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Memorandum

Date: 09 April 2009

To: Mark Grey, Director of Environmental Affairs Building Industry Association Of Southern California

From: Eric Strecker, Nichole Dunn, and Klaus Rathfelder, Geosyntec

Subject: NRDC comments on Draft NPDES Stormwater Permit for the County of Orange, Tentative Order No. R8-2008-0030

The Natural Resources Defense Council (NRDC) submitted comments on the Draft NPDES Stormwater Permit for the County of Orange, Tentative Order No. R8-2008-0030 (referred to herein as NRDC comments). As part of their comments, NRDC cites six numeric stormwater standards from jurisdictions nationwide as evidence that various jurisdictions have begun to implement numeric standards that require onsite retention, infiltration, and/or harvesting. Specific citations are included below in italics.

Geosyntec has reviewed the requirements of the stormwater standards cited by NRDC. Following each of the citations below, we provide of summary of the stormwater standards referenced. In particular, we focus on requirements for onsite retention and reuse and if and how these requirements consider site conditions. We have also attempted to characterize the current status of implementation of the requirements.

While the jurisdictions below may have begun implementing numeric standards with a focus on keeping and managing stormwater onsite, they generally recognize that this is not possible in all situations and allow for alternative measures in lieu of retaining all stormwater onsite.

Pennsylvania

Requirement: *"Capture at least the first two inches of rainfall from all impervious surfaces and retain onsite (through reuse, evaporation, transpiration, and/or infiltration) at least the first one inch of runoff" (NRDC comments/pg. 3)*

According to the Pennsylvania Stormwater Best Management Practices Manual, cited as the reference for the above information, "Pennsylvania laws and regulations do not directly manage

stormwater at the state level, although some state level management occurs through the Stormwater Management Act and the NPDES permitting program." However, the 3/2009 Draft NPDES Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) General Permit (PAG-13) requires applicants to comply with a Model Stormwater ordinance approved by the DEP in 2005 or later, or the 2008 Pennsylvania Model Stormwater Management Ordinance (SMO). Counties that discharge to special protection watersheds are not eligible for the General Permit and must apply for an individual permit. The volume control requirements stated in the Pennsylvania Stormwater Best Management Practices Manual are required by the Draft 2009 Pennsylvania SMO. Therefore, the standards in the Pennsylvania Stormwater BMP Manual are a requirement in the Draft Phase II General Permit under development by the Pennsylvania Department of Environmental Protection. In addition, the standard cited by NRDC is one of two guidelines in the SMO. The standard selected by NRDC is one that is specifically independent of site constraints and it was stated that it should not be used when regulated activities are greater than 1 acre or for any project that requires design of stormwater storage facilities. Also known as Control Guideline 2 or the Simplified Method, this guideline requires:

- The first 2" of runoff from NEW impervious surfaces be captured.
- At least the first 1" of runoff from NEW impervious surfaces be permanently removed from the runoff flow through reuse, evaporation, transpiration and/or infiltration.
- Where possible, all permanently removed runoff should infiltrated; however, it is suggested that in all cases at least 0.5" should be infiltrated.

The other guideline, which was not cited by NRDC, is Control Guideline 1 or the Design Storm Method. This guideline is applicable to any size of regulated activity and requires that the post-development total runoff volume for all storms equal to or less than the 2-year/24-hour event to not increase. This guideline also requires modeling and requires that for the existing condition all pervious areas must be modeled as in good condition and 20% of the existing impervious area must also be modeled as pervious area in good condition.

The Pennsylvania Stormwater BMP Manual also calls out several Special Management Areas (i.e., Brownfields, Highways and roads, karst areas, mined lands, near supply wells, urban areas, surface water supplies and Special Protection Waters) that may require the above standards to be modified on a case-by-case basis due to site conditions. Neither the General Permit, nor the model ordinance specifically addresses the limitations of Special Management Areas, though they do address Special Protection Waters.

Since the General Permit and SMO are still in draft form it is unknown how the authorities will address situations where Control Guideline 1 is used and the onsite management of the first 1" of runoff from new impervious surfaces is not feasible, or where the site is in a Special Management Area.

Pertinent findings from our review of the Pennsylvania stormwater ordinance are:

- The requirements cited by NRDC are general requirements (SMO) of a Draft Phase II general permit via reference to the manual. The requirements are not specific conditions in the Permit.
- The requirements cited are applicable to sites of 1 acre or less or that do not require design of stormwater storage facilities. For larger sites, the Draft SMO requires no increase in runoff volume up to the 2-year/24-hour event, which implicitly considers the pre-development site conditions.
- The Draft SMO provides allowances for special site constraints.
- The application of the above is still proposed in a draft permit, so there are no cases studies or information about the practical implications of the requirements.

Anacostia, Washington, D.C.

Requirement: *"Retain onsite the first one inch of rainfall and provide water quality treatment for rainfall up to the two-year storm volume" (NRDC comments/pg. 3)*

The original requirement was published in Final Environmental Standards June 2007, by the Anacostia Waterfront Corporation acting on behalf of the District of Columbia. The Anacostia Waterfront Initiative was a Memorandum of Understanding (MOU) entered into by 20 District and Federal agencies that owned or controlled land along the Anacostia Riverfront. The partnership formed by the MOU was formed to help attain a vision for the waterfront areas, known as the Waterfront Revitalization Endeavor. The Anacostia Waterfront Corporation was created to oversee and implement the Anacostia Waterfront Initiative for the cleanup and redevelopment along the Anacostia River. Before being dissolved by the NCRC and AWC Reorganization Act of 2008, the Anacostia Waterfront Corporation published, "Final Environmental Standards" in June of 2007 that required retention of the first 1" of runoff for beneficial reuse. However, the standards allow for exceptions where infiltration or collection and reuse are not feasible for public safety or environmental protection. If an exception is required, physical and/or financial offsets may be applied. Physical offsets require 1.5 times the amount of the stormwater that is not retained on site to be reduced through the off-site use of greenroofs, potable water conservation, and LID measures. However, if potable water conservation is used as a physical offset only 25% of the annual volume saved is credited. Financial offsets consist of payments to the Anacostia River Trust Corporation, a subsidiary of AWC, for twice the cost of obtaining an equivalent reduction of the stormwater flow being offset. Since the AWC was rolled back into the Washington D.C. Office of Planning, the District Department of the Environment is responsible for the implementation of these requirements.

While these standards have gone into law, they will not go into effect until the regulations have been promulgated, which has not happened to date[1].

Pertinent findings from our review of Anacostia stormwater requirements are:

- The requirements do not apply to the entire geographic area of the city, but are limited to small special district of 3,070 acres in area along the waterfront.
- The requirements specify retention and infiltration as the preferred stormwater management control, followed by capture and reuse.
- The requirements provide for offsets in cases when site conditions limit feasibility of infiltration and reuse.
- Since the regulations have not been issued, there are no cases studies or information about the practical implications of the requirements.

West Virginia

Requirement: *"Retain onsite the first one inch of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation" (NRDC comments/pg. 3)*

While the draft permit currently under consideration in West Virginia states that the first 1" of rainfall must be kept and managed onsite, it also allows for credits if certain types of development are used. The five development types that earn credits are:

- Redevelopment
- Brownfield redevelopment
- High Density (>7 units per acre)
- Vertical Density (Floor to Area Ratio of 2 or >18 units per acre)
- Mixed Use and Transit Oriented Development (within 1/2 mile of transit)

Each of the development types above earns a credit of 0.1" against the first 1" of rainfall. Therefore, it is possible that a site would need to mitigate only 0.5". Similar to the Anacostia standard, West Virginia allows for physical and/or financial offsets where on-site treatment of the entire amount of runoff is not possible or practical. However, the draft West Virginia permit allows offsets for a maximum of 0.4" of the original amount (i.e., if the entire first 1" of rainfall needed to be kept and managed then offsets would only be allowed for 0.4" and 0.6" would need to be managed onsite).

[1] Personal communication with Shane Farthing of District Department of the Environment. Phone. Apr. 06, 2009.

The West Virginia standard has not been implemented yet since the permit is still in draft form. Therefore, it is unknown how the regulators would address a situation where a developer was not able to keep and manage the entire amount of rainfall because of site constraints or feasibility.

Pertinent findings from our review of West Virginia stormwater requirements are:

- The requirements specify an array of options for meeting on-site retention requirements.
- Stormwater credit options provide incentives for high density development in Brownfield areas and transportation corridors.
- The requirements provide for offsets in cases when site conditions limit feasibility of infiltration and reuse, however, full offsets are not allowable, and some on-site retention will be required for all developments.
- It is a draft permit, so there are no cases studies or information about the practical implications of the requirements.

Georgia

Requirement: *"Treat the runoff from 85% of the storms that occur in an average year (i.e., provide treatment for the runoff that results from a rainfall depth of 1.2 inches)" (NRDC comments/pg. 3)*

Similar to PA, this standard is from the GA Stormwater Management Manual, which provides guidance on how jurisdictions in the state might address stormwater management. While the entire state has not adopted this standard, some local jurisdictions such as the Metropolitan North Georgia Water District have adopted model ordinances that direct their members to follow the guidelines in the Stormwater Management Manual. In either case, the standard merely requires treatment of the first 1.2" of rainfall; it does not require retention or infiltration of the stormwater.

Central Coast, California (RWQCB, Phase II)

Requirement: *"Limit effective impervious area ("EIA") at development projects to no more than 5% of total project area (interim criteria); establish an EIA limitation between 3% and 10% in local stormwater management plans (permanent criteria)" (NRDC comments/pg. 4)*

The above standard was set forth in a letter to small MS4s. Limiting the effective impervious area is an ambiguous task, as ineffective impervious area is not defined clearly. It is not clear if effective impervious area implies:

1. Total offsite runoff is limited to a volume that is equivalent to 5% impervious area. Essentially this requires that runoff generated by 95% of the project area, under most conditions be managed on site; or
2. Runoff that is not directly connected to the storm sewer. In other words, runoff from 95% of the site must be directed to pervious areas prior to collection in the storm sewer.

This is an interim criteria and it remains unclear as to what ineffective really means.

All Federal Buildings over 5,000 square feet (under EPA's draft guidance for implementation of the Energy Independence and Security Act of 2007)

Requirement*: "Manage onsite (i.e., prevent the offsite discharge of) the 95th percentile storm through infiltration, harvesting, and/or evapotranspiration." (NRDC comments/pg. 4)*

According to H.R.6 Energy Independence and Security Act (EISA) of 2007, Sec. 438. Storm Water Runoff Requirements for Federal Development Projects include:

> "The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow."

In a presentation by Jennifer Molloy and Robert Goo from the USEPA in February 2009 to the Interagency Sustainability Work Group, they presented two options for meeting the Section 438 requirement of the EISA. Option 1 is to control the 95th percentile rainfall event by managing it onsite by using infiltration, evapotranspiration, and/or re-use. Option 2 is to preserve the predevelopment hydrology (rate, volume, duration, and temperature) by conducting hydrologic and hydraulic analyses for the 1, 2, 10, and 100-year 24-hour storm events. If Options 1 and 2 are not technically feasible due to site conditions or other factors, the agency/department must follow a process to employ onsite practices to the maximum extent technically feasible and document the design. Again, this stormwater management requirement recognizes that onsite management is not always feasible. The EPA guidance manual is still in draft form. Geosyntec has developed technical comments on the guidance manual and its methods and results regarding effectiveness.

Key points from Geosyntec's technical comments in regards to the EPA's numeric standards requiring onsite retention, infiltration, and/or harvesting include:

- That retention of the 95th percentile storm event may not be cost-effective for achieving the intended level of protection. This is not supported in the Draft Guidance, nor is it generally supported by the body of scientific knowledge.

- The requirement to retain the 95th percentile storm event does not account for the drawdown time of the captured volume. Therefore, if the capture system draws down slowly the storage volume remaining when the next storm arrives may not be adequate to capture the volume generated by the next storm, which would cause the second storm to bypass or partially bypass the retention system.

See attached comments on the draft manual submitted to EPA.

Discussion/Implications

Out of the six standards cited, the only one that does not specifically recognize that onsite management will not be possible in all cases is the Central Coast standard that is required to be incorporated into small MS4s stormwater management plans for them to be approved. However, this standard is also not as clear as the rest of the standards cited because it does not provide a clear definition of effective impervious areas.

Most of the jurisdictions cited above, recognize that it may not be feasible to manage the entire volume onsite and offer methods for improving the quality of the stormwater runoff within other means. Pennsylvania requires the first 1" of rainfall from new impervious surfaces to be permanently removed from the runoff flow. However, this regulation only applies when regulated activities are less than 1 acre and do not require stormwater storage facilities. In addition, the Pennsylvania Stormwater BMP Manual recognizes that when either of the control guidelines are applied to project, if the project is located in a Special Management Area, (i.e., brownfields, highways and roads, karst areas, mined lands, near supply wells, urban areas, surface water supplies and Special Protection Waters) the guidelines may need to be modified on a case-by-case basis.

The draft permit proposed by West Virginia requires onsite stormwater retention between 0.1" and 1", depending on how many credits are issued for the type of development, but also allows offsets for up to 0.4" of that amount. However, they recognize that it may not be technically feasible to keep the entire amount of rainfall onsite and allow for deviations from that rule as long as there is a net improvement in the overall stormwater runoff for a particular sewershed/watershed.

Anacostia's standard is less stringent that West Virginia's standard only in that they do not limit the allowed offset (i.e., if needed the entire standard could be addressed by using offsets). However, Anacostia does not offer credit for different development types either. Similar to Pennsylvania, the EPA in their draft guidance for EISA Sec. 438 they offer two methods for preserving the predevelopment hydrology and if neither of those will fully address the problem, they have a process for implementing BMPs to the maximum extent technically feasible.

Georgia's stormwater management manual and associated ordinances merely require the treatment of the first 1.2" of rainfall. It recognizes that in critical or sensitive areas, additional requirements may be needed and the use of structural controls may need to be restricted to protect a special resource or address certain water quality or drainage problems.

Based on the information presented above, while various jurisdictions are moving towards implementing numeric stormwater performance standards that include retention, they recognize that numeric standards for retention are difficult to implement across all site conditions and allow alternative methods to improve the stormwater runoff quality. None of the jurisdictions cited above that clearly require implementation of retention and infiltration as the preferred method for addressing post-construction stormwater runoff have had their regulations go into effect. Therefore, there are no case studies or information about the practical implications of the requirements and how they are actually being applied.

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