

SEDIMENT BASINS and CODE 378

plus a few other things...



October 14, 2020 Amanda Malcolm, P.E.

Photo source: MDE SSDS

When is 378 small pond approval required for a sediment basin?





	Pond MD-378-1
USDA NATURAL RESOURCES CONSERVATION SERVICE MARYLAND	determined that stormwater management water supply, or temporary storage is justifice and it is feasible and practicable to build a pond which will meet local and state law re quirements.
CONSERVATION PRACTICE STANDARD	This standard establishes the minimum ac- ceptable quality for the design and construc- tion of ponds if:
CODE 378 (Reported in No.)	 Failure of the dam <u>will not result</u> in loss of life; in damage to homes, commercial or industrial buildings, main highways, or railroads; or interruption of the use or service of public utilities.
DEFINITION	2. The product of the storage times the effective height of the dam is less that
A water impoundment made by constructing a dam or an embankment or by excavating a pit or dugout.	3,000. Storage is the volume, in acre-feet in the reservoir below the elevation of the crest of the emergency spillway.
In this standard, ponds constructed by the first method are referred to as embankment ponds, and those constructed by the second method are referred to as exeavated ponds. Ponds constructed by both exeavation and the em- bankment methods are classified as embank- ment ponds if the depth of water impounded against the embankment at the principal spill-	The effective height of the dam is the dif- ference in elevation, in feet, between the energency spillway creat and the lowes point on a profile taken along the center line of the dam, excluding the cutof trench. If there is no emergency spillway the top of the dam becomes the upper limit for determining the storage and the effective height.

3. For dams in rural areas, the effective and the dam is hazard class "a"

Ponds exceeding any of the above conditions shall be designed and constructed according to the requirements of Technical Release 60

- Exemptions Soil Conservation District small pond approval is not required for small class structures where the following exists: 1. Ponds or other structures have less than
- our (4) feet of embankment, or

2. The storage at emergency spillway design

onservation practice standards are reviewed periodically, and updated if needed ntact the Natural Resources Conservation Service	To obtain the current version of this standard,
NRCS - MARYLAND	JANUARY 2000

ponds

feet or more (See Table 1).

This 3 feet shall be measured from the low

point on the upstream toe of the embankment to the design high water.

PURPOSE

To provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard spraying, and other related uses, and to main-

tain or improve water quality. This standard

also applies to stormwater management

CONDITIONS WHERE PRACTICE APPLIES

General - This practice applies where it is

height of the dam (as defined above) is 35 feet or less and the dam is hazard class "a" For dams in urban areas, the officetive height of the dam is 20 feet or less

non-commercial use of Bitmoji



2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control

G-2 Standard and Specifications for Sediment Basins

G-2 STANDARD AND SPECIFICATIONS

FOR

SEDIMENT BASINS

Definition

A temporary pond formed by excavation and/or construction of an embankment and equipped with a drawdown device.

Purpose

To intercept sediment-laden runoff and retain sediment in order to protect drainage ways, properties, and rightsof-way downstream of the sediment basin from sedimentation.

Conditions Where Practice Applies

A sediment basin is required where sediment trap drainage areas are exceeded. Stormwater management ponds may be used as sediment basins provided they meet the requirements of this section and that the construction sequence addresses converting the sediment basin to the permanent stormwater management pond.

Conditions of Use

This standard applies to the installation of temporary sediment basins on sites where:

- Failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities;
- 2. The drainage area does not exceed 100 acres;
- The maximum embankment height does not exceed 15 feet measured from the natural ground to the embankment top along the centerline of embankment; and
- 4. The basin is to be removed within 36 months after the beginning of construction of the basin.

Where any of these criteria cannot be met, the structure must be designed in accordance with Environmental Article, Title 5, Subtitle 5, Annotated Code of Maryland or Natural Resource Conservation Service (NRCS) Maryland Conservation Practice Standard Code No. 378 for Ponds.

Design Criteria

- Local Requirements. In addition to the requirements herein, the design and construction must comply with local laws, ordinances, rules and regulations.
- <u>Stormwater Management</u>. Where a sediment basin is to be used as a permanent pond, the total
 volume must be equal to or exceed the capacity requirements for the permanent pond or provisions
 must be made for additional grading when the facility is converted to a permanent structure.
- Location. Locate the basin to obtain the maximum storage benefit from the terrain and for case of cleanout. The basin should be located to avoid conflicts with utilities and construction activities. Where possible, locate so that storm drains may outfall or be diverted into the basin. Do not locate



<u>Section G-2 Standard and Specification for Sediment Basins</u> <u>Conditions of Use</u>

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- A. A sediment basin embankment that is to be used for more than 36 months does not need to be designed in accordance with Code 378 if the temporary and permanent embankments are both smaller than Code 378 size.
- B. A sediment basin embankment that is Code 378 size needs to be designed in accordance with Code 378 even if, prior to 36 months, it is converted to a permanent SWM pond that has an embankment smaller than 378 size. A dam breach analysis is not required.
- C. An embankment that is Code 378 size in <u>either</u> sediment control mode <u>or</u> permanent stormwater management mode must be designed in accordance with Code 378 and approved <u>prior to constructing the sediment basin</u>. A dam breach analysis is required for the more hazardous of the two operation modes.
- D. A temporary sediment basin embankment that is to be used for more than 36 months needs to be designed in accordance with Code 378 and approved if the embankment is Code 378 size. A dam breach analysis is required.
- E. A sediment basin embankment that exceeds Code 378 size or has a hazard class of significant or high must obtain a permit from the Dam Safety Division even if temporary. A dam breach analysis is required.



NOW WHAT?!

old timer \rightarrow



MDE photo

What do with do with Code 378 size sediment basins that were intended to be temporary but end up being permanent for whatever reason?



The take away....



APM personal photo

- Code 378 approvals for the embankment need to be issued for both sediment control and stormwater modes, as applicable.
- Code 378 approval for a sediment basin needs to be based on the temporary conditions, but it advisable to also provide the final stormwater management design for review and approval at the time of sediment basin approval.
- Preventative measures need to be taken to keep temporary Code 378 size sediment basins from remaining in the ground for more than 36 months. When in doubt, require basin to be designed and constructed in accordance with Code 378.



CONSTRUCTION INSPECTIONS FOR 378 SEDIMENT BASINS

- Certifying engineer or representative needs to be on site during construction of embankment and spillway.
- Geotechnical testing is needed for soil classification.
- Require a construction inspection checklist and photos. Inform developer of as-built requirements.
- Avoid disjointed inspections. Establish which agency is responsible for inspections.
- Construction inspection documentation required for as-built acceptance.

BMP ID:				
PROJECT NAME:	MDE#			
CONSTRUCTION INSPECTION CERTIFICATION CH	ECKLIST FO	OR CODE 37	B EMBANKM	ENTS
		√= yes		CEDTICNING
	TEST	X= no	INSPECTION	CERTIFYING
ACTIVITY	RESULTS	N/A = not	DATE	INSPECTOR'S
		applicable		INITIALS
1 SITE PREPARATION		-pp.cable		
Pre-construction meeting conducted with inspector, contractor,				
and certifying engineer.				
Sediment controls and/or flow diversions in place				
Protection areas flagged				
Grading accurately staked out				
Objectionable material removed from immediate area				
Located at centerline of embankment				
Cut-off trench extended down to impervious soil				
Length, depth, width, side slopes correct				
Subgrade dry and stable				
Area beneath embankment stripped of all vegetaion, topsoil, and				
organic matter				
Material free of large stones roots etc				
Layers placed in 8 inch lifts continuous for entire trench length				
Compaction and moisture content tested every 50 feet				
Cut-off trench Unified Soil Classification:				
4 PRINCIPAL SPILLWAY CONSTRUCTION AND BACKFILLING				
Pipe spillway: Pipe placed prior to construction of embaniment				
Pipe size, material, and class correct				
Soil compaction under and adjacent to pipe				
No gravel under spillway				
Full concrete cradle provided				
Watertight joints (joint separation OK) gap:				
Anti-seep collar location and size correct				
Anti-seep collar and cradle installed with monolithic pour Structural backfill considication followed				
Soll compaction under and adjacent to nine				
Riser:				
Overall dimensions and openings correctly located				
Base dimensions correct				
Concrete strength and bearing capacity acceptable				
Watertight joints				
Drain For wold colliners				
Footing excavated on stable subgrade				
5 EMBANKMENT CONSTRUCTION				
Impervious core length, depth, width, side slopes correct				
Material free of large stones, roots, etc.				
Layers placed in 8 inch lifts continuous for entire core length				
Impervious Core Unified Soil Classification:				
Filter diaphragm dimensions and placement				
Seepage drain pipe, perforation size, and spacing				
No geotextile in filter diaphragm or seepage drain				
Filter diaphragm materials gradation:				
Filter diaphragm compaction				
Compacted in 8 linch lifts				
Emankment compaction tested every 5000 sf				
Elevation correct				
Top width and side slopes correct				
No equipment driven within 4 ft of spillway				
6 EMERGENCY SPILLWAY				
Elevation correct				
Width and side slopes correct				
Level section length correct				
Exit slope				
7 POND EXCAVATION				
cievation and topography of pond bottom graded to plan				
Bench widths and locations correct				
Maintenance access location, width, and slope acceptable				
8 SPILLWAY OUTFALL PROTECTION				
Outfall protection channel excavated to design cross section				
Stone size correct				
stone size correct				
9 STABILIZATION AND LANDSCAPING				
Topsoil, seed, and mulch applied to site				
Topsoil, seed, and mulch applied to embankment				
Landscaping consistent with plan				
No trees/woody growth planted within 15 ft of embankment or 25				
it of riser				
Inspector's name:				
Company or agency:				
Certifying Engineer's name:				



Sizing Criteria for Sediment Basins

- Minimum storage volume of 3600 cf/ac (1800 cf/ac "wet" and 1800 cf/ac "dry")
- Minimum surface area to discharge ratio of 0.0035
- Minimum flow L:W ratio between inflow and outflow of 2:1
- 10-year conveyance and minimum freeboard above 10-year WSEL (1 ft freeboard with auxiliary spillway; 2 ft freeboard without auxiliary spillway)

Sizing Criteria for Code 378 Sediment Basins

• Same as above except design storm for conveyance and freeboard is 100-year instead of 10-year.



Evaluation of Current Sizing Criteria

- Minimum storage volume of 3600 cf/ac (1800 cf/ac "wet" and 1800 cf/ac "dry")
- Controlling Discharge Rates during Construction (Interim Conditions)



Qduring = ?? >> 10 cfs ??





vs. BASIN



TRAP

$\frac{G-1 \text{ SEDIMENT TRAPS}}{ST-I: H \le 5 \text{ ft}}$ $ST-II \text{ and } ST-III: H \le 4 \text{ ft}$



Photo source: MDE SSDS

Figure C1: Principal Spilling Design

- HEAD ON PIPE SPILIMAY (PIPE FLOW), IN FEET MEASURED FROM THE CENTERLINE OF OUTLET OR TALIWATER LEVANION, WHICHEVER IS GREATER, TO THE EMERGENCY SPILIWAY OREST OR TO DESIGN HIGH WATER, WHICHEVER IS GREATER
- = HEAD OVER RISER CREST, IN FEET
- LENGTH OF PIPE IN FEET
- Diameter of PIPE conduit

NOTE: PREFERENCE IS FOR ANTI-SEEP COLLARS TO BE OUTSIDE OF CUTOFF TRENCH

G-2 SEDIMENT BASINS

G 31

no height limitation

except DS permit required for $H \ge 20$ ft

14/18



Converting a Sediment Control Basin to Stormwater Management Facility



ESC plan of sediment basin



SWM plan of permanent 378 pond

- Raising or lowering the embankment
- Performing grading to give pond its final shape
- Adding forebays, underdrain systems, media, plantings, etc.
- Modifying the riser
- Removing the draw down device



Sediment Basins in Use III Watersheds

Sediment basins in Use III watersheds are not regulated, but if you find yourself reviewing a project that is located in a very sensitive area, please consult with DNR's Environmental Review Program.



Sediment Basins and Flocculants

After exhausting all possible traditional sediment control measures including redundant controls, chemical additives may be used to reduce the turbidity of effluent from a sediment basin or trap.



Photo source: MDE SSDS



Sediment Basins and Flocculants

After exhausting all possible traditional sediment control measures including redundant controls, chemical additives may be used to reduce the turbidity of effluent from a sediment basin or trap.

The new "20-CP" permit will address the use of chemical additives or polymers to reduce turbidity.

- The permit includes a pre-approved list of products to increase efficiency.
- For products not on the approved list, there is a required method of review established to evaluate potential toxicity of the product.
- The product may be accepted by the MDE and added to the product list after the review.
- Cationic polymers require an additional review with residual testing.
- A SWPPP (stormwater pollution prevention plan) is required for the site for projects using chemical additives or polymers for sediment control.

Link to webpage: <u>https://mde.maryland.gov/programs/water/wwp/Pages/gp_construction.aspx</u> Questions should be directed to Paul Hlavinka, MDE, WSA, Industrial Stormwater Permits Division at Paul.Hlavinka@Maryland.gov.



Thank you

Questions?

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