

Minimum Control Measure (MCM 5)

Post-Construction Stormwater Management in New Development & Redevelopment

For the past two decades the rate of land development across the country has been more than two times greater than the rate of population growth. If unchecked, the increased impervious surface associated with this development will increase stormwater volume and degrade water quality, which can harm lakes, rivers, streams, and coastal areas.

The best way to mitigate stormwater impacts from new developments is to use practices to treat, store, and infiltrate runoff onsite before it can affect water bodies downstream. Innovative site designs that reduce imperviousness and smaller-scale low impact development practices dispersed throughout a site are excellent ways to achieve the goals of reducing flows and improving water quality.



Infiltration islands in parking lots can help reduce stormwater runoff.

Phase II MS4s are required to address post-construction stormwater runoff from new development and redevelopments that disturb one or more acres. This primarily includes developing:

- Strategies to implement a combination of structural and non-structural BMPs,
- An ordinance to address post-construction runoff, and
- A program to ensure adequate long-term operation and maintenance of BMPs.

Additional information on this minimum measure, including the stormwater Phase II [regulatory requirements](#) for post-construction and [a fact sheet on the post-construction minimum measure](#) (3 pp, 223K, [About PDF](#)), is also available.

Key BMPs and Resources:

MS4s addressing the post-construction minimum measure should focus on the following four key BMPs to help them in developing a post-construction program. Information on low impact development and smart growth are key resources for MS4s. The additional BMPs in the next section describe practices that developers could use to comply with an MS4's post-construction program.

- [Ordinances for Post-Construction Runoff](#)
- [Post-Construction Plan Review](#)
- [BMP Inspection and Maintenance](#)
- [Low Impact Development \(LID\) and Other Green Designs](#)

USEPA Guidance

Stormwater Management Control Measures - Best Management Practices

MCM5 Post Construction BMPs

- [EPA's Low-Impact Development](#) website provides guidance and information on LID from many other sources.
- [EPA's Smart Growth program](#) includes many resources on smart growth.
- [Stormwater Manager's Resource Center](#) EXIT Disclaimer, created and maintained by the [Center for Watershed Protection](#) EXIT Disclaimer, provides information to stormwater practitioners, local government officials and others that need technical assistance on stormwater management issues.

BMP Fact Sheets:

The fact sheets in this section describe BMPs and how to use them to help municipal stormwater programs and construction site operators comply with the stormwater Phase II requirements.

EPA has started updating these fact sheets to include new practices and technologies. Several of these updated fact sheets are now available in PDF format.

Municipal Program Elements

[BMP Inspection and Maintenance](#)
[Ordinances for Post-construction Runoff](#)
[Post-construction Plan Review](#)
[Zoning](#)

Innovative BMPs for Site Plans

[Alternative Turnarounds](#)
[Conservation Easements](#)
[Development Districts](#)
[Eliminating Curbs and Gutters](#)
[Green Parking](#)
[Green Roofs](#)
[Infrastructure Planning](#)
[Low Impact Development \(LID\) and Other Green Design Strategies](#)
[Narrower Residential Streets](#)
[Open Space Design](#)
[Protection of Natural Features](#)
[Redevelopment](#)
[Riparian/Forested Buffer](#)
[Street Design and Patterns](#)
[Urban Forestry](#)

Infiltration

[Grassed Swales](#)
[Infiltration Basin](#)
[Infiltration Trench](#)
[Permeable Interlocking Concrete Pavement](#)
[Pervious Concrete Pavement](#)

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[Porous Asphalt Pavement](#)

Filtration

[Bioretention \(Rain Gardens\)](#)

[Catch Basin Inserts](#)

[Sand and Organic Filters](#)

[Vegetated Filter Strip](#)

Retention/Detention

[Dry Detention Ponds](#)

[In-Line Storage](#)

[On-Lot Treatment](#)

[Stormwater Wetland](#)

[Wet Ponds](#)

Other

[Alum Injection](#)

[Manufactured Products for Stormwater Inlets](#)

EPA Internet Resources:

- [Urban Management Measures Guidance](#) The National Management Measures to Control Nonpoint Source Pollution from Urban Areas helps municipalities and citizens in urban areas protect waterbodies from polluted runoff resulting from everyday activities. These scientifically sound techniques are the best practices known today. The guidance helps municipalities implement their Phase II stormwater permit programs, and states implement their nonpoint source control programs.
- [EPA's Smart Growth Program](#) includes documents on [Using Smart Growth Techniques as Stormwater Best Management Practices](#) and [Protecting Water Resources with Higher-Density Development](#)
- [Stormwater case studies on post-construction](#) includes case studies of how a Phase I or Phase II community has implemented the post-construction requirements.
- [Stormwater Manager's Resource Center](#) EXIT Disclaimer created and maintained by the [Center for Watershed Protection](#) EXIT Disclaimer, provides information to stormwater practitioners, local government officials and others that need technical assistance on stormwater management issues.
- [EPA's Low-Impact Development](#) web site provides guidance and information on LID from many other sources.

Other Internet Resources:

- [2005 Stormwater Management Manual for Western Washington](#) EXIT Disclaimer includes detailed standards to control stormwater runoff.
- [California New Development and Redevelopment BMP Handbook](#) EXIT Disclaimer includes a series of BMP fact sheets on various BMPs to control stormwater runoff from new developments.

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MCM5 Post Construction BMPs

- [Low Impact Development Center](#) EXIT Disclaimer is a non-profit organization dedicated to the advancement of Low Impact Development technology.
- [Maintaining Your BMP: A Guide for BMP Maintenance in Northern Virginia](#) EXIT Disclaimer is a simple guide targeted to homeowners on how to maintain post-construction BMPs.
- [Municipal Guide to Low Impact Development](#) (2 pp, 88K, [About PDF](#)) EXIT Disclaimer is a two-page fact sheet on the benefits of LID.
- [Prince George's County Bioretention Manual](#) EXIT Disclaimer describes how to use bioretention to improve infiltration on a site level.
- [Puget Sound Action Team Low Impact Development](#) EXIT Disclaimer includes resources and an LID Technical Guidance Manual for the Puget Sound area.
- [Department of Housing and Urban Development's The Practice of Low Impact Development](#) (131 pp, 3.32MB, [About PDF](#)) EXIT Disclaimer is a report on LID and alternatives to conventional design approaches.

Note: If you are referencing this page, please use this alias web address:

<http://www.epa.gov/npdes/stormwater/menuofbmps/postconstruction>

Stormwater BMPs

- [NPDES Home](#)
 - [BMP Background](#)
 - [Public Education](#)
 - [Public Involvement](#)
 - [Illicit Discharge](#)
 - [Construction](#)
 - [Post-Construction](#)
 - [Good Housekeeping](#)
 - [Stormwater Home](#)
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