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# Pennsylvania Stormwater Best Management Practices Manual

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## Chapter 1

### Introduction and Purpose





## **Chapter 1      Introduction and Purpose**

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## 1.1 Purpose of this Manual

The purpose of the Pennsylvania Stormwater Best Management Practices (BMP) Manual is to provide guidance, options and tools that can be used to protect water quality, enhance water availability and reduce flooding potential through effective stormwater management. This manual presents design standards and planning concepts for use by local authorities, planners, land developers, engineers, contractors, and others involved with planning, designing, reviewing, approving, and constructing land development projects.

This manual describes a stormwater management approach to the land development process that strives to:

- First, prevent or minimize stormwater problems through comprehensive planning and development techniques, and
- Second, to mitigate any remaining potential problems by employing structural and non-structural BMPs.

Manual users are strongly encouraged to follow the progression of prevention first and mitigation second. Throughout the chapters of this manual the concept of an integrated stormwater management program, based on a broad understanding of the natural land and water systems, is a key and recurring theme. Such a thorough understanding of the natural systems demands an integrated approach to stormwater management, so critical to “doing it better, doing it smarter.”

This manual provides guidance on managing all aspects of stormwater: rate, volume, quality, and groundwater recharge. Controlling the peak rate of flow during extreme rainfall events is important, but it is not sufficient to protect the quality and integrity of Pennsylvania streams. Reducing the overall volume of runoff during large and small rainfall events, improving water quality, and maintaining groundwater recharge for wells and stream flow are all vital elements of protecting and improving the quality of Pennsylvania’s streams and waterways.

It is important to note that The Pennsylvania Stormwater Best Management Practice Manual has no independent regulatory authority. The strategies, practices, recommendations and control guidelines presented in the manual can become binding requirements only through the following means:

1. Ordinances and rules established by local municipalities, or
2. Permits and other authorizations issued by local, state, and federal agencies.

## 1.2 How to Use this Manual

The following provides a guide to the various chapters of the Manual.

### **Chapter 1 – Introduction and Purpose**

### **Chapter 2 – Stormwater and the Impacts of Development and Impervious Surfaces**

This section provides an overview of the impacts of development on Pennsylvania’s natural systems and natural resources, including discussions about the effect of increased runoff volumes, water quality, stream channel erosion, flooding, and lost groundwater recharge and stream baseflow.

### **Chapter 3 – Stormwater Management Principles and Recommended Control Guidelines**

This section discusses stormwater management principles to protect water resources and provides recommended control guidelines for stormwater management. This chapter also discusses how the recommended guidelines relate to diverse conditions, such as urban areas rural settings, brownfield sites and karst topography.

### **Chapter 4 – Integrating Site Design and Stormwater Management**

This section discusses the *process* of comprehensive stormwater management, which begins with better site design and protection of important natural features first, and the use of structural Best Management Practices to manage stormwater second. An approach to site design and stormwater management for Pennsylvania is outlined in flowchart and checklist formats.

### **Chapter 5 – Non-Structural BMPs**

This section describes in detail 13 design and development techniques (non-structural BMPs) that reduce the impact of stormwater. It includes both specific design practices and recommendations that may be required or encouraged by municipal officials within the context of zoning and land development ordinances. Use of these “non-structural” BMPs is considered to be the primary means of stormwater management.

### **Chapter 6 – Structural BMPs**

This section describes in detail 21 specific engineering measures that reduce and mitigate the impacts of development. The use of the “structural BMPs” is considered the second step in stormwater design. Chapter 6 includes recommendations (protocols) for the design of infiltration systems and for soil investigation for infiltration systems.

### **Chapter 7 – Special Management Areas**

This chapter discusses issues and stormwater management implications unique to some special management areas such as brownfields, highways and roads, karst areas, mined lands, water supply well areas, surface water supplies, special protection waters, and highly urbanized areas.

### **Chapter 8 – Stormwater Calculations and Methodology**

This chapter discusses engineering techniques and methods used to perform stormwater calculations. Improved sources for rainfall estimates (NOAA Atlas 14, 2004) are suggested. This chapter also provides guidance on developing stormwater calculations based on the recommended control guidelines in Chapter 3 of the manual. In addition, this chapter includes optional flowcharts and worksheets to assist stormwater designers and reviewers organize and conduct their calculations.

### **Chapter 9 - Case Studies**

This chapter presents case studies of projects that have been implemented throughout Pennsylvania that incorporate innovative techniques and approaches to stormwater management. This chapter identifies sites in various regions of the state that users of the manual may visit to observe innovative stormwater management techniques in a range of development settings.

**Appendix A – Water Quality****Appendix B – Pennsylvania Native Plant List****Appendix C – Protocols for Structural BMPs**

Protocol 1 – Site Evaluation and Soil Infiltration Testing

Protocol 2 – Infiltration Systems Design and Construction Guideline

**Appendix D – Storm water Calculations and Methodology – Case Study****Glossary****1.3 Overview of Pennsylvania’s Existing Stormwater Management Program**

The Clean Stream Law of 1937 provides the legal foundation for water quality protection and restoration, and water resources management in Pennsylvania. The Department of Environmental Protection is primarily responsible for administering the provisions of the act. The Clean Streams Law has been affected by passage of a series of federal laws, such as the Clean Water Act (CWA) of 1972, which has also been amended over time. Local government implements specific regulations for land development and stormwater management. Pennsylvania has 2566 municipalities and 376 designated stormwater management watersheds, with diverse natural, social, and cultural features. The Pennsylvania Municipalities Planning Code (MPC) law enables, but does not require, comprehensive planning, zoning, and subdivision/land development regulation on the municipal, county, and regional levels. To achieve regulatory status, the recommendations and guidelines in this manual must be implemented by ordinances and zoning at the municipal level.

The Pennsylvania Storm Water Management Act of 1978 (Act 167) provides the legislative basis for statewide stormwater management. The Act 167 stormwater management program is mandated, administered, and funded at a 75 percent level by the state. However, stormwater management plans must be developed by the respective counties in a given watershed, and be implemented by the effected municipalities through the adoption of stormwater ordinances. This is a rather uniquely structured “sharing” of authority and powers by all levels of Pennsylvania government. In addition to the requirements under local zoning and ordinances, federal regulations require individual land development projects to obtain National Pollutant Discharge Elimination System (NPDES) permits. These permits are required for all land development projects that disturb one acre or more. The permits authorize discharges from erosion and sediment control facilities and approve post-construction stormwater management plans. The 1999 update to the federal stormwater regulations also required 923 small municipalities and numerous institutions throughout Pennsylvania to obtain NPDES permits for their stormwater discharges. Each permit holder must implement and enforce a stormwater management program that reduces the discharge of pollutants to the maximum extent practicable. More detailed discussions of individual and municipal NPDES construction and stormwater management permits can be found on the DEP web site under the keyword “Stormwater Management”.