



Commercial Real Estate Hot Topic

Presented by the Bill Gladstone Group of NAI CIR

July/August 2008

Stormwater Trends

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As developers and real estate owners progress through the myriad of requirements to obtain plan approvals for land development, they learn the basic requirements and site needs to comply with municipal stormwater regulations. Every developer realizes that changes to environmental regulations, municipal sensitivity due to recent stormwater problems, and Department of Environmental Protection (DEP) directives makes understanding site needs for stormwater a constant challenge. The challenges in establishing site requirements for proposed land development activities will significantly impact project pro forma. Proper assumption in determining project yield, developable area, and infrastructure costs will impact project profitability.

The most significant change in stormwater management that has affected the industry occurred with the implementation of federal rules governing pollutant discharges. The Environmental Protection Agency (EPA) delegates through the Clean Water Act National Pollutant Discharge Elimination System (NPDES) regulations for construction activities on tracts that are one acre or larger. DEP primarily administers the NPDES Construction Permit Program through delegation to the County Conservation Districts. The federal rules have been updated and expanded and are collectively known as Phase II of the NPDES program. This program established an extensive set of new stormwater permitting requirements for land development activities. Specifically this has meant promoting on-site infiltration of stormwater for smaller storms which will reduce total volume of surface run-off.

DEP finalized its Stormwater Best Management Practice (BMP) Manual in December 2006. The BMP Manual requires your engineer, at conceptual planning stage, to consider alternatives to satisfy municipal stormwater requirements and NPDES Phase II requirements. Traditional stormwater analysis had involved an estimation of storage volume of detention and/or retention ponds at low areas within the project site during conceptual plan development. NPDES Phase II requires developers to submit an application and develop a plan to demonstrate how they will manage stormwater run-off in an environmentally sound way. Developers whose projects are in special protection waterways (high-quality or exceptional value waterways) are required to obtain an individual NPDES Permit. Issuance of an individual NPDES permit is determined by DEP's regional office and is typically associated with larger construction activities.

Sites look and function differently than before. The departure from traditional stormwater design demands more expertise from your consultant. The designer will need to know more site specific information to determine site suitability for stormwater infiltration. A preliminary site wide feasibility evaluation and determination of methods to satisfy NPDES requirements is essential for project development.

Developers should be thinking of stormwater management early in the conceptual design the same time that water supply feasibility, wastewater disposal, and other due diligence assessments are being completed. The criteria for satisfying the NPDES requirements will hinge on location and soil type, structural and non-structural measures, and stormwater management techniques to direct and minimize stormwater run-off.

The implementation of rain gardens, infiltration beds, underground storage facilities, created wetlands, and bioretention areas are just some methods of managing the increase in stormwater volume run-off. Other non-structural items include reducing the amount of impervious areas (rooftops, parking areas and streets), preservation of areas with better soils, and clustering development.

Stormwater infiltration should be looked at as a site-wide feature and not just something taken care of in a detention basin at the low end of a site. Any place run-off leaves the site needs to be controlled after development. Structural or non-structural features are best utilized when spread throughout a site. This design philosophy mimics the natural process or water infiltration spread over a broad area versus concentrated at a point source location. Another factor to consider when analyzing a site is earthmoving. A soil test taken at a virgin location is more or less invalidated when grades are cut or filled a few feet. Testing should be done at the depth of the feature proposed. Sometimes this requires digging down several feet with a backhoe before performing the test. Limiting cuts and fills as much as possible to preserve virgin soil may be necessary to maintain the validity of tests and to maintain the performance of the facility.

Smart design in stormwater management and NPDES can benefit all parties involved from an environmental and financial standpoint. Project designers should utilize and preserve natural site features, enhance natural channels and overland drainage facilities, reduce traditional storm piping, and propose improved technology to address stormwater and NPDES requirements. Improved technology such as StormTech chambers, Rain Tanks, and Cultec chambers are being commonly used on sites as a cost effective alternative to address stormwater and provide better utilization of costly real estate.

About the Author

Bony R. Dawood is founder and managing principal of Dawood Engineering, Inc., a consulting engineering firm. Mr. Dawood is responsible for the strategic direction of the company, identifying and employing new technology, providing and enhancing service areas, and developing personnel to meet new engineering challenges. A graduate from the University of Delaware and a registered Professional Engineer, Mr. Dawood possesses over 23 years of experience in the field of civil engineering. His experience encompasses projects for major public agencies (PennDOT, The Pennsylvania Turnpike Commission, etc.), planning and land development clients as well as work for general civil engineering clients across the Commonwealth of Pennsylvania and neighboring states. For more information regarding stormwater trends contact Mr. Dawood at (717) 732-8576 or bdawood@dawood.cc.



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