

STORMWATER MANAGEMENT MANUAL



INDEPENDENCE
★ **PUBLIC WORKS** ★

**111 E Maple St
Independence, Missouri**

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PREFACE AND DISCLAIMER

PREFACE

The purpose of the Manual is to provide a comprehensive and detailed approach for providing and maintaining water quality on development sites. It has been updated to include the latest information regarding materials and installation practices that have proven effective over the past years. See the MARC/APWA Manual of Best Management and Missouri Guide to Green Infrastructure for more information on stormwater BMP selection and design.

DISCLAIMER

The Stormwater Management Manual was developed for the sole purpose of providing Post-Construction Stormwater Management in New Development and Redevelopment. The contents of this manual should not be interpreted as representing the policies or recommendations of other referenced agencies or organizations. The mention of trade names, products, or companies does not constitute an endorsement. Periodic updates will be made as materials, practices, and policies change within the industry and are made available.

INTRODUCTION

The basic goal of stormwater management is to align water quantity and water quality management techniques in such a way as to prevent further deterioration of our watersheds. Stormwater management is enacted to promote the public health, safety, and general welfare of the citizens of Independence. The three basic techniques for addressing these goals include maintaining existing conditions, decreasing runoff and reducing pollutants. New development and redevelopment shall include a stormwater management plan.

Projects meeting any of the following criteria are exempt from the provisions of this chapter:

- I. Land disturbances for localized utility construction.
- II. Single lot residential developments.
- III. Agriculture

DECREASING RUNOFF

This requirement applies to all commercial developments and redevelopments.

As land development increases, runoff discharges to waterbodies more quickly and for a longer period of time, increasing flooding of nearby areas. Allowable runoff from a site is limited due to the need to minimize downstream flood damage, prevent erosion, and/or minimize impacts to the ecology and water quality of the downstream drainage system.

To reduce the negative effects of land development on flow rates, the following performance standards must be met:

- I. Post-development peak discharge rates from the site shall not exceed those indicated below:
 - 50% storm peak rate less than or equal to 0.5 cfs per site acre
 - 10% storm peak rate less than or equal to 1.0 cfs per site acre
 - 1% storm peak rate less than or equal to 1.8 cfs per site acre
- II. 40-hour extended detention of runoff from the local 90% mean annual event (1.37"/24-hour rainfall). See Chapter 6 of the MARC/APWA BMP Manual for calculating this volume.

When best management practices (BMPs) are implemented on a site, the volume captured by these BMPs may be deducted from the site detention volume required for the 90% mean annual event under the "Frequent Event" and "Comprehensive" control designs. Stormwater best management practices (BMPs) include, but are not limited to:

- Bioretention
- Rain gardens
- Infiltration basins and trenches
- Bio-swales and wetland swales
- Extended detention facilities (including wetlands)
- Permeable pavers

See the MARC/APWA Manual of Best Management and Missouri Guide to Green Infrastructure for more information on stormwater BMP selection and design.

A maintenance plan is required for all stormwater management plans. The maintenance plan shall:

- I. Include an attachment showing the locations and dimensions of all stormwater treatment facilities
- II. Provide access to the owner to maintain the stormwater management facilities, as well as right of access to the City to inspect the facilities at any time.
- III. Establish the minimum frequency and levels of maintenance to be performed.
- IV. Identify anticipated annual maintenance expenditures, periodic major maintenance items, facility replacement costs, and expected facility lifetime, so that the responsible party may better plan for future maintenance costs.
- V. Establish the frequency of inspections to meet or exceed the requirements of this policy.

Alternative stormwater management techniques may be proposed. It is the responsibility of the design professional to demonstrate the appropriateness and effectiveness of the proposed solution and maintenance plan.

MAINTAINING EXISTING CONDITIONS

This requirement applies to all projects that disturb over 50 cubic yards.

Naturally occurring (undisturbed) soil and vegetation provide important stormwater functions including: water infiltration; nutrient, sediment, and pollutant adsorption; sediment and pollutant biofiltration; water interflow storage and transmission; and pollutant decomposition. Establishing soil quality regains greater stormwater functions in the post development landscape, provides increased treatment of pollutants that result from development and habitation, and minimizes the need for some landscaping chemicals.

All areas subject to clearing and grading that have not been covered by impervious surface, incorporated into a drainage facility, or engineered as structural fill or slope shall, at project completion, demonstrate the following:

- I. A topsoil layer meeting these requirements:
 - An organic matter content, as measured by the loss-on-ignition test, of a minimum 5 percent (target 6 percent) dry weight in planting beds, or a minimum 2.5 percent (target 3 percent) organic matter content in turf areas. Acceptable test methods for determining loss-on-ignition soil organic matter include the most current version of ASTM D2974 (Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils) and TMECC 05.07A (Loss-On-Ignition Organic Matter Method).
 - A pH from 6.0 to 8.0 or matching the pH of the original undisturbed soil.
 - A minimum depth of 6 inches.
- II. Scarify subsoils below the topsoil layer at least 4 inches for a finished minimum depth of 10 inches of uncompacted soil that is free of debris. Incorporate some of the upper material to avoid stratified layers, where feasible.

The soil quality design requirements can be met by using one of the options listed below:

- I. Leave native soil undisturbed and protect from compaction during construction.
- II. Amend existing soil in place. The default pre-approved rates are:
 - In planting beds: place 1.5 inches of compost and till in to a 6-inch depth
 - In turf areas: place 1 inch of compost and till in to a 6-inch depth
 - Scarify subsoil 4 inches below amended layer to produce a 10-inch depth of uncompacted soil.
 - After planting: apply 2 to 4 inches of wood chip or compost mulch to planting beds. Coarse bark mulch may be used. Do not use fine bark because it can seal the soil surface.

- III. Import topsoil mix with 2.5 or 5 percent soil organic matter content for turf areas or planting beds, respectively. Imported soils should not contain excessive clay or silt fines (more than 5 percent passing the No. 200 sieve). The default pre-approved rates are:
 - For planting beds: use a mix by volume of 25 percent compost with 75 percent mineral soil.
 - For turf areas: use a mix by volume of 15 percent compost with 85 percent mineral soil.
- IV. Stockpile site soil, reapply, and amend in place. Amend stockpiled topsoil if needed to meet the organic matter and depth requirement.

A Soil Management Plan is required and shall include the following:

- I. A site map showing areas to be fenced and left undisturbed during construction, and areas that will be amended at the turf or planting bed rates
- II. Calculations of the amounts of compost, compost amended topsoil, and mulch to be used on the site

Protect these areas from excessive vehicular and pedestrian traffic; pest infestations; and other potential damage caused by weather events, wildlife, and humans. If any of the trees and plantings as part of the landscape plans should die within 18 months after completion of the activities associated with construction, they are required to be replaced in-kind within six months by the party responsible for installation.