Practice: 359 - Waste Treatment Lagoon

Scenario: #1 - Waste Treatment Impoundment

Scenario Description:

A waste treatment lagoon is a component of a waste management system that provides biological treatment of manure and other byproducts of animal agricultural operations by reducing the pollution potential. Resource concern addressed is water quality by reducing the pollution potential to surface and groundwater by treating and storing liquid waste. When a liner is required to prevent seepage, plan the appropriate pond sealing and lining conservation practice standard..

Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Solid/Liquid Waste Separation Facility (632).

Before Situation:

Operator presently has a dairy or animal feeding operation where animals are confined in a small area for a period of time each day ranging from a couple of hours to 24 hours per day. The operation does not have a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

A waste treatment lagoon that is constructed by excavation and earth-fill that stores wastes such as manure, waste water, and contaminated runoff. The purpose of this facility is to biologically treat waste, such as manure and wastewater, and thereby reduce pollution potential by serving as a treatment component of an agricultural waste management system. This facility provides the landowner a means of storing and treating waste until it can be utilized in a proper manner in accordance with a nutrient management plan.
Typical design size : Design Volume 439,440 ft3; 260' X 208' (top); 3:1 inside and outside side slopes; cut/fill ratio = 1.25; total depth = 13'; 1' freeboard (not included in total depth). Excavated Volume 8,500 CY, Earthfill Volume 6,800 CY

Scenario Feature Measure: Design Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 439,440

Scenario Cost: $27,723.35 **Scenario Cost/Unit:** $0.06

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.06	8500	$26,010.00
Materials						
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	$3.45	15	$51.75
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$415.40	4	$1,661.60

Practice: 359 - Waste Treatment Lagoon

Scenario: #2 - Waste Treatment Impoundment, Rehabilitation

Scenario Description:

This scenario is for the rehabilitation of an existing waste treatment lagoon. A waste treatment lagoon is a component of a waste management system that provides biological treatment of manure and other byproducts of animal agricultural operations by reducing the pollution potential. Resource concern addressed is water quality by reducing the pollution potential to surface and groundwater by treating and storing liquid waste. When a liner is required to prevent seepage, plan the appropriate pond sealing and lining conservation practice standard.
**REQUIRES THE PRODUCER TO REMOVE ALL LIQUID AND SLURRY AS NORMAL OPERATION AND MAINTENANCE.

Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Solid/Liquid Waste Separation Facility (632).

Before Situation:

Operator presently has a dairy or animal feeding operation where animals are confined in a small area for a period of time each day ranging from a couple of hours to 24 hours per day. The operation does have an existing waste management system with a waste treatment lagoon that is inadequate to handle the waste stream leaving the animal production facilities. The existing waste treatment lagoon has exceeded its original design life and no longer has the required treatment volume due to accumulation of solids. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

A waste treatment lagoon that has been rehabilitated by removal of all waste to restore the waste treatment volume required to meet the operations current operation. In most cases the waste treatment lagoon has to be increased in size due to operations current; animal numbers and management, design criteria and/or regulations. The purpose of this facility is to biologically treat waste, such as manure and wastewater, and thereby reduce pollution potential by serving as a treatment component of an agricultural waste management system. This facility provides the landowner a means of storing and treating waste until it can be utilized in a proper manner in accordance with a nutrient management plan.
Typical design size :
**REQUIRES THE PRODUCER TO REMOVE ALL LIQUID AND SLURRY AS NORMAL OPERATION AND MAINTENANCE.
Before Design Volume 340,875 ft3; 208' X 208' (top); 3:1 inside and outside side slopes; total depth = 13'; 1' freeboard (not included in total depth); Two foot of sludge accumulated in the bottom.
After Design Volume 439,440 ft3; 260' X 208' (top); 3:1 inside and outside side slopes; Excavated Volume 4,000 CY, Earthfill Volume 3,200 CY. Requires installation of new liner or certification of the existing liner by a Professional Engineer.

Scenario Feature Measure: Design Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 439,440

Scenario Cost: $48,903.04 **Scenario Cost/Unit:** $0.11

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Foot	$0.29	33831	$9,810.99
Excavation, clay, large equipment, 150 ft	1219	Bulk excavation of clay with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$5.15	3479	$17,916.85
Scraper, pull, 15 CY	1207	Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper.	Hour	$18.80	20	$376.00
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.73	500	$365.00
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	$158.64	20	$3,172.80
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.06	500	$1,530.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.73	3200	$11,936.00

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$23.61	20	$472.20

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$415.40	8	$3,323.20