

SOIL CONSERVATION SERVICE

WASTE STORAGE POND

Definition

An impoundment made by excavation or earthfill for temporary storage of animal or other agricultural waste.

Scope

This standard establishes the minimum acceptable quality for design, construction, and operation of waste storage ponds. Embankments are limited to an effective height of 35 feet or less and hazard class (a). This standard does not apply to waste treatment lagoons or waste storage structures.

Purpose

Waste storage ponds serve as a component of a waste management system and are used to store liquid and solid waste, wastewater, and polluted runoff to reduce pollution and protect the environment.

Conditions Where Practice Applies

This practice applies where: (1) waste is generated by agricultural production or processing; (2) storage is necessary to properly manage the waste, and (3) soils and topography are suitable for construction.

Design CriteriaLocation

Waste storage ponds should be located as near the source of waste and polluted runoff as practicable giving due consideration to economics, the overall waste management plan, health, and safety. They should be located where prevailing winds, vegetative screening and building arrangement will minimize odor and visual resource problems. Nonpolluted runoff should be excluded to the fullest possible extent. They shall not be located on floodplains unless protected from inundation or damage from a 25-year flood event.

Soil and Foundation

Locate on soils of slow to moderate permeability or soils which will seal through sedimentation and biological action. Avoid gravelly soils and shallow soils over fractured or cavernous rock. Where self sealing is not probable, the storage pond shall be sealed by mechanical treatment or by the use of an impermeable membrane. Do not construct to an elevation below the seasonal high water table unless considered as a special design.

Storage Period

The storage period is the maximum anticipated length of time between emptying based on climate, crops, equipment and labor.

Design Volume

Waste storage ponds shall store the design volume. Design volume is the minimum volume required to store waste for the storage period. It is the total of the following:

<u>With drainage area</u>	<u>Without drainage area</u>
1. Manure, wastewater, and normal runoff ^{1/}	1. Manure and wastewater ^{1/}
2. Normal precipitation less evaporation on pond surface ^{1/}	2. Normal precipitation less evaporation on pond surface ^{1/}
3. 25-yr. 24-hr. runoff	3. 25-yr 24-hr. precipitation on pond surface
4. Solids accumulation ^{2/}	4. Solids accumulation ^{2/}

Additional storage may be provided to meet management goals or regulations.

Solids Separation

To minimize frequency of solids removal from runoff storage ponds it is desirable to direct polluted runoff through vegetative filter strips, low gradient channels, or debris basins to remove readily settleable solids. Settling facilities should have adequate capacity to store settled solids for a reasonable period of time based on climate, equipment, and method of disposal. Where manure from animals such as dairy cows is flushed into a storage pond, a solids separator is desirable for removing fibrous solids to facilitate pumping and irrigation.

Inlet and Outlet

Inlets to storage ponds may be of any permanent type designed to resist erosion, plugging, and, where freezing occurs, damage by ice. Where slurry and solid waste is stored, the inlet must be designed so waste will be deposited near the center of the pond.

There shall be no outlet which can automatically release storage from the design volume. An emergency spillway, combination of spillways, or additional storage shall be provided to protect the facility from overtopping during a 25-year, 24-hour storm occurring when the design volume is filled. Spillway requirements, however, do not apply to waste storage ponds without drainage areas.

^{1/} Accumulated during the storage period.

^{2/} For the period between solids removal. This applies mainly to ponds used to store wastewater and polluted runoff, and refers to the residual solids after the liquids have been removed.

Disposal Facilities

Waste shall be removed from storage and utilized or disposed of at location, times, rates and volumes as shown in the overall waste management plan without polluting surface or ground water. Waste may be liquid, slurry, or solid, and proper equipment must be available to remove and apply it to the land.

Where polluted runoff is stored, liquids shall be removed promptly to insure that sufficient capacity is available to store runoff from subsequent storms. The maximum allowable emptying time shall be based on the chance of overflow from subsequent storms and capacity of the disposal area.

Provisions shall be made for removal of solids from storage ponds to preserve the storage capacity. The method of solids removal must be considered in planning, particularly in determining the size and shape of the pond. With ponds built to store runoff and wastewater, an entrance ramp with a slope of 4:1 or flatter may be used. With those built to store slurry and solid waste, some type of emptying facility must be provided. This can be a dock, pumping platform, retaining wall, or a ramp with a slope of 7:1 or flatter.

Earth Embankment

The design height of the embankment shall be increased by the amount needed to insure that the design top elevation will be maintained after settlement has taken place. This increase shall not be less than 5 percent. The minimum top width shall be 8 feet. The combined side slopes of the settled embankment shall not be less than 5 horizontal to 1 vertical.

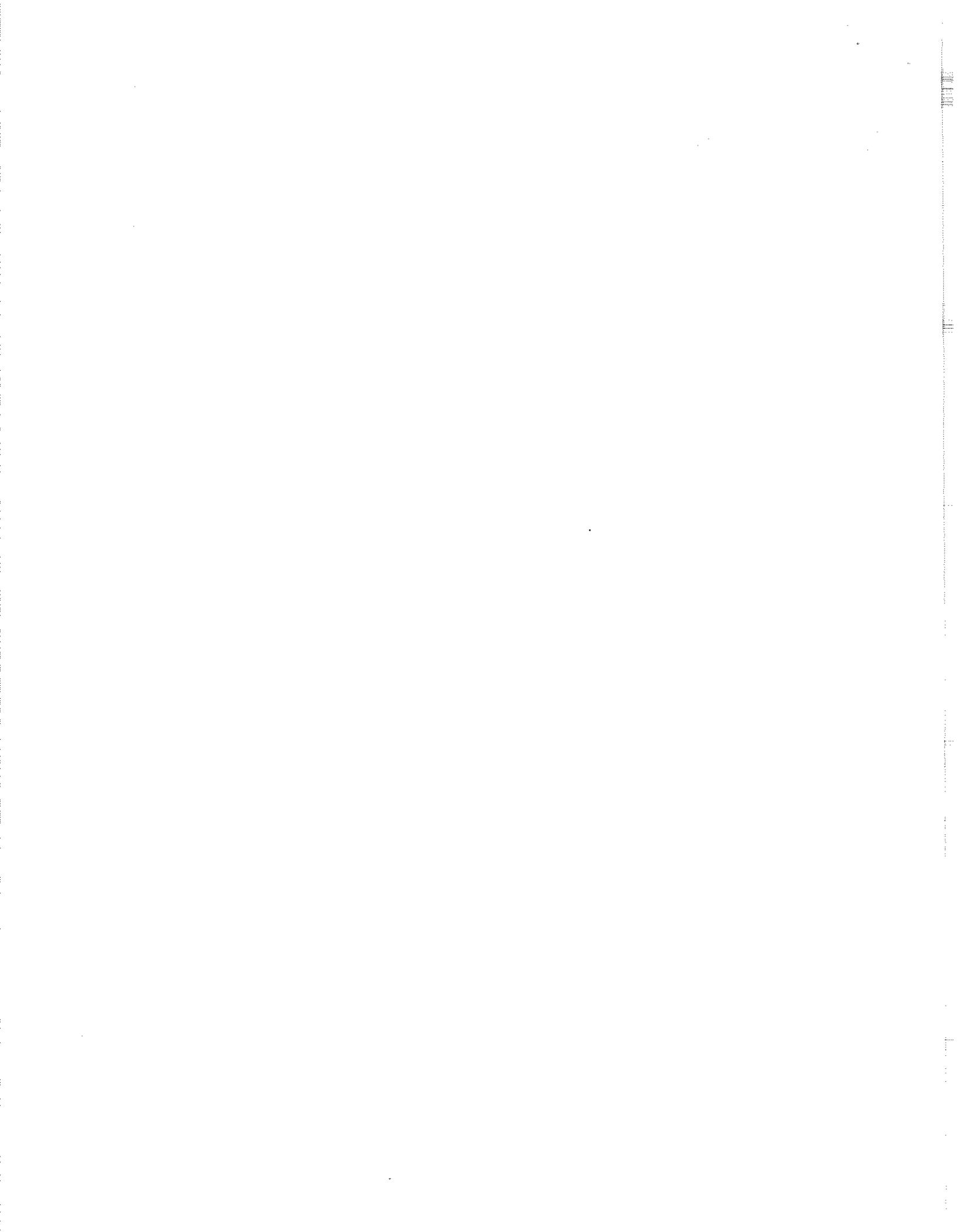
For ponds with a drainage area, the minimum elevation of the top of the settled embankment shall be one foot above the elevation of the water surface during the 25-year, 24-hour emergency spillway storm occurring when the design volume is filled. For ponds without a drainage area, the minimum elevation of the settled top shall be one foot above the design volume.

Protection

Where the location is such as to create a safety hazard, the waste storage pond shall be fenced and warning signs posted to prevent children and others from using it for purposes other than intended. The embankment and surrounding areas shall be vegetated to control erosion. Vegetative screens or other methods should be used to shield the pond from public view and improve visual conditions.

Plans and Specifications

Plans and specifications for waste storage ponds shall be in keeping with this standard and shall describe the requirements for application of the practice to achieve its intended purpose.



WISCONSIN SUPPLEMENT

FOR

WASTE STORAGE POND

Page 425-1 - Conditions Where Practice Applies

This practice shall not be installed until an overall waste management system has been considered and the essential components determined.

All federal, state, and local laws, rules and regulations governing waste management, pollution abatement, health, and safety shall be strictly adhered to. The owner or operator shall be responsible for securing all required permits and approvals and for performing in accordance with such laws and regulations. Regulations published by the Environmental Protection Agency are listed on page WI-1-1 of the Agricultural Waste Management Field Manual. Responsibility for enforcement of the EPA regulations in Wisconsin is under the authority of the Department of Natural Resources.

Location

Wisconsin Administrative Code NR 112 requires that at least 250 feet must exist between a waste storage pond and a well or reservoir which is intended or used for supplying water for human consumption or in the production and preparation of food products. These minimum distances are also recommended for wells not used for human consumption.

Soil and Foundation

Soil profiles obtained by borings or backhoe test pits shall be made to an elevation below the maximum depth of excavation. The elevation of temporary or permanent water tables will be noted and drainage systems provided where necessary. Where the potential for ground water pollution exists, the storage pond shall be sealed.

Page 425-2 - Design Volume

To reduce the necessity of spreading on frozen ground, a storage for a minimum of 150 days should be provided. Storage up to 180 days is desirable and recommended especially for northern areas of the state or where wet soils prevent spreading in early spring. Many landowners prefer storage periods of 365 days for best overall management of wastes. If storage for less than 150 days is provided, adequate conservation treatment must be on the land where spreading will be performed to reduce runoff to a minimum. Restrict application to areas with a minimum pollution hazard. In no case will storage be for less than 120 days.

Tables on pages WI-4-1 and WI-4-2 of the Agricultural Waste Management Manual are a guide to manure production from various animals.

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The volume of wash water should be determined by actual measurement or estimated by a reliable method such as calibration of a faucet, hose, or spray nozzle and applying the rate of water used to the time of operation.

Table WI-4-4 on page WI-4-3 of the Agricultural Waste Management Manual is a guide to determine the volume needed for normal precipitation less evaporation for the storage period.

Table WI-4-5 on page WI-4-4 of the Agricultural Waste Management Manual is a guide to determine the normal runoff for the storage pond.

Page 425-2 - Solids Separation

The capacity of the debris basin or channel shall be sufficient to pass the peak runoff for a 10-year frequency, 24-hour storm to the holding pond in addition to providing capacity for solids removed from the runoff. An allowance for 0.2 to 0.5 cubic feet of solids per day for each 1000-1200-pound animal should be provided. The number of days to be used in computing storage depends on anticipated time between cleanings of the settling basin. The 0.2 cubic foot per day applies to lots on steeper slopes that are not cleaned regularly. (A settling basin for a paved lot cleaned irregularly would require a capacity for solids as follows: $0.3 \text{ cu. ft./day} \times 365 = 100 \text{ cu. ft. per } 1000 \text{ lb. animal}$. Assumed once a year cleaning for settling basin.)

Channels used as settling basins should have side slopes 2:1 or flatter. The channel shall be designed to provide a design velocity of one foot per second or less for runoff for a 10-year frequency, 24-hour storm. Channels used for settling basins should have paved bottoms to facilitate cleanout.

Page 425-2 - Addition following paragraph on Solids Separation.
Separation of Precipitation

Precipitation which collects on waste storage ponds must be drained or pumped away when conventional manure handling equipment is used for removal of the wastes. This polluted runoff must be collected and disposed of in a safe manner. Picket dams may be used to separate the water resulting from precipitation when the manure contains bedding. The pickets should be placed vertically and designed to withstand a horizontal loading equal to 60 pounds per cubic foot. The picket dam should extend up the ramp to a point where the wastes are first removed.

Page 425-3 - Addition following paragraph on Protection
Design Considerations - Manure Ponds

Structural components shall be designed in accordance with applicable provisions of the SCS standard for Waste Storage Structure (313).

Manure ponds should be designed as deep as practical to keep surface area to a minimum. The limitations of the landowners pump must be considered in determining depth.

Agitation requirements should be considered in determining pond shape. Agitation is easily accomplished from the sides of ponds which are long and have widths of 70 feet or less. Ponds with greater widths may require pump docks for proper agitation.

Materials such as sand, limestone, and straw should be kept out of the ponds as much as possible if emptying is to be performed by pumping.

Pipes conveying wastes from manure pumps should extend as far as possible out into the pond.

Drains used to lower the water table around manure ponds need not be deeper than the bottom elevation of the pond.

Page 425-3 - Addition following paragraph on Protection
Diversions for Disposal of Barnyard and Feedlot Runoff

Diversions may be used to dispose of barnyard and feedlot runoff by reducing the velocity of the runoff in a channel and allowing the liquid to seep into the ground or evaporate. The diversions should be placed on a flat grade and be of sufficient length to hold the anticipated runoff. These diversions should not be placed on soils having bedrock close to the surface or on sands or gravels. All diversions shall be seeded to grasses tolerant of high soil moisture conditions.

Page 425-3 - Plans and Specifications

Construction shall be completed in accordance with the following Wisconsin Construction Specifications, when applicable:

1. Clearing
2. Excavation
3. Earth Fill
4. Concrete
7. Conduits: Concrete Pipe, Clay Pipe, and Asbestos-Cement Pipe
10. Fencing
11. Fertilizing, Seeding, and Mulching