

Practice: 629 - Waste Treatment

Scenario: #1 - Phosphorus Reduction System

Scenario Description:

This practice scenario includes infrastructure to remove phosphorus from swine operation wastewater in watersheds with limited land for application and the phosphorus index is rated High or greater. The purpose of the practice is to address resource concerns related to water quality degradation (excess nutrients).

Associated practices: Nutrient Management (590), Waste Storage Facility (313), Irrigation Water Conveyance, Pipeline (430), Irrigation System, Spinkler (442), Irrigation System, Microirrigation (442)

Before Situation:

Untreated swine lagoon water is applied to fields in a watershed where the phosphorus index is rated High or greater.

After Situation:

This scenario assumes that swine wastewater is treated with a phosphorus reduction system. The precipitated phosphorus, in the form of struvite, can be collected and sold to commercial fertilizer producers. The treated wastewater may be able to be agronomically applied at higher application rates and/or on fewer acres. This system has been shown to decrease movement of phosphorus particles into waterways.

Scenario Feature Measure: gallons per minute treated

Scenario Unit: Gallon Per Minute

Scenario Typical Size: 600

Scenario Cost: \$378,307.70

Scenario Cost/Unit: \$630.51

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$92.63	133.2	\$12,338.32
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$29.26	907.5	\$26,553.45
Materials						
Struvite extraction system	1865	Struvite extraction system (magnesium ammonium phosphate) Phred components including fabricated parts, off the shelf parts, and installation materials.	Each	#####	1	\$331,242.45
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	\$508.22	1	\$508.22
Mobilization, Material, distance > 50 miles	1043	Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price.	Dollar	\$1.03	7442	\$7,665.26

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Scenario: #2 - Pathogen Removal System

Scenario Description:

This practice scenario includes a reclamation system to treat and recycle water collected from the overflow of livestock watering facilities. The associated pipelines, collection manholes, pumping plants, and other items are covered by other conservation practices. The portion of the system covered by this scenario includes sand media filters, a pathogen removal system (such as an ultraviolet light treatment unit, chlorination, or ozone system), and a small building to house the treatment facility. The complete system collects overflows from multiple feedlot watering facilities (where overflow is used to prevent winter freeze-up), filters and disinfects the water to a quality suitable for livestock consumption, and then conveys the treated water back into the livestock water supply system.

Associated practices: Nutrient Management (590), Waste Storage Facility (313), Livestock Pipeline (516), Irrigation Pipeline (430), Sprinkler System (442), Pumping Plant (533), Structure for Water Control (587), Waste Recycling (633), Waste Transfer 634)

Before Situation:

Overflow water picks up excessive nutrients and organics from ground surface contaminants, and results in a substantial loss of water available for livestock consumption. Overflow water is discharged into the waste stream collected by a waste storage pond, increasing the storage and waste utilization requirements.

After Situation:

Overflow water is disinfected to a quality suitable for livestock consumption, and is conveyed back into the livestock water supply system. This decreases the volume of process-generated wastewater that is discharged into the waste storage pond system. This increases the effective storage capacity and service life of the waste storage ponds and facilitates nutrient management by decreasing the amount of wastewater that must be applied to agricultural land. Implementation also provides a water conservation benefit.

Scenario Feature Measure: Design flow rate

Scenario Unit: Gallon per Minute

Scenario Typical Size: 300

Scenario Cost: \$26,966.54

Scenario Cost/Unit: \$89.89

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$69.96	8	\$559.68
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	\$173.70	4	\$694.80
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	\$25.79	8	\$206.32
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	\$18.71	24	\$449.04
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$29.26	24	\$702.24
Materials						
Pathogen Removal System	2547	Pathogen removal system for wastewater, using ultraviolet light, chlorination, ozone, or similar treatment, with a capacity up to 0.5 MGD. Includes materials and shipping only.	Each	\$11,841.00	1	\$11,841.00
Micro Irrigation, media filter	1482	Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station.	Each	\$4,939.89	2	\$9,879.78

Materials

Post Frame Building, enclosed 4 sides	1046	Enclosed post frame building, four walls. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, and labor only.	Square Foot	\$9.47	250	\$2,367.50
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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	\$266.18	1	\$266.18
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