

**Practice: 313 - Waste Storage Facility**

**Scenario: #1 - Earthen Storage Facility**

**Scenario Description:**

An earthen waste impoundment constructed with cuts and fills balanced such that one half of the impoundment depth is excavated and the remainder of the storage is created with the embankment. The structure is constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Payment includes materials and equipment necessary for construction of the storage structure. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. If an earthen storage liner is to be included in the installation, refer to associated Practice Standards 521A, 521B, 521C, or 521D. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Adequately protect liner at agitation and access points.

**Before Situation:**

Operator presently has a confined animal feeding operation without 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:**

An earthen storage structure constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan.

Typical design size: total storage volume 147,000 ft<sup>3</sup>; 150'X150' (top); 3:1 inside and outside side slopes; embankment topwidth = 10'; compaction ratio = 1.1; total depth = 10'; embankment volume = 10,430 cu yd.

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), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632), Waste Treatment (629) .

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 147,000

**Scenario Cost:** \$29,179.62

**Scenario Cost/Unit:** \$0.20

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.99	4110	\$16,398.90
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	\$3.64	3130	\$11,393.20
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.86	980	\$842.80
<b>Materials</b>						
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.37	8	\$26.96
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76

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**Scenario: #2 - Earthen Natural Storage**

**Scenario Description:**

An embankment is constructed in a location to utilize naturally available storage to serve as a waste impoundment structure for storing wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Payment includes materials and equipment necessary for construction of the storage structure. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. If an earthen storage liner is to be included in the installation, refer to associated Practice Standards 521A, 521B, 521C, or 521D. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Adequately protect liner at agitation and access points.

**Before Situation:**

Operator presently has a confined animal feeding operation without 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:**

An earthen storage structure constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan.

Typical design size: design storage volume 153,000 ft<sup>3</sup>; embankment topwidth = 10'; 3:1 upstream slope; 3:1 downstream slope; compaction ratio = 1.1; settlement = 10%; total depth = 10'.

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), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632), Waste Treatment (629) .

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 153,000

**Scenario Cost:** \$13,997.60

**Scenario Cost/Unit:** \$0.09

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.86	518	\$445.48
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.99	3260	\$13,007.40
<b>Materials</b>						
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.37	8	\$26.96
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76

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**Scenario: #6 - Dry Stack Facility, Earthen Floor with Concrete Side Walls**

**Scenario Description:**

This scenario consists of a dry stack facility with compacted earthen floor with concrete side walls. This scenario is intended for poultry litter or similar dry product. Payment includes materials and equipment necessary for construction of the floor and walls. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical is 40' x 56' slab with walls. The earthen floor will be prepared by stripping the top 1' of soil and roller compacting it back into floor. Walls are 5' reinforced concrete. Walls consist of three perimeter walls (40' + 56' + 40') for a total wall length of 136 linear feet. Walls allow for greater storage volume. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Scenario Feature Measure:** Cubic Foot Storage

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 11,200

**Scenario Cost:** \$11,934.44

**Scenario Cost/Unit:** \$1.07

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.99	83	\$331.17
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	30	\$10,817.70
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.15	83	\$178.45
<b>Mobilization</b>						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$174.12	2	\$348.24
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	1	\$258.88

**Practice: 313 - Waste Storage Facility**

**Scenario: #7 - Dry Stack Facility, Concrete Floor without Side Walls**

**Scenario Description:**

This scenario consists of a dry stack facility with reinforced concrete floor without side walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibits earthen floors. Payment includes materials and equipment necessary for construction of the floor. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). The purpose of this practice is to properly store manure and other agricultural by-products that are stackable until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical is 75'x226'. The facility floor is 5" reinforced concrete without side walls. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Scenario Feature Measure:** Square Foot Floor Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 16,950

**Scenario Cost:** \$51,403.09

**Scenario Cost/Unit:** \$3.03

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.99	315	\$1,256.85
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.15	630	\$1,354.50
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	260	\$43,056.00
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	206	\$5,217.98
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76

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**Scenario: #8 - Dry Stack Facility, Concrete Floor with Wood Side Walls**

**Scenario Description:**

This scenario consists of a dry stack facility with reinforced concrete Floor with pressure treated wood side walls. Payment includes materials and equipment necessary for construction of the floor and walls. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). This scenario is intended for situations where consistency of manure or geographical conditions prohibits earthen floors. The purpose of this practice is to temporarily, properly store manure and other agricultural by-products that are stackable until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical is 40' x 56' concrete slab with 5' high walls. The facility floor is 5" reinforced concrete with 5' pressure treated wood (2" x 8" boards) walls, 6" x 6" x 8' posts set 4' c-c with 6" concrete curbing. Walls allow for greater storage volume. Walls consist of three perimeter walls (40' + 56' + 40') for a total wall length of 136 linear feet. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Scenario Feature Measure:** Cubic Foot Storage

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 11,200

**Scenario Cost:** \$13,679.30

**Scenario Cost/Unit:** \$1.22

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.15	83	\$178.45
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	2	\$721.18
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	35	\$5,796.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.99	83	\$331.17
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$114.12	4.5	\$513.54
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	\$8.47	9	\$76.23
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$43.69	9	\$393.21

**Labor**

**Labor**

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$20.32	90	\$1,828.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.08	9	\$198.72

**Materials**

Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.56	840	\$1,310.40
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	28	\$709.24
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.84	1315	\$1,104.60

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76
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**Practice: 313 - Waste Storage Facility**

**Scenario: #9 - Dry Stack Facility, Concrete Floor with Concrete Side Walls**

**Scenario Description:**

This scenario consists of a dry stack facility with reinforced concrete floor and concrete side walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibits earthen floors. Payment includes materials and equipment necessary for construction of the floor and walls. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). The purpose of this practice is to properly store manure and other agricultural by-products that are stackable until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

The typical is 40' x 56' concrete slab with 5' high walls. The facility floor is 5" reinforced concrete with 5' reinforced concrete walls. Walls allow for greater storage volume. Walls consist of three perimeter walls (40' + 56' + 40') for a total wall length of 136 linear feet. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Note on use of concrete walls versus wood walls: different states utilize different options depending on many specific conditions which may change what is considered least cost. Each state will decide individually based on the suite of scenarios developed which meets their program policy and resource goals and needs

Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Scenario Feature Measure:** Cubic Foot Storage

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 11,200

**Scenario Cost:** \$18,350.32

**Scenario Cost/Unit:** \$1.64

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	30	\$10,817.70
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	35	\$5,796.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.99	83	\$331.17
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.15	83	\$178.45
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	28	\$709.24
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76

**Practice: 313 - Waste Storage Facility**

**Scenario: #10 - ConcreteLid Tank, <1,000 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing a small concrete tank with a solid lid and a total storage volume of less than 1,000 Cu Ft. Design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete lid tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Tank typically 5' deep x 8' wide x 9' long, with a total storage volume of 360 cubic feet. Sizing based on manure, other wastes, rainfall, lot runoff, etc. Tanks associated with open lots sized to handle design storm in tank or in combination with lot as per state regulations.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), Pumping Plant (533),and Underground Outlet (620).

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 360

**Scenario Cost:** \$4,672.72

**Scenario Cost/Unit:** \$12.98

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	60	\$314.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$115.48	10	\$1,154.80
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	6	\$2,163.54
<b>Labor</b>						
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	\$26.97	10	\$269.70
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	4	\$101.32
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor.	Foot	\$3.78	40	\$151.20
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76

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**Scenario: #11 - Concrete Lid Tank, ≥1,000 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing a small concrete tank with a solid lid and a total storage volume of greater than or equal to 1,000 Cu Ft. Design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete lid tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Tank typically 8' deep x 12' wide x 40' long, with a total storage volume of 3,840 cubic feet. Sizing based on manure, other wastes, rainfall, lot runoff, etc. Tanks associated with open lots sized to handle design storm in tank or in combination with lot as per state regulations.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), Pumping Plant (533),and Underground Outlet (620).

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 3,840

**Scenario Cost:** \$18,824.43

**Scenario Cost/Unit:** \$4.90

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	35	\$12,620.65
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	10	\$1,656.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	100	\$524.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$115.48	20	\$2,309.60
<b>Labor</b>						
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	\$26.97	20	\$539.40
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	14	\$354.62
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6" wide. Includes materials, equipment and labor.	Foot	\$3.78	80	\$302.40

**Mobilization**

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76
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**Practice: 313 - Waste Storage Facility**

**Scenario: #12 - Concrete Tank Open Top, <5,000 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing an open top concrete tank with or without a full width ramp that has a total storage volume less than 5,000 Cu Ft. Payment includes materials and equipment necessary for construction of the concrete tank. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Tank can also be installed under an animal facility using slats. Design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Tank typically 5' deep, with a bottom area of 880 sq ft, and a total storage volume of 4,400 cu ft. Sizing based on volume of manure, other wastes, rainfall, lot runoff, etc. as appropriate.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 4,400

**Scenario Cost:** \$17,623.61

**Scenario Cost/Unit:** \$4.01

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	15.2	\$5,480.97
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	25.7	\$4,255.92
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$115.48	30	\$3,464.40
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	200	\$1,048.00
<b>Labor</b>						
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	\$26.97	30	\$809.10
<b>Materials</b>						
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6" wide. Includes materials, equipment and labor.	Foot	\$3.78	186.5	\$704.97
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	53	\$1,342.49

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76
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**Practice: 313 - Waste Storage Facility**

**Scenario: #13 - Concrete Tank Open Top, 5,000 - 14,999 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing an open top concrete tank that has a total storage volume from 5,000 to 14,999 Cu Ft. Payment includes materials and equipment necessary for construction of the concrete tank. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Tank can also be installed under an animal facility using slats. Design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Tank typically 8' deep, with a bottom area of 1256 SF, and a total storage volume of 10,048 cubic feet. Sizing based on volume of manure, other wastes, rainfall, lot runoff, etc. as appropriate.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 10,048

**Scenario Cost:** \$20,936.12

**Scenario Cost/Unit:** \$2.08

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	200	\$1,048.00
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	20	\$3,312.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$115.48	30	\$3,464.40
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	28	\$10,096.52
<b>Labor</b>						
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	\$26.97	30	\$809.10
<b>Materials</b>						
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6" wide. Includes materials, equipment and labor.	Foot	\$3.78	125	\$472.50

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	48	\$1,215.84
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76
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**Practice: 313 - Waste Storage Facility**

**Scenario: #14 - Concrete Tank Open Top, 15,000 - 24,999 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing an open top concrete tank that has a total storage volume from 15,000 to 24,999 Cu Ft. Payment includes materials and equipment necessary for construction of the concrete tank. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Tank can also be installed under an animal facility using slats. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Tank is typically 8 ft deep, with a bottom area of 2,670 sq. ft., and a total storage volume of 21,360 cubic feet. Size based on volume of manure, other wastes, rainfall, lot runoff, etc. as appropriate.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), Pumping Plant (533) and Underground Outlet (620).

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 21,360

**Scenario Cost:** \$31,840.03

**Scenario Cost/Unit:** \$1.49

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$115.48	46	\$5,312.08
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	240	\$1,257.60
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	37	\$13,341.83
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	45	\$7,452.00
<b>Labor</b>						
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	\$26.97	46	\$1,240.62
<b>Materials</b>						
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6" wide. Includes materials, equipment and labor.	Foot	\$3.78	183	\$691.74
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	80	\$2,026.40
<b>Mobilization</b>						

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76
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**Practice: 313 - Waste Storage Facility**

**Scenario: #15 - Concrete Tank Open Top, 25,000 - 49,999 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing an open top concrete tank that has a total storage volume from 25,000 to 49,999 Cu Ft. Payment includes materials and equipment necessary for construction of the concrete tank. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Tank can also be installed under an animal facility using slats. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Tank installed is 8' deep, with an interior bottom area of 3,786 SF, and a total storage volume of 30,288 cubic feet. Outside dimensions, 4,225 sq ft (includes 3' footing and 8" wall). Size based on manure, other wastes, rainfall, lot runoff, etc. as appropriate.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 30,288

**Scenario Cost:** \$43,298.28

**Scenario Cost/Unit:** \$1.43

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	50	\$18,029.50
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	\$3.64	1450	\$5,278.00
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	80	\$13,248.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	400	\$2,096.00
<b>Materials</b>						
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6" wide. Includes materials, equipment and labor.	Foot	\$3.78	248	\$937.44
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	126	\$3,191.58
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76

**Practice: 313 - Waste Storage Facility**

**Scenario: #16 - Concrete Tank Open Top, 50,000 - 74,999 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing an open top concrete tank that has a total storage volume from 50,000 to 74,999 Cu Ft. Payment includes materials and equipment necessary for construction of the concrete tank. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Tank can also be installed under an animal facility using slats. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Tank typically 8' deep, with a bottom area of 8470 SF, and a total storage volume of 67,760 cubic feet. Outside dimensions 9,216 sq ft (includes 3' footing and 8" wall). Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Scenario Feature Measure:** total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 67,760

**Scenario Cost:** \$75,693.57

**Scenario Cost/Unit:** \$1.12

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
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	\$3.64	3000	\$10,920.00
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	75	\$27,044.25
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	160	\$26,496.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	600	\$3,144.00
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	244	\$6,180.52
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6" wide. Includes materials, equipment and labor.	Foot	\$3.78	368	\$1,391.04
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76

**Practice: 313 - Waste Storage Facility**

**Scenario: #17 - Concrete Tank Open Top, 75,000 - 109,999 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing an open top concrete tank that has a total storage volume from 75,000 to 109,999 Cu Ft. Payment includes materials and equipment necessary for construction of the concrete tank. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Tank can also be installed under an animal facility using slats. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water.

Tank typically 8' deep, with a bottom area of 12,642 SF, and a storage capacity of 101,136 cubic feet. Outside dimensions 13,456 sq ft (includes 3' footing and 8" wall). Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Pipeline (516), Subsurface Drain (606), and Underground Outlet (620).

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 101,136

**Scenario Cost:** \$101,334.78

**Scenario Cost/Unit:** \$1.00

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	230	\$38,088.00
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	90	\$32,453.10
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	900	\$4,716.00
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	\$3.64	4300	\$15,652.00
<b>Materials</b>						
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6" wide. Includes materials, equipment and labor.	Foot	\$3.78	450	\$1,701.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	324	\$8,206.92

**Mobilization**

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76
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**Practice: 313 - Waste Storage Facility**

**Scenario: #18 - Concrete Tank Open Top, ≥110,000 Cu Ft Storage**

**Scenario Description:**

This scenario consists of installing an open top concrete tank that has a total storage volume of 110,000 Cu Ft or greater. Payment includes materials and equipment necessary for construction of the concrete tank. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Tank can also be installed under an animal facility using slats. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Payment includes all materials, equipment and labor to install a concrete tank and gravel for drainfill around the tank.

**Before Situation:**

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.  
 Tank typically 8' deep with a bottom area of 21,000 SF and a total storage volume of 168,000 CF. Outside dimensions 22,200 sq ft (includes 3' footing and 8" wall). Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate.

Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Pipeline (516), Subsurface Drain (606), and Underground Outlet (620).

**Scenario Feature Measure:** Total Storage Volume

**Scenario Unit:** Cubic Foot

**Scenario Typical Size:** 168,000

**Scenario Cost:** \$153,008.62

**Scenario Cost/Unit:** \$0.91

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	116	\$41,828.44
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	1660	\$8,698.40
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	370	\$61,272.00
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	\$3.64	7000	\$25,480.00
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	514	\$13,019.62
Waterstop, PVC, ribbed, 3/16" x 6"	1614	Waterstop, PVC, ribbed, 3/16" thick by 6" wide. Includes materials, equipment and labor.	Foot	\$3.78	580	\$2,192.40
<b>Mobilization</b>						

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76
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**Practice: 313 - Waste Storage Facility**

**Scenario: #19 - Composted Bedded Pack - Gravel Floor**

**Scenario Description:**

A composted bedded pack facility is constructed to store wastes as part of an agricultural waste management system. Payment includes materials and equipment necessary for construction of the floor and walls. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation.

**Before Situation:**

Operator presently has a confined animal feeding operation without 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:**

Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan.

Typical design: floor area 4,000 ft<sup>2</sup>, (40' X 100'); 4' concrete wall height, 3' footing depth with a geotextile and 6" gravel layer over an earthen floor; 20' openings on each end of structure.

Potential Associated Practices: Fence (382), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Obstruction Removal (500), and Roofs and Covers (367).

**Scenario Feature Measure:** Square Foot Floor Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 4,000

**Scenario Cost:** \$22,508.94

**Scenario Cost/Unit:** \$5.63

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
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	\$3.64	74	\$269.36
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.86	102	\$87.72
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	22	\$115.28
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.99	74	\$295.26
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.15	22	\$47.30
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.28	444	\$1,012.32
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	42	\$15,144.78
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	15	\$2,484.00

**Materials**

**Materials**

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$25.33	74	\$1,874.42
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**Mobilization**

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$71.49	2	\$142.98
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	4	\$1,035.52

**Practice: 313 - Waste Storage Facility**

**Scenario: #21 - Composted Bedded Pack, 5 inch Reinforced Concrete Floor**

**Scenario Description:**

A composted bedded pack facility is constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario is intended for situations where consistency of manure or geological conditions prohibits the use of earthen floors. Payment includes materials and equipment necessary for construction of the floor and walls. The walls may be constructed of concrete or wood as allowed by state policies and regulations. If a roof is to be included in the installation, refer to Practice Standard 367 - Roofs and Covers. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation.

**Before Situation:**

Operator presently has a confined animal feeding operation without 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:**

Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan.

Typical design: floor area 4,000 ft<sup>2</sup>, (40' X 100'); 4' concrete wall height, 3' footing depth with a 5" reinforced concrete floor; 20' openings on each end of structure. 5" reinforced concrete floor is the minimum requirement in Iowa.

Potential Associated Practices: Fence (382), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Obstruction Removal (500) and Roofs and Covers (367).

**Scenario Feature Measure:** Square Foot Floor Area

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 4,000

**Scenario Cost:** \$27,522.03

**Scenario Cost/Unit:** \$6.88

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.15	22	\$47.30
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	\$3.64	74	\$269.36
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	\$0.86	102	\$87.72
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.24	22	\$115.28
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.99	37	\$147.63
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$165.60	62	\$10,267.20
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$360.59	42	\$15,144.78
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$25.00	37	\$925.00

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$258.88	2	\$517.76
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