

# NPDES Construction General Permit

What's Old; What's New?



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# Why Storm Water?

Poorly Managed Storm Water = Poor Water Quality



Fecal Coliform



Oil & Grease



Misc Illicit Discharges



Suspended Solids

Accelerated Channel Erosion  
Infrastructure Damage



Nutrients



## Ohio EPA Regulates Stormwater Runoff

- Via National Pollutant Discharge Elimination System (NPDES) Permits for:
  - Construction Site Operators
    - All sites which disturb  $\geq 1$  acre in the larger common plan of development
    - Exceptions: Agriculture, Silviculture, Routine Maintenance < 5 acres disturbed, Combined Sewer Areas, Erosivity Factor "R" < 5
  - Industrial Site Operators
    - Extensive list of industries based primarily on SIC code
  - Municipal Separate Storm Sewer System (MS4) Operators
    - All cities, villages, townships, counties within an Urbanized Area
    - Includes "non-traditional" MS4s, e.g., ODOT, parks, universities
    - MS4s designated by the Director of Ohio EPA
- All permits have Erosion & Sediment Control requirements

Based on Ohio EPA's 2006 Integrated Report, slightly over 1/2 of the watershed assessment units and 1/3 of the large river assessment units monitored by Ohio EPA are impaired because of siltation/sediment from non-point sources. To protect Ohio's water resources, Ohio EPA issues National Pollutant Discharge Elimination System (NPDES) permits. In the storm water program, each type of NPDES permit (MS4, Construction, and Industrial) requires Best Management Practices (BMPs) to address discharges of sediment. The most specific requirements address construction site runoff.

These are the laws and rules governing water quality in the US and the state of Ohio. They state who is required to obtain an NPDES permit for their storm water discharges.

CWA 1972 – NPDES for point sources: sewage treatment plants and industrial wastewater

1987 Amendments – phased NPDES storm water requirements

1990 Phase 1 Rules ...Large MS4s, Large Construction, and Industries

1999 Phase 2 Rules...Small MS4s, Small Construction

See 40 CFR 122.26 & 122.30 thru .37

ORC 6111 – No discharge of pollutants unless complies w/ NPDES permit

OAC 3745 – Ohio's Water Quality Standards

OAC 3745-38 – General NPDES Permits

OAC 3745-39 - Small MS4 Rules effective since June 2004

## Construction General Permit Who Needs Permit Coverage?

- “Operators” of sites which, either by themselves or collectively, disturb  $\geq 1$  acre in the “larger common plan of development or sale”
- An “Operator” is either:
  - Party with operational control over construction plans and specifications, including the ability to modify the plans
  - Party with day-to-day operational control of activities necessary to comply with the SWP3 or other permit conditions
- Generally: Developers, General Contractors, Home Builders

# How to Obtain Permit Coverage

- NPDES Construction General Permit
  - READ THE PERMIT
  - Develop Storm Water Pollution Prevention Plan (SWP3)
  - Submit NOI Application
- Alternative: Individual NPDES permit
  - Form 1 and 2F
  - Submit applications at least 180 days prior to ground breaking
  - Anti-Degradation review may apply

Most operators pursue coverage under the CGP. Ohio EPA processes about 3000 NOIs per year. 60% are for sites with less than 5 acres disturbed. If for some reason, the operator believes they can not meet the conditions of the CGP, they can apply for coverage under an Individual NPDES permit. In 15 years, we have issued 1 Individual NPDES permit for construction. (involved Cat 3 wetlands).

## How to Obtain Permit Coverage

- Developer submits Notice of Intent (NOI)
  - **At least** 21 days prior to the start of construction
    - Can not start before receiving Authorization Letter from Ohio EPA
  - Fee is \$200 for disturbances  $\leq$  5 acres
  - \$20/acre surcharge for larger sites, \$500 max.
- General Contractor submits Co-Permittee NOI
  - Before he starts work on project
  - Can submit with Developer's NOI or after Developer obtains coverage
  - No fee

## How to Obtain Permit Coverage

- Home Builder submits Individual Lot NOI
  - Submit 7 days prior to date they accept responsibility of lot
  - No fee
  - Developer must maintain all centralized sediment controls
  - If no centralized sediment controls are required:
    - Developer must stabilize lot at least 7 days prior to transfer
    - Developer may submit Individual Lot Notice of Termination (Individual Lot NOI) for lot

Submit 7 days prior to the date they intend to accept responsibility for permit requirements. Transfer not granted until approval letter from the director is received by the applicant. Centralized controls are those serving more than one lot (sed basins, inlet protection, etc.)

# Completing the NOI

## DO:

- List the name of project, as it will be known when completed, as “Facility Name”
- Include 8 ½ by 11 map, showing project location and boundaries of earth disturbance.
- List total acreage to be covered by the NOI
  - *Disturbed area, not parcel size*
- List any other DSW applications pending or for which you have yet to apply
  - PTL, NPDES , 401, Isolated Wetlands
  - If an Anti-Degradation Review is required, NOI will be processed at the same time.
  - Incorrectly leaving this blank may mean your site is actually unauthorized to discharge

# Storm Water Pollution Prevention Plan (SWP3)

A little planning goes a long way



A big part of the permit is about the SWP3, which is required to be developed before submitting the permit application. Prior planning makes for more effective and less costly controls.

# What is a SWP3?

- Drawings and Narrative
  - Which Best Management Practices (BMPs) will be implemented?
  - Where will they be installed?
  - When will they be implemented during the sequence of construction?
  - How will they be built?
  - What are their maintenance requirements?
- Essential Components
  - **Sediment & Erosion Controls** - Permit guides the selection of these controls and requires them to be implemented within certain timeframes
  - **Non-Sediment Pollution Controls** - To address issues such as cement washout, fuel tank storage areas, waste disposal, trench dewatering, etc.
  - **Post-Construction Storm Water BMPs** - Permanent features of the site which improve the quality of storm water runoff from the developed site

## Storm Water Pollution Prevention Plan

- SWP3 submittal not required unless requested.
  - The use of alternative post-construction BMPs must be requested and OK'd before NOI submittal.
- Ohio EPA screens NOIs. May request SWP3. Coverage **may not be granted** if SWP3 is deficient.
- Must address **entire** permitted area
  - Example: NOI submitted for 20 acres. SWP3 only developed for Phase I (5 acres). The remaining 15 acres do not have permit coverage as there is no SWP3.
- Checklist of required information available at [www.epa.state.oh.us/dsw/storm/swp3\\_cgp\\_checklist2.pdf](http://www.epa.state.oh.us/dsw/storm/swp3_cgp_checklist2.pdf)

## Storm Water Pollution Prevention Plan

- Informational Changes Include:
  - Cover page w/ site name & location, operator contact info, contact info for person authorized to amend SWP3, SWP3 prep date
  - A log documenting grading and stabilization activities and SWP3 amendments
  - Minimum info to include in inspection reports
  - Inspection Frequency,....

## Storm Water Pollution Prevention Plan

### ■ Self Inspections

- At least every 7 days & within 24 hrs. of ½" rain
- Reduce to 1/mo. if entire site is temp. stabilized or runoff unlikely (frozen)
- Waiver available til 1 mo. before thaw expected if
  - Located in area frozen conditions anticipated to continue for more than a month
  - Land disturbances halted
  - Document waiver start and stop dates in SWP3
- Definable area reached final stabilization? Mark SWP3 and no more inspections for that area

# What Does Ohio EPA Look For?

- SWP3
  - Did they show limits of disturbance?
  - Are drainage areas delineated & acreage given?
  - Is a narrative provided?
  - Are drawings and specifications provided for all BMPs?
  - Are BMPs site specific?
  - Do BMPs address all phases of construction, not just final grade?
  - Does it include non-sediment pollution control BMPs?
  - Who will inspect and maintain each control?
- Inspection log book
- BMP standards?
  - [Rainwater & Land Development Manual](#) or other Ohio EPA accepted standard

Narrative - Should answer the following questions about each BMP

Who will install and maintain Best Management Practices (BMPs)?

Which BMPs will be implemented?

Where will they be installed?

When will they be implemented during the sequence of construction?

How will they be built?

What are their maintenance requirements?

Limits of Disturbance - Just contours not enough. Grade changes may not occur but earth is being disturbed.

Drainage Areas - Picking the right BMP depends on drainage area and slope.

Site specific - Detail drawings of practices not shown on the site map should not be included in the SWP3.

Detail drawings/specifications - Check for inconsistencies and proofread boilerplates. Elevations should match between plan and profile views. Seeding specs between narrative and on drawings must be identical.

Construction Phases - Multiple grade changes/shifting drainage areas may require multiple site maps. Sediment pond may be required prior to the installation of storm sewers. Address individual lot construction.

## Erosion vs. Sediment Control

- **Erosion Control** prevents the suspension of soil in runoff
  - Provides cover over disturbed soils
  - Examples: hydroseeding, mulching, mats/blankets
- **Sediment Control** removes soil once it becomes suspended in runoff
  - Must pond runoff long enough to allow settling
  - Examples: silt fence, diversion berms, sediment ponds
- Permit requires that they are used **together** to achieve optimal soil retention
  - Doing one does not relieve them of the obligation of doing the other

## Why is Erosion and Sediment Control Important?

- ESC reduces runoff volumes, sediment loads and downstream flooding
- ESC helps mitigate the impacts of land disturbing activities:
  - Environmental impacts
  - Economic impacts
- ESC is required(!):
  - Construction Stormwater Program
  - Industrial Stormwater Program
  - Municipal Separate Storm Sewer System (MS4) Program

Add notes about the environmental and economic impacts of land disturbing activities here.

# Erosion Control Requirements

- Stabilize!
- Temporary Stabilization required:
  - Within 7 days of last disturbance on all disturbed areas where construction has temporarily ceased for 21 days
  - Within 2 days for ground within 50 ft. of a **surface water**
  - Before the onset of winter
  - Often this means: after backfilling foundations and before material delivery, before utilities are completely installed.
- Permanent Stabilization required:
  - Within 7 days of final grade
  - Within 2 days for ground within 50 ft. of a **surface water**
  - Areas likely to remain dormant for 1 year or longer
  - Final stabilization not reached until the vegetative growth **density** is at least 70% or equivalent
  - Don't remove sediment controls before this!

**BMPs must provide immediate cover...**

Since the most effective controls are erosion controls, our permit places great emphasis on them. The number 1 erosion control is stabilization – or some kind of cover over the soil. Temporary stabilization often means: after backfilling foundations, before material delivery and before utilities are completely installed.

## Erosion Control Matting/Turf Reinforcement Mats



So - how would these erosion controls look in the real world? Here are some good and bad examples...In this photo work was limited to the distance covered in each days work. Each increment was stabilized to protected from erosion at the end of each work day and prior to disturbing the next increment.

# Erosion Control

## Matting/Mulching/Rock Check



## Erosion Control



# Erosion Control

Stabilize entire lot. ROW not enough.



# Erosion Control

## Runoff Controls

- Runoff controls – practices that control flow to prevent erosion in drainage ways – also required



Apron



Check Dam

Slope Drain

## Soil Binders & Stone Cover

- Can be used where vegetation or mulch is inappropriate
- Soil binders must be reapplied frequently
- Stone cover is a good alternative to vegetation for areas that will be paved or for building pads

## Sediment Controls

- Structural controls required for sites remaining bare for 14 days or longer
- Must be capable of ponding runoff in order to be considered functional
- Sediment ponds and perimeter sediment controls must be installed
  - Prior to grading
  - Within 7 days of the start of grubbing
- Must function until the contributing drainage area is restabilized
- **Cannot be placed in-stream!**

## Sheet Flow vs. Concentrated Flow



Use silt fence for small drainage areas. Diversions to Sed Ponds for larger drainage areas.



Concentrated Flow = Sed Pond

Which sediment control must be used? It depends on whether you have sheet flow or concentrated flow.

## Silt Fence vs. Sediment Pond

- Max drainage area per 100 linear feet of silt fence:

Slope	Drainage Area
0 to 2%	0.5 ac (or 218 ft.)
2 to 20%	0.25 ac (109 ft.)
20% to 50%	0.125 ac (55 ft.)
> 50%	Do not use

- If exceeded, then divert to sediment settling pond

Once you exceed the numbers in this table, you are looking at situations where concentrated flow is likely to develop.

# Sediment Ponds

- When required?
  - Concentrated runoff
  - When the design capacity of silt fence or inlet protection is exceeded
  - For drainage areas with 10 acres or more disturbed at once
    - Includes “storm sewer-shed”
- Sizing requirements
  - 67 c.y. dewatering volume per drainage acre with a min. 48 hr drain time
  - Dewatering zone no deeper than 5 ft.
  - Plus a 1000 c.f./disturbed acre sediment storage zone, or use RUSLE
  - At least 2:1 length-to-width ratio
    - Divide pond's surface area by the length from the nearest inlet to the outlet to obtain the width

## Sediment Control

Silt Fence: drainage area is too large!



# Silt Fence



Poorly Located



# Silt Fence



Poorly Installed



# Sediment Control

## Silt Fence and Diversion Berm



# Sediment Control

## Compost Berm & Filter Socks



# Sediment Control

## Sediment Trap vs. Silt Fence



Sediment Trap  
for < 5 acres

# Sediment Control

## Sediment Settling Ponds



Sediment Basins  
for > 5 acres

2 cells are better than 1



# Sediment Control Inlet Protection

- Required on all inlets that do not drain to a sediment pond
- Cannot be the only sediment control due to low efficiency



Field/Yard Inlet Protection



Curb Inlet Protection

## Diversions direct runoff to sediment ponds



# Sediment Basins



## Sediment Traps vs. Rock Check Dams

- Rock check dams are not a sediment control
  - Sediment retention is only about 20%
- Rock check dams are a flow control
  - Placed within drainage channels to keep them from eroding
- Saddle-shaped
- Spacing depends on slope (max = 200 ft)
- Straw bales are not acceptable

## Good Rock Check Dam



## Incorrect Curb Inlet Protection



# Sediment Control Inlet Protection



Commercially  
Available



Block & Gravel Inlet Protection

# Non-Sediment Pollutant Controls

- No wastewater discharges permitted
  - Concrete truck or paint pan washout
  - Leachate at C&DD landfills or slag
  - Runoff from contaminated soils
- Waste disposal
  - Provide dumpsters
  - Do not open burn
- Control off-site tracking
  - Including dust control
- Material storage
  - Fuel tanks within dikes
  - Cover or locate stockpiles, drums, containers indoors/in trailers/away from drainageways

# Site Dewatering Requirements

- No discharge of turbid water
- If contains sediment, must pass thru a sediment pond or equivalent
  - Sump pit
  - Filter bag
- Stable, non-erodible outlet



Another source of sediment is dewatering activities.

## Site Dewatering Needs a non-erodible outlet.



## Near or In Stream Activities

Divert flow around work area until channel is stabilized.



Work areas in or near a surface water (stream, lake, wetlands, etc.) are critical places for erosion and sediment controls.

## Near or In-Stream Activities

Work during low flow.



In this example, the stream has been re-routed to perform construction activities within the stream

# Near or In-Stream Activities

Use non-erodible material.



Photo 2. Upper work area



Photo 3. Lower work area

# Non-Sediment Pollutant Control Wastewater Discharges



# Non-Sediment Pollutant Control Contaminated Soil



# Non-Sediment Pollutant Control

## Waste Disposal

- Open burning to dispose of wastes is generally prohibited
- Do not bury wastes on site
- Provide a covered dumpster for construction debris



# Non-Sediment Pollution Control

## Control Off-Site Tracking



# Non-Sediment Pollutant Control Material Storage



Leaking lift and fuel tank  
near pond



Secondary containment

Spills must be cleaned up when they occur

## Post-Construction BMPs

- Provide a narrative description of post-construction BMPs for *ALL* sites and rationale for their selection
  - Except those with no impervious surface
- All large construction projects (5 or more acres in the larger common plan of development or sale) must provide structural controls that capture the Water Quality Volume (WQv) and release it over a prescribed number of hours
- Post Construction Q & A Document is online:  
<http://www.epa.state.oh.us/dsw/storm/CGP-PC-Q&A.html>.

# Post-Construction BMPs

## Non Structural BMPs

- Follow local requirements
- Use before Structural BMPs – reduces size
- Ohio EPA may consider to demonstrate compliance for areas not draining to common drainage system
  - Sheet flow from perimeter areas
  - Low density development

# Non-Structural Post-Construction BMPs

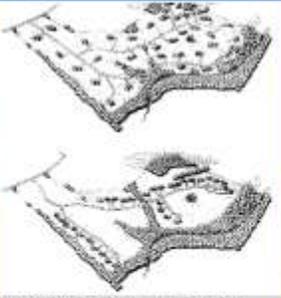


Permeable Paving

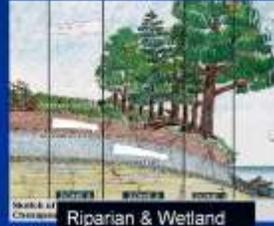


Rain Barrels

Conservation Subdivision  
Design



A site developed using open space design principles (bottom) maintains more undeveloped common space than the conventional development plan (top) (Source: Aronoff, 1996)



Riparian & Wetland  
Setback Ordinances



Green Roofs



Grass Channels to Convey Runoff

## Post-Construction BMPs

### Structural BMPs:

- Must be used on sites where “larger common plan” disturbs  $\geq 5$  ac
  - But, appropriate on all sites
- Incorporate into the permanent drainage system
- Must treat Water Quality Volume (WQv)
  - Based on 0.75-inch rainfall
  - Outlet designed per target “drawdown time”, Table 2
  - No more than  $\frac{1}{2}$  of EDv drains in less than  $\frac{1}{3}$  of the target drain time
  - Designed per ODNR Rainwater Manual

# Water Quality Volume (WQv)

**Goal: capture and treat 85% of the annual runoff volume**

- Use the following formula to calculate

$$WQv = 0.75 * C * A / 12$$

where C = runoff coefficient appropriate for storms less than 1 inch, Table 1 or

$$C = 0.858i^3 + 0.774i + 0.04 \text{ where } i = \% \text{ imperviousness}$$

A = contributing drainage area (ac)

WQv = in units of acre-feet

(to convert to yd<sup>3</sup>, multiply by 1613)

Add 20% to store sediment which will accumulate in structure.

The goal of the water quality criteria is to capture and treat 85% of the average annual stormwater runoff volume. This is equivalent to the 85<sup>th</sup> percentile rainfall multiplied by the volumetric runoff coefficient and site area. This criteria strives to achieve 80% TSS removal and 40% TP removal on an annual basis (assuming appropriate treatment practices are used and constructed, designed, and maintained correctly). Higher removal rates can be obtained using a greater water quality volume or specific design features.

# Water Quality Volume

- Draw down time is for the WQv or extended detention portion of the BMP
- Some BMPs may need to be placed “off-line”
- Design Guidance - See Q & A Document:
  - Georgia Storm Water Manual
  - New York’s
  - Connecticut’s
  - Ohio’s Rainwater Manual

Target Draw Down Time	
BMP	Time (hrs)
Infiltration	24 - 48
WQ Swale & Filter Strip	24
Extended Detention Basin (Dry Basin)	48
Retention Basins (Wet Basins)* <small>*Provide both a permanent pool and an extended detention volume above the permanent pool, each sized at 0.75*WQv</small>	24
Constructed Wetlands (above permanent pool), Pocket Wetland	24
Media Filtration & Bioretention	40

There are six groups of structural stormwater management practices that can be used to meet the water quality volume criteria and the target removals of 80% for TSS and 40% for total phosphorus: ponds, wetlands, infiltration, filtering, and open channels.

## Structural Post-Construction BMPs

- Vegetated Filter Strips
- Enhanced (Water Quality) Swales
- Bioretention Cells
- Water Quality Ponds
  - Dry Extended Detention Basin
  - Wet Extended Detention Basin
  - Constructed Wetland
- Pocket Wetland
- Sand Filters
- Infiltration Basins



# Post-Construction BMPs

- Transportation Projects
  - Public entities may follow ODOT's current I&D Manual, Volume 2
- Offsite Mitigation
  - Prior to NOI, case by case,
  - Demonstrate Table 2 BMPs infeasible,
  - Remain in perpetuity,
  - Same HUC 14 watershed,
  - Mitigation ratio of WQv is 1.5 to 1 or the WQv at point of retrofit whichever greater

## Post-Construction BMPs Redevelopment

- Construction projects on land where impervious surfaces had previously been developed and where the new land use will not increase the runoff coefficient.
- Table 1 of the CGP may be used to determine if the runoff coefficient will increase.

## Post-Construction BMPs Redevelopment

- If large construction, must have structural BMP
  - Treatment must be provided for 20% of the WQv, or
  - The impervious area of the proposed redevelopment project will be 20% less than the impervious area on the existing site prior to the construction activity, or
  - A combination of the above
  - 1:1 credit towards imperviousness thru use of pervious pavement or green roofs.
  - Combo new & redevelopment?
    - Total WQv based on weighted average. New at 100% WQv & old at 20% WQv

# Post-Construction BMPs

## Alternative BMPs

- Request prior to NOI
- Table 2 BMPs infeasible due to physical constraints that prevent functional BMP
- Tested following TARP Protocol
- Minimum removal of 80% TSS
- WQv discharge rate must be reduced unless negligible hydrologic impact
- May require monitoring

## Post-Construction BMPs

### Negligible Hydrologic Impact?

- Entire WQv infiltrates to groundwater
- Larger common plan < 1 ac. Impervious
- Redevelopment in ultra-urban area (100% impervious)
- Direct discharge to lake or 4<sup>th</sup> order stream or larger, and where project is < 5% of watershed area upstream from site, and TMDL does not ID problems

### Stream Order for Major Ohio Rivers



Fourth order  
stream or larger –  
only need to treat  
the WQv.  
Do not necessarily  
need to meet  
drawdown times

## Post-Construction BMPs

Small Sites (Common Plan < 5 ac.)

- Describe measures and rationale
- Explain technical basis used to pick BMPs

Wetlands

- Diffuse flow
- Applicant must perform hydrologic analysis
- Attempt to match pre- hydroperiods & hydrodynamics
- Applicant shall assess impacts to hydrologic flora/fauna.

# Which Post Construction BMPs?

## The Rationale

1. Land Use
2. Physical Feasibility
3. Climate/ Regional Factors
4. Watershed Factors
5. Stormwater Management Capability
6. Pollutant Removal
7. Community and Environmental Factors

Source: CWP Approaches to Stormwater Treatment ©2001

The matrices presented can be used to screen practices in a step-wise fashion. There are 7 steps.

### **Step 1 Land Use**

*Which practices are best suited for the proposed land use at this site?* In this step, the designer makes an initial screen to select practices that are best suited to a particular land use.

### **Step 2 Physical Feasibility Factors**

*Are there any physical constraints at the project site that may restrict or preclude the use of a particular STP?* In this step, the designer screens the STP list using Matrix No. 2 to determine if the soils, water table, drainage area, slope or head conditions present at a particular development site might limit the use of a STP. In addition, the matrix indicates which STP options work well in highly urban areas.

### **Step 3 Climate/ Regional Factors**

*Are there any regional characteristics that restrict or modify the use of certain STPs?* Matrix No. 3 details potential modifications to STP selection based on climate and geology.

### **Step 4 Watershed Factors**

*What watershed protection goals need to be met in the resource my site drains to?* Matrix No.4 outlines STP goals and restrictions based on the resource being protected.

### **Step 5 Stormwater Management Capability**

*Can one STP meet all design criteria, or is a combination of practices needed?* In this step, designers can screen the STP list using Matrix No. 5 to determine if a particular STP can meet recharge, water quality, channel protection, and flood control storage requirements. At the end of this step, the designer can screen the STP options down to a manageable number and determine if a single STP or a group of STPs are needed to meet stormwater sizing criteria at the site.

### **Step 6 Pollutant Removal**

*How do each of the STP options compare in terms of pollutant removal?* In this step, the designer views removal of select pollutants to determine the best STP options for water quality.

### **Step 7 Community and Environmental Factors**

*Do the remaining STPs have any important community or environmental benefits or drawbacks that might influence the selection process?* In this step, a matrix is used to compare the twenty STP options with regard to maintenance, habitat, community acceptance, cost and other environmental factors.

# Water Quality Volume

Wet Detention  
Basin

Extended  
Detention Volume  
 $= 0.75 * WQv$

Permanent Pool  
 $= 0.75 * WQv$



# Dry Extended Detention Pond

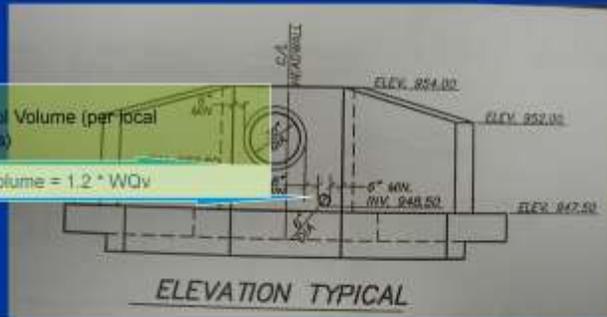
Flood Control  
Outlet

Flood Control Volume (per local  
requirements)

Water Quality  
Outlet

Releases WQv  
over a 48-hr time  
period

Water Quality Volume =  $1.2 \cdot WQv$



Provide the additional 20% of WQv in forebays or micropools

## Dry Extended Detention Pond



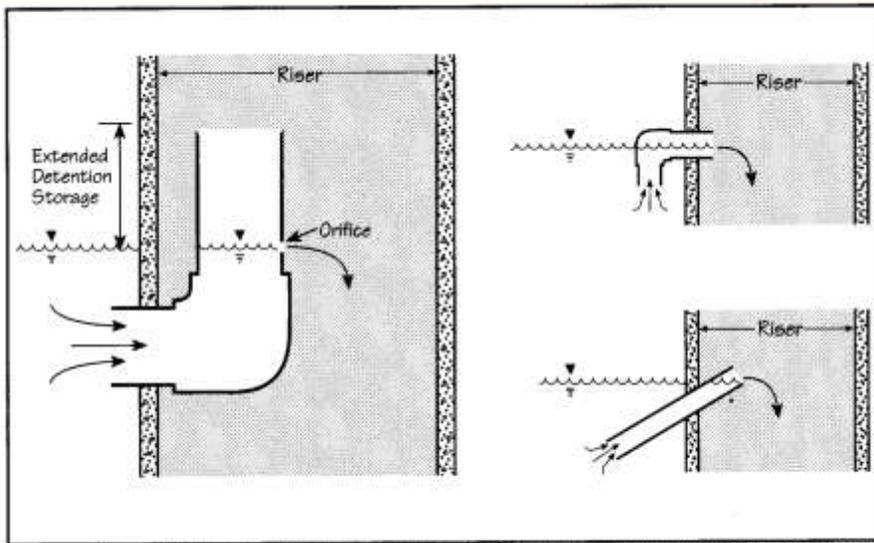
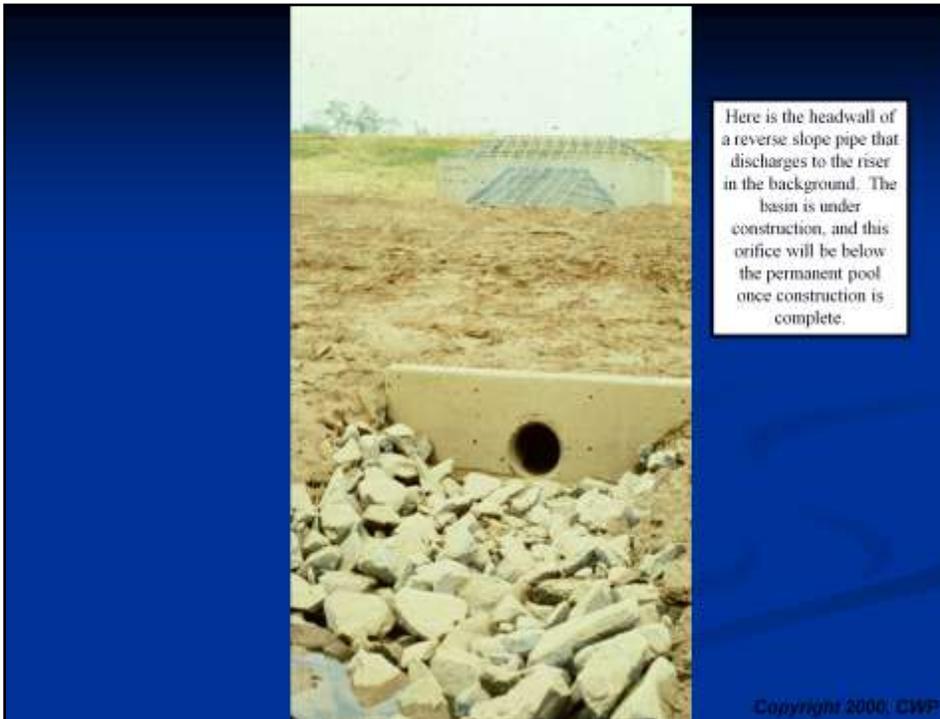


Figure 1-9 Reverse flow structures reduce clogging of slow release and trap floating pollutants

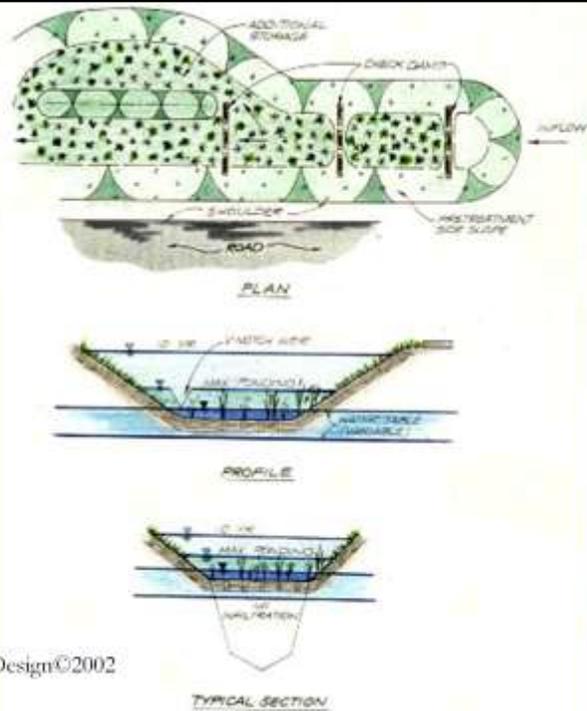


Here is the headwall of a reverse slope pipe that discharges to the riser in the background. The basin is under construction, and this orifice will be below the permanent pool once construction is complete.

Copyright 2000 CWP

Here is the headwall of a reverse slope pipe that discharges to the riser in the background. The basin is under construction, and this orifice will be below the permanent pool once construction is complete.

# Wet Swale



© W.P. Stormwater Practice Design © 2002

This slide shows a schematic of a plan, profile, and section of a typical wet swale.

# Vegetated Swales & Filter Strips



Grassed swales can be used along roadsides and parking lots to collect and treat storm water runoff



Provide for scour protection.

(a) Cross section of swale with check dam.

## Post-Construction BMPs

- Include Post Construction O&M Plan
  - Designate entity responsible for inspection & maintenance
  - List routine & non-routine maintenance tasks
  - Inspection & maintenance schedule
  - Any necessary legally binding easements & agreements
  - Map showing all access & maintenance easements

## Top Excuses for NOT doing Erosion and Sediment Control...



Source: CWP 2007 Storm Water Institute

8. "The city/county/my brother was supposed to do it."



Source: CWP 2007 Storm Water Institute

7. "The water was ponding - it never worked right."

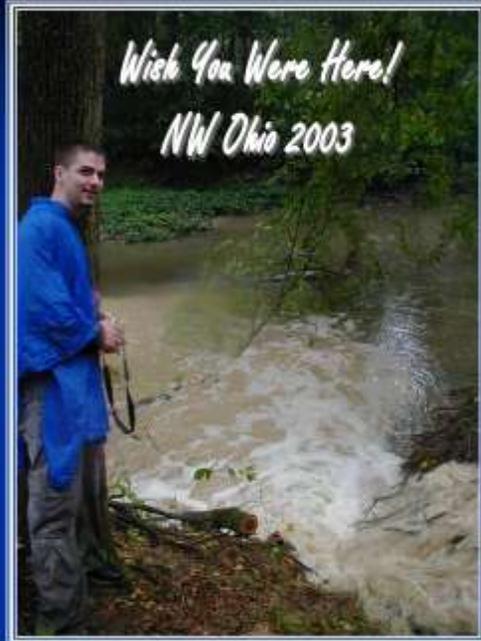


6. “We just finished yesterday.” and “I am working there tomorrow.”



Obviously if you see this and/or the equipment is not onsite, it's a red flag.

5. "It hasn't rained."



#### 4. "It's the farmer next door."



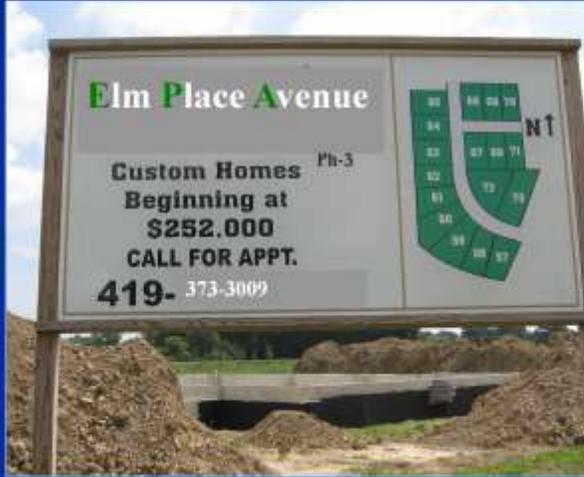
This subdivision drains to a predominantly agricultural stream.

### 3. “The site is flat – there is no runoff.”



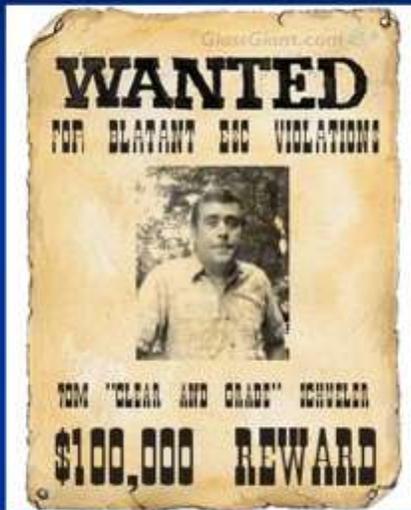
If you keep pouring milk on a tabletop, does it stay put? Water, too, will usually find its way offsite.

## 2. "I just can't afford it."



For a 1/3 acre lot:  
-\$740 seed & mulch  
-\$300 - 400/lot sed.  
basin  
-\$90/dewatering  
filter bag  
-\$27/100 ft. silt  
fence  
-\$100/catch basin  
- If used all, several  
times, still < 1% of  
cost

1. “The developer is on the run from the  
FBI.”



Source: CWP 2007 Storm Water Institute

I've only heard this one once – but it was so original I had to include it  
And, it was true.

# For More Information

## Ohio EPA Contacts

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## Websites

USEPA [http://cfpub.epa.gov/npdes/home.cfm?program\\_id=6](http://cfpub.epa.gov/npdes/home.cfm?program_id=6)

Ohio EPA [www.epa.state.oh.us/dsw/storm/index.html](http://www.epa.state.oh.us/dsw/storm/index.html)