strongly encouraged over standard infiltration structural practices." It is strongly suggested that this section be revised to clarify why BSD practices are considered more appropriate than practices that meet the technical standards elsewhere in the manual, and are considered suitable for treating the Water Quality Volume.

Response: Use of Better Site Design practices allows reduction of the runoff volume by distributed runoff control before they are lead to the collection system. It generates less runoff, reducing the total WQv and the size of centralized treatment system.

Comment: Page 10-22, second paragraph, last sentence states: "Sand filters are practices that have been proven to be effective for reduction of temperature." This indicates that the DEC encourages practitioners to install sand filters at the outlets of ponds and wetlands. It is suggested that DEC reconsider this statement. This would require that the discharge rate from the pond or wetland to be reduced to such great degree as to possibly necessitate the creation of larger or deeper ponds and wetlands. It is also extremely unlikely that practitioners would follow this guidance.

Response: Sizing of the upstream facilities would not need to be increased as long as the filter is sized adequately. In addition to temperature mitigation, sand filters polish storm water prior to discharge. The Manual does not require multiple treatment system.

Comment: Can a reference for using sand filters to cool effluent on a trout stream be provided?

Response: Most importantly, sand filters in cold water areas reduce temperature when they are either of the underground or perimeter variety. That temperature reduction is not available in surface filters with direct sun exposure and air temperature. "Sand filter can be a good treatment option for cold water streams. Surface sand filters are typically not designed with a permanent pool, although there is ponding in the sedimentation chamber and above the sand filter. Designers may consider shortening the detention time in cold water watersheds. Underground and perimeter sand filter designs have little potential for warming because these practices are not exposed to the sun." (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=73)

Comment: Page 10-17, Achieving Effluent Concentration for Dissolved Phosphorus -The section equates stormwater treatment with flows that are not effectively bypassed. This section should clarify this philosophy, as it seems that flows could also be ineffectively bypassed. Suggest a definition of "effective bypass".

Response: Effective bypass is the runoff that leave the site untreated. Example: flow that pass over the weir in a filter system not treated. i.e. not effected by the primary removal mechanism.

Question: The intended meaning of "water quality efficiency" discussed in Item should be clarified.

Response: Efficiency is a term that is intended to indicate the performance of the SMP by itself (not the full system including bypass). With less flow (hydrologic source control) the efficiency is likely improved.

Question: Can the meaning of "long term runoff volume" be clarified?

Response: Total runoff over a long period of time (>25 years).

Question: Can references be provided substantiating the relationship between Goals 3 and 4 and the design criteria provided in the Chapter?

Response: Based on research by the International Storm water Best Management Practices Database it can be expected that Retention Ponds, Wetland Basins, and Media Filters should all be able to achieve these levels of effluent quality performance for TP. Therefore it is likely that the effluent levels for particulate phosphorus of 0.1 mg/L can be achieved. For dissolved phosphorus the ability to empirically evaluate performance is limited by the number of data points for some BMP types, however it does appear that Wetland Basins and Retention ponds can achieve these levels and that media filters can achieve slightly higher concentrations (it should be noted that the design criteria for media filters in the supplement require media that is much more likely than the average BMP in the database to sorb phosphorus).

http://www.bmpdatabase.org/Docs/Performance%20Summary%20Oct%202007_Final_v2.pdf

Comment: Can the reference for the concept CN+2 be provided.

Response: This requirement is revised to increase curve number by one level of hydrologic soil group. The reference for this requirement is as follows:

Geoffrey A. Cerrelli, P.E., USDA/NRCS, Stormwater Management Impacts Resulting from the Volumetric Abstraction of Runoff from Frequent Storms per PADEP CG-1

Pitt, R. E. Shen-En Chen, S. Clark, J. Lantrip, and C.K. Ong. "Infiltration through compacted urban soils and effects on biofiltration design." *Stormwater and Urban Water Systems Modeling*. In: *Models and Applications to Urban Water Systems*, Vol. 11 (edited by W. James). CHI. Guelph, Ontario, pp. 217 – 252. 2003.

Comment: It is recommended that a maximum release time also be suggested in the section to avoid flushing of the treatment practice that could occur from successive storms in slow-draining practices.

Response: We would not recommend that a maximum drain time be included for extended detention facilities. Wet ponds never draw down and perform quite well. Flushing using the specified designs is not a primary concern and is addressed through appropriate design parameter constraints.

Comment: Page 10-24, Landscaping Required Elements -It is stated in the first bullet: "Optimize the vegetation in pond for phosphorous uptake." This sentence requires more detail in order to establish design criteria.

Response: The table on this page lists factors for optimizing vegetation.

Comment: Page 10-34, Required Elements -The information for using peat translate into a working plan or specification. This discussion should clarify what reed-sedge hemic peat is, and why that type of peat is required. From this discussion, it is unclear whether reed-sedge hemic peat is commercially available or if commercially available peat moss is acceptable. A recent design of an Organic Filter using the mixture has revealed that there are limited sources of sedge hemic peat. The only one that was found was a source in Minnesota called "Dakota Peat". Further research revealed that there are three general types of peat -sapric, hemic, and fibric. Sapric peat is not suitable for an organic filter but both hemic and fibric peat should be suitable for an organic filter. The "Required Elements"should be practical and attainable criteria that designers can reasonably specify and contractors can reasonably acquire.

Response: The peat mix as listed in the Design Manual will be clarified when this document is updated. In the interim, use of other types of peat may be considered.

Comment: Page 10-34 -The soil requirements for Bioretention appear to be different from the soil requirements shown in Appendix H of the Design Manual. If one soil mix is better for water quality, it is suggested this mix be used statewide, and that this chapter be consistent with Appendix H.

Response: In the future update of the Manual Appendix H will be modified to reflect the most up-to-date information.

Comment: Pages 10-35 and10-36, Soil Requirements -The bullets are provided on the Page 10-34. If Section10.4.4 also includes bioretention (and apparently it does), then this information does not need to be repeated here.

Response: This section follows the original organization of the Manual and discusses bioretention in a separate section.

Comment: Page 10-36, Drainage configuration -The second sentence should be revised. The first sentence states: "Systems designed for recharge do not require use of underdrain pipe and geotextile fabric on the bottom of the facility." The second sentence states: "Systems designed for not need geotextile fabric on the bottom of the facility, which appears to be redundant with the first sentence, yet appears to contradict the first sentence with "...but require a gravel underdrain and perforated pipe." This is further confused by the third sentence, "A liner must be provided between the made soil and the in-situ soils, which seems to contradict the first two sentences.

Response: These refer to different design configurations in different conditions.

Comment: Page 10-38, under "Feasibility"-The discussion of the open swales is confusing. It says it is not effective as a stand alone practice, yet is included in this section. It is suggested that this section be revised to state that swales are not the practice for removing phosphorus, but are included in this chapter due to the practicality of these practices in redevelopment and linear projects.

Response: This practice is not one of the more effective practices for phosphorus removal but is included only for limited applications such as linear projects, road/highway project and redevelopment applications.

Comment: Page 10-47, In the footnote below Table 10.5.6, there is a statement: of 10 % of impervious area through raingardens meet the source control requirement. If only 9% of the runoff was directed to raingardens, and therefore no credit for a volumetric reduction would be applied in this proposal, is it wise to discourage the use of such source controls in this situation, and especially in HSG A B soils?

Response: The Design Manual clearly states that runoff volume reduction is performed by <u>assessment of the feasibility of hydrological source controls</u> and allows providing the reasons for acceptance and rejection of the various controls.

Comment: Page 10-58 -In the first full paragraph, there is a reference to "bioretention area.. . (without underdrain pipe)". This is another example where the bioretention design meets the criteria in this chapter, yet contradicts the criteria in Chapter 6, and thereby raises the question as to whether the goal should be to reduce Water Quality Volume or to treat the Water Quality Volume.

Response: Bioretention area with infiltration capacity is a standard practice. Volume reduction can be factored in to the calculation. Bioretention systems with infiltration meet both treatment and volume reduction objectives.

Comment: Page 10-59 -The last sentence in the first paragraph states: "Routing the flow through the grass swale increases the time of concentration to 30 minutes." This is a key (and common) criterion for the effectiveness of the swale. This section should show how this criterion is achieved.

Response: Dividing to sub-catchments and incorporating a grass channel as a reach to increases the time of concentration. This result is obtained from standard hydrology calculation methods.

Comment: Page 10-59, Step 4 -reasoning behind subtracting 2' to pass the discharge should be included in this discussion.

Response: The 2’ elevation, a function of site elevation, allows adequate freeboard and prevents back flow into the conveyance system.

Comment: Page 10-60, Figure 10.5.4 -It is suggested that the elevations be shown in this figure consistent with the units used in the text "13.0" should be "213.0). This would be inconsistent with the figure in Chapter 8, but that figure can be revised at a later time. It is also suggested that this figure show the location of the gravel blanket and sand bed.

Response: Corrections are incorporated and more details will be incorporated in the update of the Design Manual.

Comment:10-58, Step 3 -It is stated in the first sentence: "The site is designed to route the runoff from 0.6 acre of the impervious area through a bioretention area, overflow to an open channel, and eventually flow to the proposed filter system." The rationale for and the benefit of routing the runoff to a filter after the runoff has gone through bioretention and swale should be explained, especially if a volumetric reduction of the Water Quality Volume can only be applied for the bioretention practice.

Response: The volume of runoff that does not infiltrate through Bioretention area overflow to the open channel as a conveyance system. Both practices provide a combination of volume reduction, treatment, increased time of concentration and decreased flow rate.

Comment: Enhanced phosphorus Removal Standards must be required in the West-of-Hudson watersheds.

Response: This issue is independent from the Enhanced Phosphorus Removal Standards. The decision as to where the standard might be applied is determined through various mechanisms such as the sensitivity of the receiving water and management programs developed for those. This recommendation will be considered in the decision making process.

Comment: Standardized design and sizing criteria simplify incorporation of stormwater controls into projects. However, in some instances site constraints may prevent incorporation of controls that are fully compliant with the standards as outlined. in these instances, we recommend the department incorporate additional flexibility into the standard to allow permittees to size treatment facilities based on site-specific characteristics including the gradation of site soils, the actual median concentration and ratio (particulate-bound versus dissolved) of phosphorus in stormwater runoff, and the required median effluent phosphorus concentrations.

Response: The proposed methodology requires a new approach that would require update and major revisions to the Design Manual. It must be noted that detailed soil testing on every site not only requires the additional testing, but it does not address atmospheric deposition, degradation and break down of material, etc. Although the point of particle size associated with roads is valid, it does not rule out phosphorus availability.

Comment: Identifying particle size and character as "non-design criteria" appears to preclude the development of site-specific treatment designs for projects with significant constraints to implementing the stormwater treatment controls as identified. See Comment 2.

Response: See the response above.

Comment: While we recognize that permanent pool depth can play an important role in biological removal and uptake of dissolved phosphorus, removal of particulate-bound phosphorus is principally a factor of detention time versus particle settling velocity. For sites with very low dissolved phosphorus or where maintaining standing water is impractical, flexibility should be incorporated into the section to allow development of site-specific design criteria. See comment 2.

Response: Low dissolved phosphorus may be identified based on land use and land cover so that appropriate practices are selected. Site physical limitations are also factored into the process of practice selection. Although both are integral to a sound design, criteria can not be modified on a site-by-site basis. Flexibility is provided to meet the criteria by choice of practice selection based on the site specific conditions.

Comment: It is unclear if proprietary or alternative practices can be used to meet the enhanced phosphorus removal requirements for redevelopment projects within phosphorus-limited watersheds. Response 20 in the Draft Responsiveness Summary indicates that proprietary or alternative measures can be used. Response 23 seems to contradict that position by indicating that "the overriding factors in application of redevelopment criteria to such projects in the phosphorus limited watersheds are the design storm and the *standard practice selection.* Please provide greater clarification on how redevelopment projects within a phosphorus-limited watershed are to be addressed.

Response: Standard practices in Chapter 9 do include proprietary systems and those systems are allowed to be used in redevelopment condition. An alternative practice for treatment of 75% of water quality volume is an acceptable alternative.

Comment: A rigorous monitoring program is required to verify pollutant removal efficiencies of stormwater management practices.

Response: State is pursuing opportunities to evaluate the performance of stormwater management practices through different mechanisms as they become available. Currently DEC is looking into utilizing retrofit/demonstration the New York City watershed as a study opportunity. DEC continues to take advantage of the National BMP database as an important resource for assessing the performance of the practices.

Pages 10-45 to 10-47 -This section presents an example in which 56 rain gardens are created, resulting in a 6% reduction of the Water Quality Volume. Most practitioners would not likely consider the creation of 56 separate practices (costs, construction, and maintenance) to be worth the benefit of a small reduction in the Water Quality Volume. DEC may want to reconsider what example it uses to promote source controls.

Response: Other scenarios could have promoted the benefits of source control better. However, creating 56 rain gardens is not an unreasonable approach for a development with 108 lots. The proposed rain gardens are each capable of controlling runoff from 1000 ft^2 rooftop. The reason this seems to amount to a small percentages of total water quality volume is the characteristics of the site used in the example such as the large area of off site contributing area and the predominant soil type (C/D).