

# Holding Pond Water Management



## What is a Holding Pond?

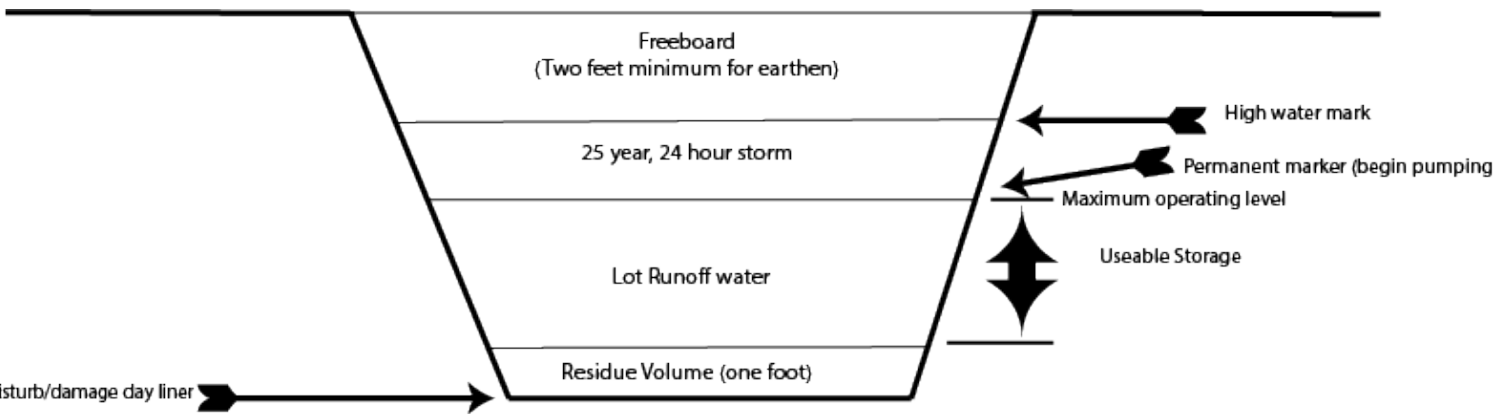
A holding pond is part of an animal waste management system. The holding pond is usually a clay-lined earthen structure that stores the liquid runoff from the components of an animal feeding operation, including open feedlot areas, feed storage area, stacking pad, and other areas that generate process wastewater. Holding ponds will usually have water loss due to evaporation, but the ponds should be checked after storm events to determine if they should be emptied. During periods of wet climatic weather, the ponds may have to be emptied more than once during the year. The figure below shows the typical distribution of storage for a holding pond for an open feedlot. The lot runoff water component shown in the figure is the most common volume that will need to be emptied. This volume often ranges in size from 1,000,000 gallons to 10,000,000 gallons, but may vary outside that range depending on the size of the holding pond and lot.

## How are holding ponds emptied?

- Holding ponds are commonly emptied by using irrigation equipment such as center pivot irrigation, a traveling gun system, or employing surface irrigation methods. In some cases, a drag hose system or water tankers may also be used to dewater holding ponds.
- It is important to consider the solids content of the waste to be emptied and adjust the irrigation system (nozzles, pump rate, etc.) to handle the waste without plugging or maintenance issues occurring.
- It is also important to compare the irrigation rate with the field's soil characteristics to avoid ponding, runoff of water, and/or excessive nutrient application.

## For More Information

- SD NRCS Manure Management page: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/sd/technical/ecoscience/manure/>
- South Dakota Department of Agriculture and Natural Resources wet weather management: <https://danr.sd.gov/Agriculture/Livestock/FeedlotPermit/docs/>



Holding pond diagram.

## What other operation and maintenance will be required?

The amount of operation and maintenance of a dewatering system depends primarily on the nature of the system and the requirements of any permits that are in place for a system. Common elements to plan for are:

- Monitor the level of the pond to ensure there is adequate storage capacity to contain the volume of a 25-year-24-hour storm event. The maximum water level of the holding pond is indicated by a permanent marker. When the water level is above this marker, the pond must be pumped down below the marker within 14 days. The equipment to be used to empty the holding pond should be prearranged so that it is available on short notice. It is also useful to install a depth gauge in the holding pond to determine the gallons applied based on a change in pond depth.
- Consider the addition of concrete ramps, pads, or other structures to facilitate agitation, pumping, or holding pond access to prevent damage occurring to the clay liner of the holding pond.
- The bottom of a holding pond with a clay liner should be kept in a saturated condition at all times to prevent cracking or damage to the clay liner. **Do not** penetrate or damage the clay liner on pond bottom or sides during pumping.
- Testing the waste water contained in the holding pond is necessary to determine the amount of nitrogen, phosphorus, potassium, salts, and other nutrients or contaminants in the material being applied to the field(s).
- The nutrient management plan for the system should include a specific pumping plan. This plan will identify which fields are suitable to pump the effluent on, and the type of equipment that will be used to dewater the pond. A useful conversion to know is that one inch of water applied over an area of one acre represents approximately 27,152 gallons of water.
- Review fields noted in the nutrient management plan that would be ideal to pump the effluent to during periods of saturated ground conditions. The application field would be those with gentle slopes (<4 percent), without setback areas, and have a variety of vegetation that could allow for longer time periods with the wastewater may be applied to growing crops.
- Consider using crops that provide a longer window of application such as alfalfa, grass, or small grain on fields identified for pond water application. Cover crops are also an excellent tool following small grain or silage to sequester nitrogen, prevent runoff, and improve infiltration.
- Best management practices should be employed during application such as not applying during windy conditions, communicating with neighbors to make them aware of when the application will occur, applying at the rate that does not cause runoff, disking or creating dikes or terraces around application areas to prevent runoff from leaving the field, ensuring all equipment is in working order, repairing leaking systems and maintaining buffers and setbacks as outlined in the nutrient management plan.

