Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

PENNSYLVANIA'S STORMWATER BEST MANAGEMENT PRACTICES MANUAL

Background

Stormwater runoff and flooding are natural events that have helped shape our watersheds and rivers. Our activities on the landscape routinely alter natural drainage patterns. If not managed, these changes increase localized flooding, streambank erosion and loss of groundwater recharge. In addition to its physical impact on the environment, stormwater may carry a variety of pollutants. Stormwater runoff impacts can be minimized through planning and properly constructed and maintained best management practices (BMPs). By managing stormwater runoff as a resource rather than as a waste, a host of opportunities are available to protect the environment and complement new development.

Pennsylvania's Stormwater Best Management Practices Manual (manual) identifies opportunities to manage stormwater as a resource, defines performance guidelines and standards, provides an inventory of proven BMPs and describes a process for planning and applying them to construction sites. It is a technical reference of planning concepts and design standards that will satisfy Pennsylvania's stormwater management requirements when properly tailored and applied to local conditions.

Legal Framework

Land development activities that change the surface features of the land also alter stormwater runoff characteristics. Unmanaged changes in stormwater runoff volume, rate and water quality that alter the chemical, physical or biological properties of receiving waters can constitute pollution regulated under the federal Clean Water Act, as well as the Pennsylvania Storm Water Management Act and Clean Streams Law.

Post construction stormwater management is addressed under several programs administered by the Department of Environmental Protection (DEP) including: the National Pollutant Discharge Elimination System Permit for Discharges Associated with Construction Activities (NPDES Construction), and the National Pollutant Discharge Elimination System Permit for Municipal Small and Large Separate Storm Sewer System (NPDES MS4) programs, as well as under the Pennsylvania Storm Water Management Act requirements (Act 167).

These programs identify BMPs for stormwater control. BMPs used to manage post construction stormwater runoff must ultimately meet antidegradation requirements of Chapter 93 Water Quality Standards to protect the water quality of special protection waters (high quality and exceptional value) and protect, maintain and restore water uses for all surface waters (25 Pa. Section 93.4a).

The manual is a tool to help achieve stormwater discharge compliance with water resource protection requirements. It includes information on resource planning, techniques for land development and BMPs for managing stormwater for quantity and quality. When properly planned, designed, installed, operated and maintained, these BMPs should generally meet water resource protection requirements.

Though the manual in itself is not regulation, it is provided as a guideline to assist permit applicants in meeting the regulatory requirements.

Alternate BMPs or control strategies, not listed in this manual, or variations of the BMPs included that meet water resource protection requirements, may also be used. Proposals to use alternative BMPs or deviate from the control guidelines must demonstrate their effectiveness with appropriate supporting analysis, calculations, test results or other documentation.

Stormwater Management Performance Standards and Guidelines

***Standards**:* The regulatory performance standards for post construction stormwater discharges are based on the designated and existing use protection provisions of Chapter 93.

- **In Areas Tributary to High Quality and Exceptional Value (Special Protection) Waters** – There shall be no degradation of existing or designated stream quality through a change in post construction stormwater runoff volume, rate and quality.
- **In Areas Tributary to Waters other than Special Protection** – Any change in post construction stormwater runoff volume, rate and quality shall not impair existing or designated uses whichever use is more stringent.

To meet these standards the stormwater goal of construction projects should be no-net-change in stormwater runoff volume, rate or quality from pre to post construction conditions. This goal ensures that the chemical, physical and biological properties of receiving waters will not be altered. This no-net-change level of management may not be required to protect downstream uses for waters other than Special Protection. However, where a net change in stormwater discharge will result, applicants must demonstrate that there will be no degradation on the receiving water's existing or designated use. This demonstration requirement applies even if the receiving waters' designated use is currently impaired by other sources.

***Guidelines**:* The volume, rate and quality guidelines described in the manual are designed to satisfy the post construction stormwater management performance standards that derive from Chapter 93. Below is a summary of the manual guidelines:

Volume. Post construction stormwater runoff volume control should mitigate the impacts of construction when the project results in changes to stormwater infiltration, evapotranspiration and runoff volumes from site conditions existing prior to construction.

- Design Storm Method Guidance: For all storms equal to or less than 2-year/24-hour events the project site's total post construction stormwater runoff volume should be no greater than total preconstruction stormwater runoff volume. (Bankfull stream flow typically occurs between the 1-year and the 2-year storm event, often around the 1.5-year storm.) In calculating the total runoff volume for preconstruction conditions, the runoff characteristics of meadowland cover should be applied to preconstruction, non-forested pervious areas and to 20% of preconstruction impervious areas.
- Simplified Method Guidance: An alternative for projects that will disturb 1 acre or less is to implement BMPs that capture at least the first 2 inches of precipitation runoff from all new impervious surface areas. At least the first inch is to be retained on site (evaporated, transpirated or infiltrated) and at least the first 0.5 inches of this should be infiltrated.

Rate. The peak rate post construction stormwater discharge for 1-year through 100-year events shall not increase from preconstruction conditions. Local ordinances may exempt this requirement for construction projects that disturb 1 acre or less.

Quality. The guideline for water quality control is to reduce post development stormwater total suspended solids by 85%, total phosphorus by 85% and nitrogen (NO3-N) by 50%. Following the manual's volume and rate control guidelines generally should result in the application of BMPs that have a cumulative pollution reduction that at least meets these removal efficiencies for pollutants normally found in stormwater runoff. Where this is not the case, additional BMPs or pollution source reductions will be necessary. Other site-specific pollutants not normally found or in greater concentrations than normally found in stormwater must be managed to maintain and protect water quality in Special Protection waters, and to protect the more stringent of existing or designated uses for other waters including groundwater.

Temperature is also a measure of water quality. Projects that include large exposed impervious areas (roofs, parking areas) need to also consider potential impacts of stormwater discharge temperature on receiving waters. Increases beyond established limits and abrupt changes to the receiving water's temperature can impact existing or designated use. The

manual includes methods for evaluating and BMP guidelines for managing temperature in stormwater discharges.

The Chapter 93 regulations establish **anti-degradation** for water quality and water use protection that are generally met for stormwater runoff when the manual guidelines are followed. When an applicant demonstrates that the guidance objective of no-net-change in stormwater runoff volume, rate or quality, including temperature has been met, the application will generally be considered sufficient to meet the non-discharge test for anti-degradation. When stormwater management practices are proposed that do not achieve the no-net-change guidance objective or stormwater runoff pollutants are expected to exceed normal expectations, additional documentation is required to demonstrate that anti-degradation requirements will be satisfied.

Stormwater retention and detention facilities should be designed to completely drain over a period of 24 to 72 hours. **Infiltration BMPs** should be spread out and located to maximize use of on-site natural infiltration areas.

The manual addresses **special areas**, which include existing urban or developed sites, contaminated or brownfield sites, karst geology, public water supply protection areas, endangered and rare species habitat areas, waters designated as impaired, and mining areas. The manual recognizes that special areas could alter the application of BMPs or require additional performance considerations and outlines recommended alternate BMP approaches for such areas.

Municipal governments may also have local ordinances that include stormwater management requirements. These requirements may be based on county Act 167 Stormwater Management Plans and/or NPDES MS4 permits. For the most part, these local government stormwater management requirements should be modeled after the guidelines described in the manual, but may be more stringent based on local concerns.

Implementation Process

The manual provides:

- A standardized approach to measuring preconstruction volume, rate and quality and post construction site runoff volume, rate and quality.
- A standardized process for evaluating site design and BMP selection to minimize or eliminate the net change in post construction volume, rate and quality.
- Standardized specifications for BMPs to manage stormwater to minimize the net change in post construction runoff volume, rate and quality.
- Methods for assessing impacts of net change from post construction runoff volume, rate and quality on surface water and measurable changes in special protection waters.
- Guidelines for additional considerations in special areas.

The recommended stormwater management implementation process begins with the preliminary layout and design of the project. This way stormwater management is integrated into the planning and design of the project rather than added at the end of the process. Early in the design process the project team (owner/developer, consultant/designer, contractor) is encouraged to meet with regulators (local government, county conservation district and DEP regional office) to review preliminary plans in a pre-application conference. This will also help to avoid redesign costs later in the project to meet applicable requirements.

The manual recommends the following sequence for the planning process:

- Use comprehensive site planning procedures to limit the impacts of development activities by reducing impervious area, minimizing impacts to existing soils and vegetation (Chapter 4), and consider the limitations of special areas (Chapter 7). Take full advantage of the features on the site and the layout of the project to replicate pre-development natural retention, infiltration, and evapotranspiration of stormwater.
- Use non-structural BMPs (Chapter 5) to reduce and minimize the impacts of stormwater runoff.

- Structural BMPs (Chapter 6) offer further options for mitigation of stormwater runoff impacts that cannot be avoided.
- Chapter 8 includes the guidance for the designer to calculate the total impact of the project on rate, volume and water quality and whether additional runoff reduction or mitigation is necessary.

State and federal stormwater management permit coverage is required for construction activities that disturb more than 5 acres and for those that disturb more than 1 acre with a point source discharge to surface water. To meet these state and federal permit requirements, DEP has integrated this into one application process, which is the NPDES Construction application. Permit application instructions and forms are available through the DEP regional offices, county conservation districts and at DEP's Web site at www.depweb.state.pa.us.

Stormwater permit applications are expected to be complete and meet professional quality standards. Information on assembling complete, quality stormwater permit applications and plans is also available at DEP's Web site. The most efficient process for obtaining required stormwater permits is to start with complete, quality applications.

Pennsylvania Professional License laws require that Licensed Professional Engineers be in responsible charge of engineered stormwater BMPs. This professional obligation for the engineer-of-record applies to project planning, design, installation oversight and final certification to meeting applicable design standards and specifications. The Professional Engineer's certification for final as-built plans for engineered BMPs is required to terminate the permittees obligations under a stormwater permit.

For more information, visit DEP's Web site at www.depweb.state.pa.us, Keyword: "Stormwater."