**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE STANDARD**

# SEDIMENT BASIN

**(No.)**

**CODE 350**

## DEFINITION

A basin constructed with an engineered outlet, formed by an embankment or excavation or a combination of the two.

## PURPOSE

To capture and detain sediment laden runoff, or other debris for a sufficient length of time to allow it to settle out in the basin.

## CONDITIONS WHERE PRACTICE APPLIES

This practice applies to urban land, construction sites, agricultural land, and other disturbed lands:

- Where physical conditions or land ownership does not allow treatment of a sediment source by the installation of erosion-control measures.
- Where a sediment basin offers the most practical solution.
- Where failure of the basin will not result in loss of life, damage to homes, commercial or industrial buildings, main highways or railroads; or in the use of public utilities.
- The product of the storage times the effective height of the dam is less than 3,000. Storage is the volume, in acre-feet, in the reservoir below the elevation of the crest of the auxiliary spillway.
- The effective height of the dam is 35 feet or less. The effective height of the dam is the difference in elevation, in feet, between the auxiliary spillway crest and the lowest point in the cross section taken along the centerline of the dam.
- The Hazard Class of the dam is Low.

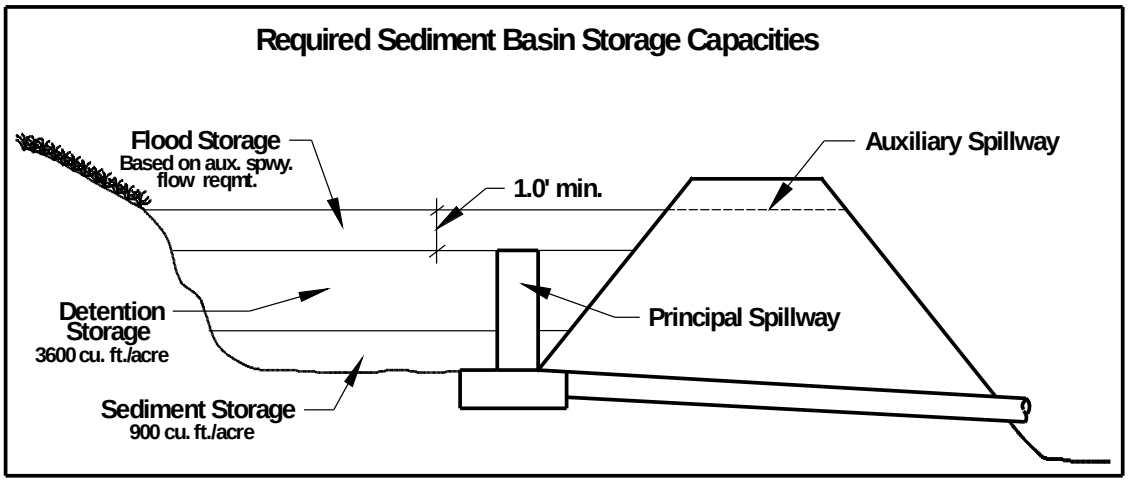
## CRITERIA

Sediment basin design and construction must comply with all applicable federal, state and local laws and regulations.

**Location.** Sediment basins should be located to intercept as much of the runoff as possible from the watershed. Choose a location that minimizes the number of entry points for runoff in to the basin and interference with construction or farming activities. Do not locate sediment basins in perennial streams.

**Basin Capacity**. The sediment basin design must provide sediment storage, detention storage and temporary flood storage. For maximum sediment retention, design the basin so that the detention storage remains full of water between storm events. If site conditions, safety concerns, or local laws preclude a permanent pool of water, design all or a portion of the detention and sediment storages to be dewatered between storm events.

Design the sediment storage for a minimum of 900 $ft^3$/acre of disturbed area. The sediment storage volume is calculated from the bottom of the basin. Design the detention storage for a minimum of 3600 $ft^3$/acre of drainage area. The detention volume is calculated from the top of the sediment storage to the crest of the principal spillway.




Flood storage is based on the required design storm for the auxiliary spillways. Flood storage is calculated between the crest of the principal spillway and the crest of the auxiliary spillway. A minimum of 1 foot in elevation is required between the principal and auxiliary spillways.

**Principal and Auxiliary Spillway Design**

Design the principal spillway to carry long-duration, continuous, or frequent flows without discharge through the auxiliary spillway. The diameter of the principal spillway pipe must be 6 inches or greater.

The principal spillway can be designed to remove only water from the flood storage or to dewater all or part of the detention storage. Design the principal spillway to drawdown the flood storage within 24 hours. Drawdown times for the detention storage can be longer to improve sediment trapping.

Design the auxiliary spillway to pass large storms without damage to the basin. Refer to NRCS Conservation Practice Standard 378, Ponds for the required design storm and design criteria for the auxiliary spillways.

The outlet of the principal spillway must be stable for anticipated design flow conditions.

**Basin Shape.** When possible, design basins with a length to width ratio of 2 to 1 or greater. Baffles to divert the flow in the basin can be used to lengthen the flow path of incoming water to achieve the required length to width ratio.

**Embankment and Side Slopes.** Refer to NRCS Conservation Practice Standard 378, Pond for design requirements for the embankment.

Above the permanent water line, the side slopes of the pool area must be 3 horizontal to 1 vertical or flatter. Side slopes below the permanent water line can be as steep as 2 horizontal to 1 vertical.

**Vegetation.** Establish vegetation on the embankment and side slopes of the basin and pool area immediately after construction. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for criteria for the establishment of vegetation. If construction takes place during a time period that is not conducive to establishing vegetation, protect the embankment by mulching or other methods. Refer to NRCS Conservation Practice Standard 484, Mulching for mulching criteria.

If arid climatic conditions do not allow for the establishment of vegetation other means of reducing erosion may be used.

**Safety.** Sediment basins located in urban areas shall be signed and fenced to limit access by the public.

**CONSIDERATIONS**

Consider any potential negative effects the basin may have downstream from the structure.

Consider additional erosion control practices to reduce the sediment load on, and improve effectiveness of, the basin.

The following techniques can be considered to increase sediment capture efficiency:

- Increase detention time by increasing the detention storage volume in the basin.
- Maintain a permanent pool by only dewatering the flood storage or only a portion of the detention storage.
- Remove sediment from the basin before it reaches the sediment storage elevation.

Diversion of runoff from undisturbed areas away from the basin will improve the function of the basin. Locate the basin to allow access for sediment removal when the storage capacity is full.

If the basin will be used by wildlife, the use of native species is recommended to provide food and habitat diversity. Also, consider wildlife use of the basin when scheduling maintenance activities that may disrupt wildlife life cycles or negatively impact pollinators.

**PLANS AND SPECIFICATIONS**

Prepare plans and specifications for sediment basins that describe the requirements for applying the practice according to this standard. Include as a minimum, the following in the plans and specifications:

1. A plan view of the layout of the sediment basin.
2. Typical cross sections of the basin.
3. Details of the outlet system
4. Seeding requirements if needed.
5. Construction specifications that describe in writing site specific installation requirements of the sediment basin.

**OPERATION AND MAINTENANCE**

Prepare an operation and maintenance plan for the operator. The minimum requirements to be addressed in the operation and maintenance plan are:

1. Periodic inspections and maintenance of the embankment, principal and auxiliary spillways and dewatering device especially following significant runoff events.
2. Prompt repair or replacement of damaged components.
3. Prompt removal of sediment when it reaches pre-determined storage elevations.
4. Periodic mowing of vegetation to control of trees, brush and invasive species.
5. Periodic inspection of safety components and immediate repair if necessary.

**REFERENCES**

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