

CHAPTER 1

PURPOSE AND SCOPE OF THIS GUIDE

Stormwater management is essential to ensuring a clean urban environment, but is just as important to building a vital community. Achieving both of these goals require a coordinated strategy. This guide provides developers, contractors, planners, local government officials and the general public information to assist them with harmonizing these community efforts.

This guide begins with a discussion on the causes and effects of stormwater impacts on community life. Persons involved with managing stormwater should understand the basics of water movement and its capacity to transmit harmful pollutants and cause physical damage. After introducing these fundamentals, the guide presents the many different options and techniques for controlling stormwater. The guide is designed to help the reader obtain the knowledge necessary to develop an effective and cost efficient strategy to manage stormwater within their unique community.

The Importance of Community Stormwater Management

High density human activities, particularly urbanization without proper design can alter water drainage patterns and add pollutants to our rivers, lakes and streams. Recent studies by the U.S. Environmental Protection Agency, or EPA, state water pollution control agencies and universities show stormwater runoff as a major source of urban water pollution. Polluted water runoff endangers humans by polluting the water sources being used for drinking, household purposes, recreation and fishing.

Soil sediment leaving the site of construction activity is a large contributor to water pollution. This sediment not only carries soil particles (the major pollutant), but can also carry attached pollutants such as petroleum products, metals, chemicals, pesticides, organic products and bacteria.

Sediment loading rates from construction sites are typically 10 to 20 times greater than pre-construction rates (North Carolina DEHNR, 1993). Over a short period of time, construction sites can contribute more sediment to receiving streams than was previously deposited over several decades.

There are three main reasons why construction activities increase pollutant loads in runoff. First, the volume and rate of runoff are typically increased, providing a larger capacity to transport pollutants to rivers and lakes. This is why it is critical that best site designs and post-construction practices are well understood and considered before the project is even designed and constructed. See [Missouri Guide to Green Infrastructure: Integrating Water Quality into Municipal Stormwater Management 2011](#). Second, the vegetation is removed leaving bare soil that is much more vulnerable to erosion, resulting in sediment moving into receiving waters. The third reason is some pollutants (e.g., petroleum products, chemicals from construction materials, metals, debris), are added to the site

during construction (*After the Storm*, EPA Fact Sheet 833-B-03-002, January 2003). These pollutants can attach to the soil particles or remain suspended in the stormwater runoff and move directly off-site to the stream.

The Evolution of Best Management Practices

The industry of erosion and sediment control is very young especially when looking at urban and construction activity controls. Urban erosion and sediment control has been regulated since the early 1970s, and in most places, since the 1990. In the beginning, the four most often used devices were the straw bale, rock construction exit, sediment basin and silt fence. Straw bales are no longer recognized by EPA, and many local ordinances do not allow their use. This guide will cover straw bale use for very small areas of sheet flow only. The rock construction exit will be covered but has been found to have little effect for reducing track out, and it requires very high maintenance.

This guide will look at alternatives and controls to add to the rock exit to make it more effective. Significantly different is the added emphasis to erosion control as the first step in reducing sediment runoff. The sediment (silt) fence will still be covered but should be limited to small areas of overland sheet flow. There are many alternatives to sediment fence that are more effective, are easier to install and maintain and that limit the amount of ponding behind them.

This guide will likely not be updated as fast as new and improved devices are added to this industry. The thing to remember is to explore new and different control devices to find the ones that work best for the situation at the site. It is important to change out devices found to be less effective at controlling the discharge of sediment and other pollutants from the construction site.

This guide also will cover the Stormwater Pollution Prevention Plan, or SWPPP, which will explain the use of different devices and control measures that are a moving target during the construction project. The plan to control pollutants in stormwater runoff from the construction site is ever evolving and changing as the site conditions change. Changing and moving the control devices to fit the conditions of the site is a requirement of your land disturbance permit.

This guide will provide developers, contractors, planners, local government officials and the general public with the latest information on erosion. Sediment and stormwater control practices. Using practices that are state-of-the practice will achieve the greatest balance between providing environmental protection and achieving development goals at construction sites.

Development plans and designs that integrate well with the surrounding environment and embrace the existing community infrastructure will more often avoid the delays and cost associated with having to reevaluate and reconstruct these practices at a later date. Consequently, the installation of proper practices within the context of the environmental site design will support community growth, while “dated” practices may become a hindrance.

Current Legislation

As a result of evolving knowledge and skill for controlling stormwater, there will continue to be a changing mix of regulatory requirements in obtaining the necessary environmental permits. Success in implementing a community stormwater management program requires certain permitting processes be understood and integrated into the overall planning efforts. Erosion, sedimentation and stormwater runoff control is governed by federal, state and

local regulations. State permit coverage is required for all land-disturbing construction activities that disturb one or more acres over the life of the project or that are part of a larger common plan of development or sale that will disturb one or more acres over the life of the project. This includes projects less than one acre that are part of a larger common plan of development or sale. In addition to federal and state regulations governing land disturbance activities, more than 150 municipalities in Missouri are also required to regulate construction activities. Also, some non-regulated municipalities choose to enforce erosion and sediment control. In many cases, it may be necessary to obtain a permit from both the state and the municipality. The statutes currently in force are:

Federal

The federal Clean Water Act of 1972 and additions in 1987 established certain water pollution control regulations and permit requirements. Section 402 within the Clean Water Act titled National Pollutant Discharge Elimination System, or NPDES, provides for permit coverage to be obtained for the discharge of stormwater by industrial activities. In 1992, the NPDES program was modified to include land disturbance through construction as an industrial activity to regulate the discharge of sediments and other pollutants during construction. EPA administers the NPDES permit program but authorization can be granted to the state level (most states have permitting authority.) The Missouri Department of Natural Resources has delegated authority to regulate the NPDES permit program in Missouri and the Kansas Department of Health and Environment, or KDHE, has delegated authority to regulate the NPDES permit program in Kansas. EPA typically acts more as an auditor for the state programs, but retains the authority to directly enforce the regulations of construction sites.

The U.S. Army Corps of Engineers governs the placing of dredge or fill material in waterbodies and development or removal of wetland areas. This falls under Section 404 of the Clean Water Act. Other Clean Water Act permits are available on the Missouri Department of Natural Resources' website at www.dnr.mo.gov/env/wpp/stormwater/sw-other-site-permits.htm which includes the following information.

General Information

Missouri Department of Natural Resources

- Dam Safety Permits (www.dnr.mo.gov/env/wrc/damsft/pubs_av.htm#forms) from the Department's Water Resources Center may be required for dam construction activities, especially if the dam is 35 feet or greater in height or the water is listed on Missouri's Impaired Waters List (www.dnr.mo.gov/env/wpp/waterquality/303d/index.html). Contact the Water Resources Center prior to building a dam. See general Dam and Reservoir Safety Program information at www.dnr.mo.gov/env/wrc/damsft/damsfthp.htm.
- Sand and Gravel Mining Permits (www.dnr.mo.gov/env/lrp/homesg.htm) may be required from the Department for commercial removal of in-stream sand and gravel. Contact the Department's Land Reclamation Program for permit applications and instructions. Call 573-751-4041 or 800-361-4827 and ask for the Industrial Minerals Unit.
- 401 Certification (www.dnr.mo.gov/env/wpp/401/index.html) from the state department per Section 401 of the Clean Water Act is required when placing material, or fill, into the jurisdictional waters of the U.S. Examples are culverts under road crossings, riprap along stream banks and stormwater outfall pipes. The term jurisdictional waters here refer to large lakes, rivers, streams and wetlands, including those that don't always contain water. The permitting and certification process is shared between the Department, under Section 401, and the U.S. Army Corps of Engineers, under Section 404.

U.S. Army Corps of Engineers

- A 404 permit (<http://apps.ecy.wa.gov/permithandbook/permitdetail.asp?id=37>) from the Corps is required per Section 404 of the Clean Water Act for the discharge of dredged or fill material in all waters of the United States, including rivers, streams, lakes and wetlands. This includes work such as site development fills, causeways or road fills, dams and dikes, artificial islands, bank stabilization (riprap, seawalls and breakwaters) levees, landfills, fish attractors, mechanized clearing of wetlands and certain types of excavation activities, etc.
- Map of Missouri's five Corps districts and their program service areas (www.dnr.mo.gov/env/wpp/401/corps-map3.gif).
- Kansas City District map of counties and general program information (www.nwk.usace.army.mil/regulatory/boundary.htm).
- Rock Island District Mississippi Valley Division (Northeast corner of Missouri) (www.mvr.usace.army.mil/).
- Memphis District Mississippi Valley Division (Southeast bootheel corner of Missouri) (www.mvm.usace.army.mil/).
- St. Louis District list of counties (www.mvs.usace.army.mil/permits/permtcou.htm) and general program information (www.mvs.usace.army.mil/permits/TOCStL.htm).
- Little Rock District boundary map (Southern Missouri) (www.swl.usace.army.mil/regulatory/images/districtlettersize.pdf) and general program information (www.swl.usace.army.mil/regulatory/index.html).
- The Corps may also require a permit for any work or structures in, under or over any navigable Waters of the United States per Section 10 of the Rivers and Harbors Appropriations Act of 1899 (www.epa.gov/owow/wetlands/regs/sect10.html). This includes such items as boat docks, boat ramps, powerlines, excavation, filling, etc. This is more likely to be applicable in projects adjacent to the Lake of the Ozarks, the Osage River below Bagnell Dam and the Missouri, Mississippi and Gasconade rivers.

State

The Missouri Department of Natural Resources, the Kansas Department of Health and Environment and most other states regulate the quality of stormwater runoff by requiring permit coverage under the NPDES program - whenever there is land disturbance due to construction subject to regulations. In Missouri, the NPDES program is regulated through the Missouri Clean Water Law (10 CSR 20-6.200). The general land disturbance permit addresses the reduction or elimination of pollution in stormwater and certain non-stormwater discharges from:

- Construction sites that will disturb one acre or greater.
- Construction activities that are part of a larger common plan of development or sale that will disturb one acre or more over the life of the project.

Local Government

You may also need to obtain a permit or similar approval from the municipality where your construction project is located. Visit the Missouri Department of Natural Resources' Stormwater Clearinghouse website at www.dnr.mo.gov/env/wpp/stormwater/sw-phaseII-communities.pdf for a list of municipal separate storm sewer systems, or MS4s, required to implement a construction program. Note also that several unregulated MS4s choose to regulate erosion and sediment control.

Local Municipal Separate Storm Sewer System Programs

The NPDS permit program also requires certain entities that manage municipal separate storm sewer systems, or MS4s, to have a land disturbance ordinance and permit program. If your construction project falls within any of these local programs, you will also need to understand and abide by the local ordinance and permit program. You may also need to obtain permit coverage or similar approval for the municipality where your construction project is located. Visit the Missouri Department of Natural Resources' Stormwater Clearinghouse website at www.dnr.mo.gov/env/wpp/stormwater/sw-phaseII-communities.pdf for a list of municipal separate storm sewer systems required to implement a construction program.

Missouri's Phase I & Phase II Stormwater Communities *Revised March 29, 2010*

Arnold	Dardenne Prairie	Ladue	Riverview, Village of
Ballwin	Dellwood	Lake Lotawana	Rock Hill
Battlefield	Des Peres	Lake St. Louis	Rolla
Bellefontaine Neighbors	Duquesne	Lakeshire	Sedalia
Bel-Nor, Village Of	Ellisville	Lebanon	Shrewsbury
Bel-Ridge, Village Of	Excelsior Springs	Lee's Summit	Sikeston
Belton	Farmington	Liberty	Springfield*
Berkeley	Fenton	Manchester	St Charles
Black Jack	Ferguson	Marlborough, Village of	St. Ann
Blue Springs	Festus	Marshall	St. Charles County
Boone County	Florissant	Maryland Heights	St. George
Breckenridge Hills	Fort Leonard Wood	Maryville	St. John
Brentwood	Frontenac	Mexico	St. Joseph
Bridgeton	Fulton	MoDOT	St. Louis (MSD)
Buchanan County	Gladstone	Moberly	St. Louis County
Byrnes Mill	Glendale	Moline Acres	St. Martins
Callaway County	Grain Valley	Neosho	St. Peters
Calverton Park, Village of	Grandview	Newton County	Sugar Creek
Cape Girardeau	Green Park	Nixa	Sunset Hills
Carl Junction	Greene County	Normandy	Town And Country
Carterville	Greenwood	North Kansas City	U.S. Medical Center for Federal Prisoners
Carthage	Hanley Hills, Village of	Northwoods	
Cass County	Hannibal	Norwood Court, Town of	University of Missouri-Col
Charlack	Hazelwood	Oakland	Valley Park
Chesterfield	Herculaneum	O'Fallon	Vinita Park
Christian County	Holts Summit	Olivette	Warrensburg
Clarkson Valley	Independence*	Overland	Warson Woods
Clay County	Jackson, City of	Ozark	Washington
Claycomo, Village of	Jackson County (Salem E)	Pagedale	Weatherby Lake
Clayton	Jasper County	Parkville	Webb City
Cole County	Jefferson City	Pevely	Webster Groves
Columbia	Jefferson County	Platte County	Weldon Spring
Cool Valley	Jennings	Pleasant Valley	Wentzville
Cottleville	Joplin	Poplar Bluff	West Plains
Country Club, Village of	Kansas City*	Raymore	Wildwood
Crestwood	Kennett	Raytown	Winchester
Creve Coeur	Kirksville	Richmond Heights	Woodson Terrace
Crystal City	Kirkwood	Riverside	

*Three of these communities came in under Phase I. Communities may be added to or removed from this list after further review. This list is also subject to change upon completion of the 2010 U.S. Census.

Missouri Permit Requirements

Land Disturbance General Permit Requirements

Site owners or operators disturbing land due to construction activity within Missouri generally need to apply for permit coverage, to be issued under one of the following three general Missouri State Operating Permits. In some circumstances, the Missouri Department of Natural Resources may require you to submit an application for a site-specific permit.

All general permits listed below are available on the department's website at

www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm.

1. MO-R10A-Z - General construction or land disturbance activities.
2. MO-R100 - Construction or land disturbance activity performed by or under contract to a city, county or other governmental jurisdiction.
3. MO-R109 – Construction or land disturbance near valuable resource waters.

Valuable resource waters are stormwater discharges within 1,000 stream feet of:

- Streams identified as a losing stream.
- Reservoirs or lake used primarily as a public drinking water supply.
- Streams or lakes listed as an outstanding national or state resource waters, such as cold water trout streams.
- Streams, lakes or reservoirs identified as critical habitat for endangered species.
- Streams, lakes, or reservoirs listed as impaired for sediment or an unknown pollutant by standard Missouri Department of Natural Resources methodology.

Also included as valuable resource waters are stormwater discharges:

- Within 100 stream feet of a permanent stream (Class P) or major reservoir (Class L2).
- Within two stream miles upstream of biocriteria reference locations.
- Where any of the disturbed area is defined as a wetland (Class W), by 10 CSR 20-7.031(1)(F)7.
- The stormwater discharges to a sinkhole or other direct conduit to groundwater.

Other permits or authorizations may be necessary for your construction project.

For more information visit www.dnr.mo.gov/env/wpp/stormwater/sw-other-site-permits.htm.

Permit Coverage Application Forms and Fees:

To obtain permit coverage from the State of Missouri for land disturbing activities visit www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm.

To obtain land disturbance permit coverage for construction projects complete, sign and submit *Form E - Application for General Permit*, Form--MO 780-0795 and *Form G - Application for Stormwater Permit Under the General Permit: Land Disturbance*, Form--MO 780-1408. If the land disturbing activity is between one and five acres, use *Form O - Application for Land Disturbance Less than 5 Acres*, Form--MO 780-1829 instead of Form G. These forms must be signed by persons according to the requirements in the regulations.

The permit coverage fee is \$300 and must be included with the forms and submitted to your local Missouri Department of Natural Resources office.

Missouri Department of Natural Resources Central and Regional Offices

Central Office
 PO Box 176
 Jefferson City, MO 65102-0176
 573-751-3443

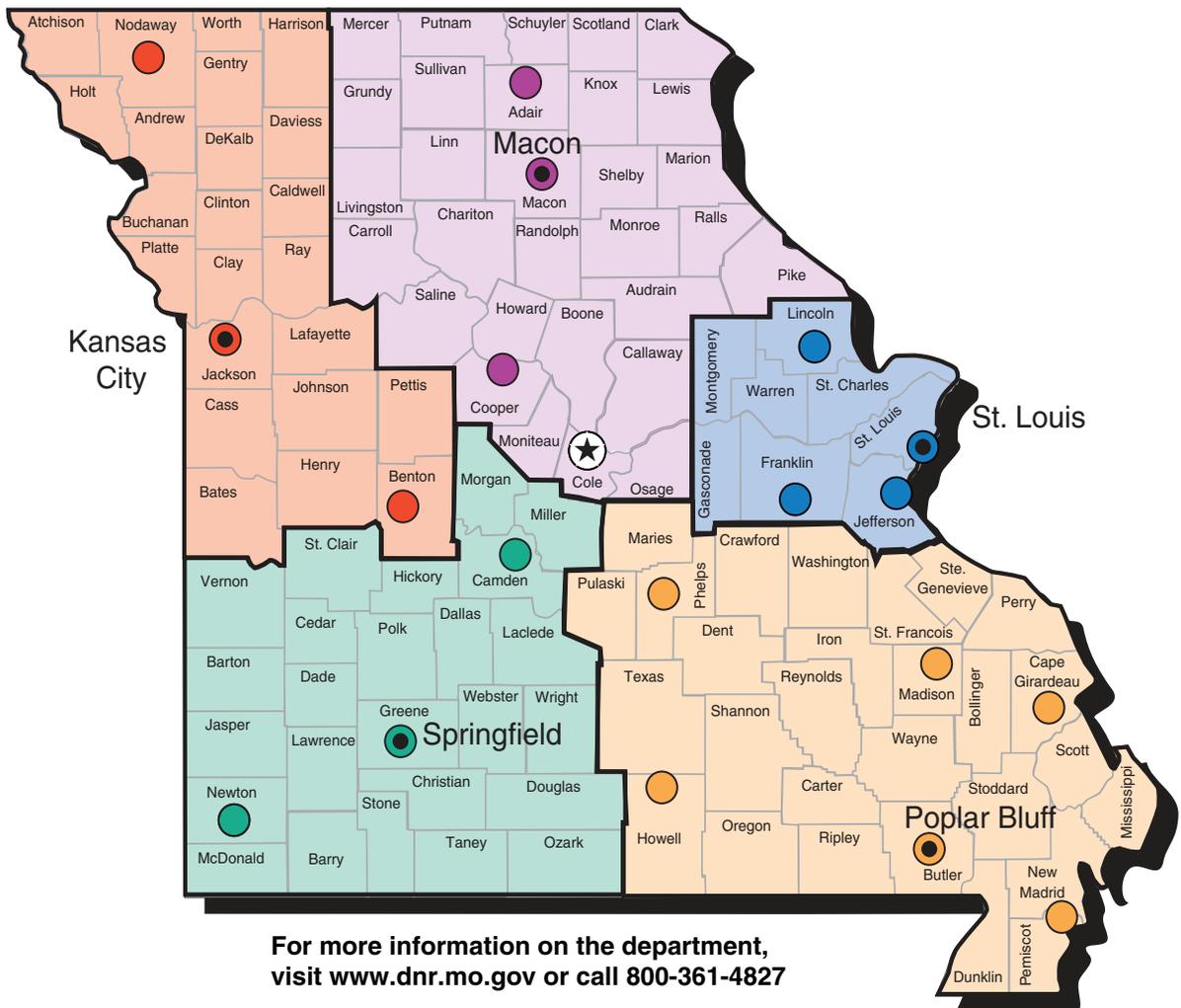
Southeast Regional Office
 2155 North Westwood Blvd.
 Poplar Bluff, MO 63901
 573-840-9750

Kansas City Regional Office
 500 NE Colburn Road
 Lee's Summit, MO 64086-4710
 816-622-7000

St. Louis Regional Office
 7545 S. Lindbergh, Suite 210
 St. Louis, MO 63125
 314-416-2960

Northeast Regional Office
 1709 Prospect Drive
 Macon, MO 63552-2602
 660-385-8000

Southwest Regional Office
 2040 W. Woodland
 Springfield, MO 65807-5912
 417-891-4300



In addition to filling out and submitting these forms for permit coverage, a SWPPP must be prepared specific to the project for which permit coverage is needed. Guidance for preparation for this plan is available under the heading SWPPPs, in this handbook. A good source of information about SWPPP preparation is available on EPA's website at cfpub.epa.gov/npdes/stormwater/swppp.cfm.

The general permit also requires the permittee to perform regularly scheduled inspections of the SWPPP and all best management practices on the construction site to make sure they are functioning and maintained properly to reduce or eliminate sediment and other pollutants from leaving the construction site and entering a waterway. Additional information on inspections is available in the [Inspection for Erosion, Sediment and Stormwater Control](#) section of this handbook.

If the permittee sells less than one acre of a permitted site to an entity for commercial, industrial, or residential use (unless sold to an individual for the purpose of building his or her own private residence) that is part of a common plan or sale, this land remains a part of the common sale and regulated by this permit. Therefore, the permittee is still responsible for erosion control on the sold property until termination of the permit.

After the construction project or land disturbing activity is complete and the site is stabilized to meet the requirements within the regulations, permit coverage can be terminated. To do so complete, sign and submit Missouri Department of Natural Resources' [Form H - Request for Termination of a General Permit](#), Form--MO 780-1409. A Missouri State Operating Permit expires within five years from its effective date. If the active construction project will not be completed by the permit expiration date, it will be necessary to re-apply for coverage within 180 days of permit expiration.

Kansas Permit Requirements

For information about requirements for Construction Activity permit coverage in Kansas visit their website at www.kdheks.gov/stormwater/index.html#construct or contact:

Kansas Department of Health and Environment
Bureau of Water
Building 283, Forbes Field
Topeka, KS 66620
913-296-5557

Training and Certification Information

The Missouri land disturbance permits require that persons designated for environmental responsibility and inspections have a thorough and demonstrable knowledge of the site's SWPPP and erosion and sediment control practices in general. Although currently there are no certification requirements in Missouri for specific education or background for those persons preparing the SWPPP or conducting the site inspections, it is in the permittees' best interest to ensure all permit requirements are being met. This includes proper SWPPP preparation and inspections of controls to ensure the site is in compliance at all times. There are numerous training and certification opportunities available in the field of erosion and sediment control and stormwater pollution prevention plan preparation.

The International Erosion Control Association provides educational opportunities through their annual conferences and live and online instruction programs. Nationwide certification programs are available through [EnviroCert International](#), [National Institute for Certification in Engineering Technologies](#) and [CISEC Inc](#). Additional information about these programs are available on the Missouri Department of Natural Resources website at www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm.