

SOIL CONSERVATION SERVICE

SEDIMENT BASIN (NO.)

Definition

A basin constructed to collect and store debris or sediment.

Scope

This standard applies to the installation of all basins where the primary purpose is to trap and store waterborne sediment and debris.

Purpose

To preserve the capacity of reservoirs, ditches, canals, diversions, waterways, and streams; to prevent undesirable deposition on bottom lands and developed areas; to trap sediment originating from construction sites; and to reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Conditions Where Practice Applies

This practice applies where physical conditions or land ownership preclude treatment of a sediment source by the installation of erosion control measures to keep soil and other material in place or where a sediment basin offers the most practical solution to the problem.

Design Criteria

The capacity of the sediment basin shall equal the volume of sediment expected to be trapped at the site during the planned useful life of the basin or the improvements it is designed to protect. If it is determined that periodic removal of sediment will be practicable, the capacity may be proportionately reduced. The volume of sediment may be estimated by using the Wisconsin SCS publication "Determining Sediment Volumes from Sheet, Rill, Streambank, and Gully Erosion in Wisconsin." Special designs must be used for urban development construction sites.

The design of dams, spillways, and drainage facilities shall be according to SCS standards for ponds (378) and grade stabilization structures (410) or according to the requirements in SCS Technical Release No. 60, Earth Dams and Reservoirs (TR-60), as appropriate for the class and kind of structure being considered.

Temporary basins having drainage areas of 5 acres or less and a total embankment height of 5 ft or less may be designed with less conservative criteria if

conditions warrant. The embankment shall have a minimum top width of 4 ft and side slopes of 2:1 or flatter. An outlet shall be provided of earth, pipe, stone, or other devices adequate to keep the sediment in the trap and to handle the 10-year frequency discharge without failure or significant erosion.

Provisions shall be made for draining sediment pools if necessary for safety and vector control. Fencing and other safety measures shall be installed as necessary to protect the public from floodwater and soft sediment. Due consideration shall be given to good visual resource management.

Design Criteria for Concentrated Livestock Areas

The design loadings and materials of wood and concrete walls shall be in accordance with Waste Storage Standard (313).

Runoff shall be based on the 10-year, 24-hour rainfall. The following values of rainfall and runoff may be used:

Rainfall = 4.0 inches

Runoff Curve No.	Runoff (inches)
85	2.5
90	2.9
95	3.4
98	3.8

The suggested runoff curve numbers are 90 for unpaved lots and 95 for paved lots. The minimum runoff curve number for unpaved lots shall be 85.

The peak discharge from the lot area can be determined from Table 5-3, Tabular Discharges for Type II Storm Distribution (csm/in), Technical Release No. 55, (TR-55) Urban Hydrology for Small Watersheds, or by using other approved hydrology methods. Peak discharges in table WI-1 in the Agricultural Waste Management Field Manual (AWMFM), Chapter 12, may be used for the respective lot sizes and runoff curve numbers. *Exhibit 5-II*

Flood routing procedures described in the Engineering Field Manual, pages 11-55b and 11-55c or TR-55 may be used when applicable. Sediment and/or manure storage must be considered in all settling basins.

A sediment basin shall be provided between the waste source and filter strip when more than fifty 1,000-pound animal units are confined. Such facilities should be considered for use with all filter strips.

A constructed sediment basin, if needed, shall have sufficient capacity, as a minimum, to store 65 percent of the peak inflow rate from a 10-year, 24-hour storm for a duration of 15 minutes. Any basin outflow shall be disregarded in computing minimum storage. Additional storage capacity, based on frequency of cleaning, shall be provided for manure and other solids settled within the basin. The solids storage volume shall be based on the number of head, percent of time on the lot, and a minimum of 10 days between cleanings. The

minimum daily volume of solids per animal for design purposes shall be: (1) 1,400# dairy cow--1.85 cubic feet; (2) young dairy stock--1.0 cubic foot; (3) 1,000# beef animal --1.2 cubic feet. The stock shall be considered to be on the lot at least 25 percent of the time.

The bottom elevation of the settling basin shall be at least 2 feet above bedrock or ground water.

Operation and Maintenance

Provisions shall be made for cleaning the settling basins.

Plans and Specifications

Plans and specifications for installing sediment basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Design Documentation Requirements

Location map, applicable soil investigation logs, hydrology data and/or computer printouts, storage volumes, discharge rate, orifice dimensions, if applicable, principal and emergency spillway dimensions and elevations, pipe material, quantity and quality, embankment dimensions, seeding requirements.

Construction (As Built) and/or Certification Documentation Requirements

Weir or orifice dimensions, principal and emergency spillway dimensions and elevations, pipe material, quantity and quality, profile and cross section of embankments, seeding adequacy.

SEDIMENT BASIN SPECIFICATIONS

Foundation Preparation

The foundation area shall be cleared of trees, logs, stumps, roots, brush, boulders, sod, and rubbish. If needed to establish vegetation, the topsoil and sod shall be stockpiled and spread on the completed dam and spillways. Foundation surfaces shall be sloped no steeper than 1:1. The foundation area shall be thoroughly scarified before placement of the fill material. The surface shall have moisture added or it shall be compacted if necessary so that the first layer of fill material can be compacted and bonded to the foundation.

The cutoff trench and any other required excavations shall be dug to the lines and grades shown on the plans or as staked in the field. If they are suitable, excavated materials shall be used in the permanent fill.

Foundation areas shall be kept free of standing water when fill is being placed on them.

Fill Placement

The material placed in the fill shall be free of detrimental amounts of sod, roots, frozen soil, stones more than 6 in. in diameter (except for rock fills), and other objectional material.

Selected backfill material shall be placed around structures, pipe conduits, and antiseep collars at about the same rate on all sides to prevent damage from unequal loading.

The placing and spreading of fill material shall be started at the lowest point of the foundation and the fill brought up in horizontal layers of such thickness that the required compaction can be obtained. The fill shall be constructed in continuous horizontal layers except where openings or sectionalized fills are required. In those cases, the slope of the bonding surfaces between the embankment in place and the embankment to be placed shall not be steeper than 3 horizontal to 1 vertical. The bonding surface shall be treated the same as that specified for the foundation so as to insure a good bond with the new fill.

The distribution and gradation of materials shall be of such that no lenses, pockets, streaks, or layers of material differ substantially in texture or gradation from the surrounding material. If it is necessary to use materials of varying texture and gradation, the more impervious material shall be placed in the center and upstream parts of the fill. If zoned fills of substantially

differing materials are specified, the zones shall be placed according to lines and grades shown on the drawings. The completed work shall conform to the lines, grades, and elevations shown on the drawings or as staked in the field.

Moisture Control

The moisture content of the fill material shall be adequate for obtaining the required compaction. Material that is too wet shall be dried to meet this requirement, and material that is too dry shall have water added and mixed until the requirement is met.

Compaction

Construction equipment shall be operated over the areas of each layer of fill to insure that the required compaction is obtained. Special equipment shall be used if needed to obtain the required compaction.

If a minimum required density is specified, each layer of fill shall be compacted as necessary to obtain that density.

Fill adjacent to structures, pipe conduits, and antiseep collars shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping or manually directed power tampers or plate vibrators. Fill adjacent to concrete structures shall not be compacted until the concrete is strong enough to support the load.

Protection

A protective cover of vegetation shall be established on all exposed surfaces of the embankment, spillway, and borrow area and other disturbed areas if soil and climatic conditions permit. If soil or climatic conditions preclude the use of vegetation and protection is needed, nonvegetative means, such as mulches or gravel, may be used. In some places, temporary vegetation may be used until conditions permit establishment of permanent vegetation. The embankment and spillway shall be fenced if necessary to protect the vegetation.

Seedbed preparation, seeding, fertilizing, and mulching shall comply with instructions in technical guides.

Principal Spillway

Corrugated metal pipe shall conform to the requirements of Federal Specifications WW-P-402 or WW-P-405, as appropriate. Other pipe materials shall conform to specifications suitable for the intended purpose. Antiseep collars shall be of materials compatible with that of the pipe and shall be installed so that they are watertight. The pipe shall be installed according

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to the manufacturer's instructions. The pipe shall be firmly and uniformly bedded throughout its length and shall be installed to the line and grade shown on the drawings.

Concrete

Concrete shall meet the requirements of Wisconsin Construction Specification #4, Concrete or Specification 4A, Air-Entrained Concrete With Steel Reinforcement, whichever is applicable.

The mix design and testing of concrete shall be consistent with the size and requirements of the job. Mix requirements or necessary strength shall be specified. The type of cement, air entrainment, slump, aggregate, or other properties shall be specified if necessary. All concrete is to consist of a workable mix that can be placed and finished in an acceptable manner. Necessary curing shall be specified. Reinforcing steel shall be placed as indicated on the plans and shall be held securely in place during concrete placement. Subgrades and forms shall be installed to line and grade, and the forms shall be mortar tight and unyielding as the concrete is placed.

Timber

Timber walls shall be constructed according to Wisconsin Construction Specification #14, Timber Fabrication and Installation.

Foundation and Embankment Drains

Foundation and embankment drains, if required, shall be placed to the line and grade shown on the drawings. Detailed requirements for drain material and any required pipe shall be shown in the drawings and specifications for the job.

Excavated Ponds

The completed excavation shall conform to the lines, grades, and elevations shown on the drawings or as staked in the field.

Embankment and Excavated Ponds

Construction operations shall be carried out in such a manner and sequence that erosion and air and water pollution are minimized and held within legal limits. All work shall be conducted in a skillful and workmanlike manner.

The completed job shall present a workmanlike appearance.

Measures and construction methods that enhance fish and wildlife values shall be incorporated as needed and practical.

Fencing and cover to control erosion and pollution shall be established as needed.

Appropriate safety measures, such as warning signs, rescue facilities, and fencing, shall be provided.

Other construction specifications which may apply are:

<u>Number</u>	<u>Title</u>
1	Clearing
2	Excavation
3	Earth Fill
4 or 4a	Concrete
6	Corrugated Metal Pipe Conduits
8	Drain Fill
11	Fertilizing, Seeding & Mulching, and Sodding
14	Timber Fabrication and Installation